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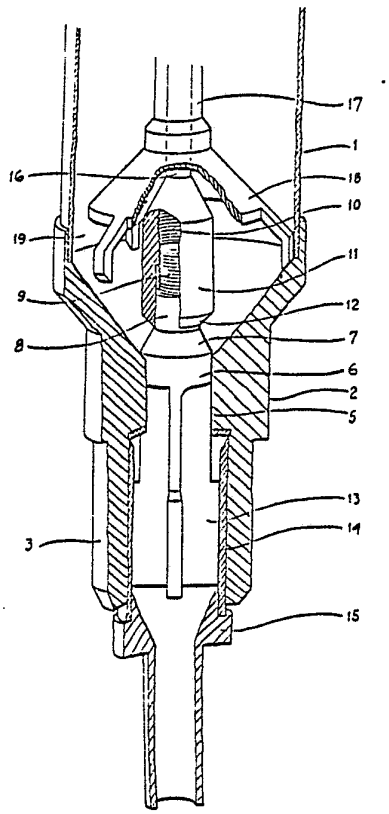
(54) Title: MEANS FOR DOSING A PREDETERMINED QUANTITY OF POWDER OR GRANULAR MATERIAL

(57) Abstract

The invention is intended to collect a predetermined quantity of powder or granular material from a store (1). This is achieved with the aid of a store (1) and a discharge means (3) arranged one above the other and connected by an aperture (5) for a cylinder (6 and 11) having a circumferal groove (7, 8 and 12), which cylinder (6 and 11), when displaced in the aperture (5), carries with it material from the store (1) to the discharge means (3).



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Means for dosing a predetermined quantity of powder or granular material

The present invention relates to a means for dosing a predetermined quantity of powder or granular material. A desire exists to transfer a predetermined quantity of material from a store for powder or granular material to a container or conveyor belt immediately below the store. It must also be possible to set the predetermined quantity.

The object of the present invention is to fulfil the above-mentioned desired and this is achieved by arranging an aperture or pipe for a cylinder with an adjustable circumferal groove, between a store and a discharge means located one immediately above the other. The cylinder is movable in said aperture between the two spaces in such a way that in one position the circumferal groove is in the store and in a second position it is in the discharge means. Said aperture has only sufficient room for said cylinder.

At the upper end of said aperture the store may be provided with a control means so that the material in the store flows at an angle towards said cylinder. The discharge means cooperates with a container movable between the discharge means and a discharge station where it is emptied into a container.

This emptying is preferably via a mixer arranged symmetrically in relation to the container and being identical in appearance to the container opening except that its dimension is smaller than the actual opening of the container. This avoids spilling outside the opening of the container.

Further features of the present invention are revealed in the following claims.

The present invention will be described more fully with reference to the accompanying drawings, in which

Figure 1 shows equipment comprising a store, a means according to the invention, a discharge means and a conveyor belt,

Figure 2 shows a means according to the present invention with part of a store and with the discharge means,

Figure 3 shows the equipment according to Figure 1 but with the conveyor belt replaced by a truck with a container, said truck carrying the container to a discharge station,

Figure 4 shows the truck according to Figure 3 with the container in position for receiving material,

Figure 5 shows the truck at the discharge station, with the container on its way out of the discharge position, together with a container to receive the material, and a mixer, and

Figs.6-7 show the transport container in receiving position and in discharge position, together with the turning mechanism.

In the drawings, 1 is a store and below the store is a dosing means, followed in turn by a discharge means opening to a conveyor belt 4. The dosing means, described in more detail in Figure 2, has an aperture 5. The aperture 5 cooperates with a cylinder consisting of a lower part 6 and an upper part 11. The cylindrical part 6 is bevelled at the top, has a conical portion and then a cylindrical part 8 with smaller diameter than the lower part. The cylindrical part 8 continues into a threaded part 9 which screws into a hole 10, also threaded, and arranged in the upper part 11 of the cylinder. The upper part 11 is conically bevelled at the bottom, and this bevelled part is designated 12. The bevelled sections 7 and 12 and the cylindrical part 8 together provide a circumferal groove, the size of which is adjustable since the two parts 6 and 11 of the cylinder are axially displaceable in relation to each other due to their screw threads. Naturally, the axial displacement between the cylindrical parts 6 and 11 may be achieved by any other suitable means desired. Above the aperture 5 is the lower part of the store 1. This lower part is first purely cylindrical and then becomes conical. Above the cone is a control means for the material flow towards the cylinder 6,11. The control means consists of a

conical hood 18 provided with openings 19 at its periphery. The hood is connected at the top to a pipe 17 through which leads an operating rod 16, connected to the cylinder 6 and 11. The lower end of the cylinder 6 and 11 is provided with guide blades 13 joined to a tube 14. The tube 14 is in turn joined at the lower end to a discharge tube 15. When the cylinder 6,11 is displaced, the tube 14 and discharge tube 15 are also displaced.

The dosing means described above functions as follows. First the width of the circumferal groove 7, 8 and 12 is set by turning the two cylindrical parts 6 and 11 in relation to each other. The dosing quantity is determined by the width of this groove. The cylinder 6,11 is moved by an operating rod to the position shown in Fig.2. If the store is filled with material, this will be supplied through the openings 19 from the side to the circumferal groove. The material supplied to the groove is not subjected to the full pressure of the material in the store, thanks to the protective conical hood 18. If the operating rod 16 is moved down, the circumferal groove 7, 8 and 12 will arrive in the aperture 5. There is thus a limited quantity of material in the groove. Once the groove arrives on the other side of the aperture 5, the material will be transferred to the discharge means and the discharge tube 15. The desired quantity then arrives on the conveyor belt 4.

The conveyor belt may be replaced by a unit 20 moved by a chain 21 or other linear transport means between a discharge station on the left and the discharge means 3. The container 23 is provided at the side with a toothed wheel 25 cooperating with a rack 26. The container 23 can be forced into a receiving position by the toothed wheel 25 and rack 26, as shown in Figs.4 and 6 or into a discharge position as shown in Figs.5 and 7, where the axis of the discharge aperture is quite vertical. A receiving unit such as a container 22, or a mould, is provided at the discharge station. When the material is emptied from the container 23 it passes a mixer 24, as is clearly shown in Fig.5. The opening of the mixer has the same appearance as that of the container 22. The dimension of the mixer opening is slightly less than that of the container opening in order to prevent spilling outside the container 22.

The powder in the container 23 is below the centre of rotation. This means that when transferred from horizontal transport to rotation, it will not change position because of the centrifugal force and retardation force.

It should be evident that the container 23 with mixer can be used for applications other than that described above.

CLAIMS

1. Means for dosing a predetermined quantity of powder or granular material, characterised by a vertically movable rod (6 and 11) or cylinder having a circumferal groove (7, 8 and 12), the size of which is preferably adjustable, said rod or cylinder (6 and 11) being displaceable in an aperture (5), the length of which is greater than the width of the circumferal groove (7, 8 and 12) and a width only sufficient for the rod or cylinder (6 and 11), in such a manner that the circumferal groove (7, 8 and 12) is exposed on each side of the aperture, by a storage space or connection (1) to a storage space at the upper end of the aperture (5) and by a discharge means (3) at the lower end of the aperture (5).

2. Means according to claim 1, characterised in that the rod or cylinder (6 and 11) comprises two parts, axially displaceable in relation to each other by means of a screw thread, for instance.

3. Means according to claim 1, characterised in that the space (1) above the aperture (5) is provided with a control means (18 and 19) in the form of a cone, so that the material is caused to flow towards and rod or cylinder (6 and 11) at an angle.

4. Means according to claim 1, characterised in that the discharge means (3) is in communication with a conveyor belt (4) or with a movable container (23).

5. Means according to claim 4, characterised in that the container (23) is moved to and from a discharge station.

6. Means according to claim 5, characterised in that the container (23) is spherical in shape.

7. Means according to claim 5, characterised in that a mixer (24) is arranged between the container (23) and the unit (22) which is to

receive the material in the container (23), said mixer (24) being placed symmetrically in relation to the opening of the unit (22) and has the same shaped opening as the unit (22), but on a smaller scale.

FIG. 1

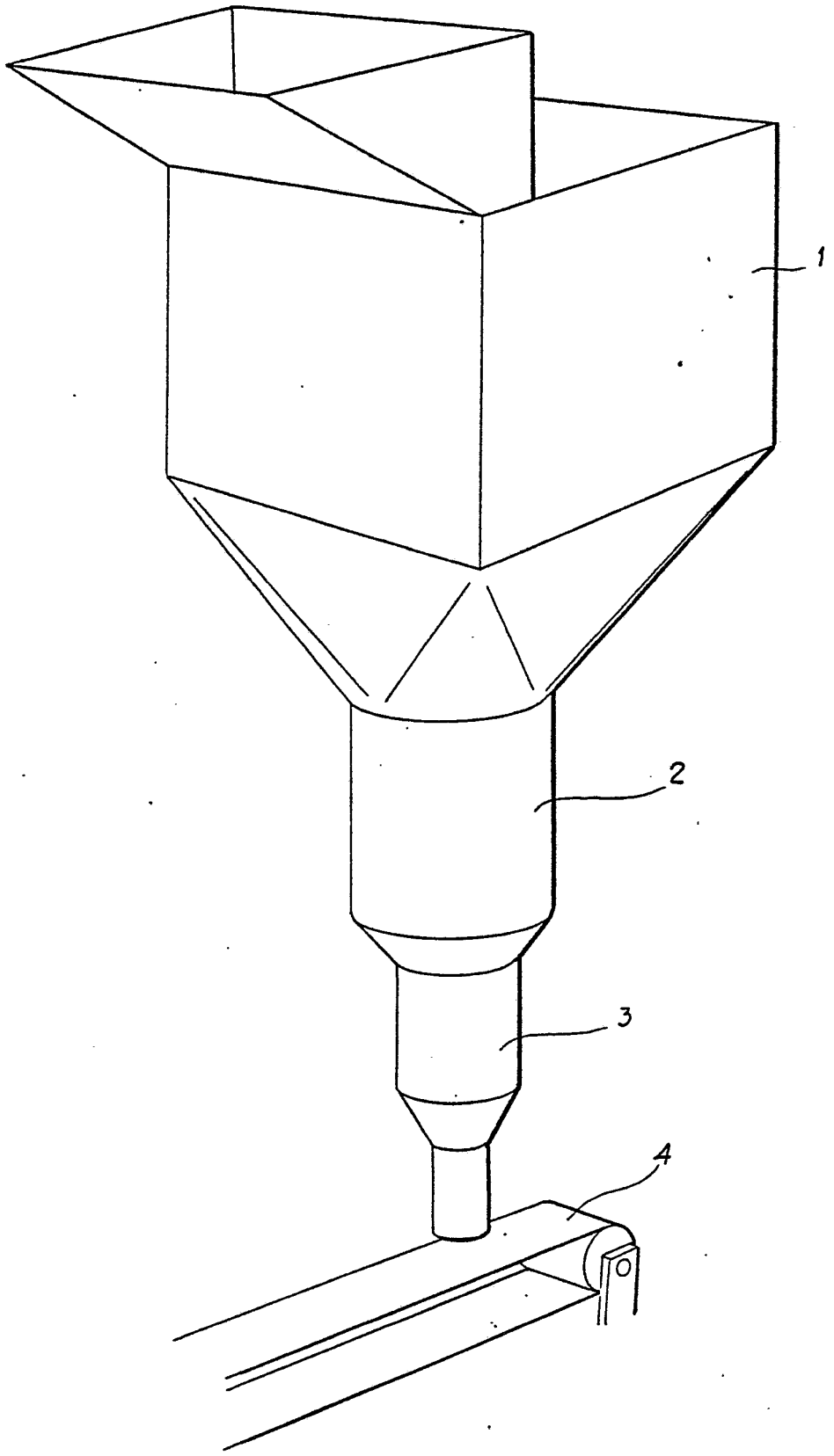
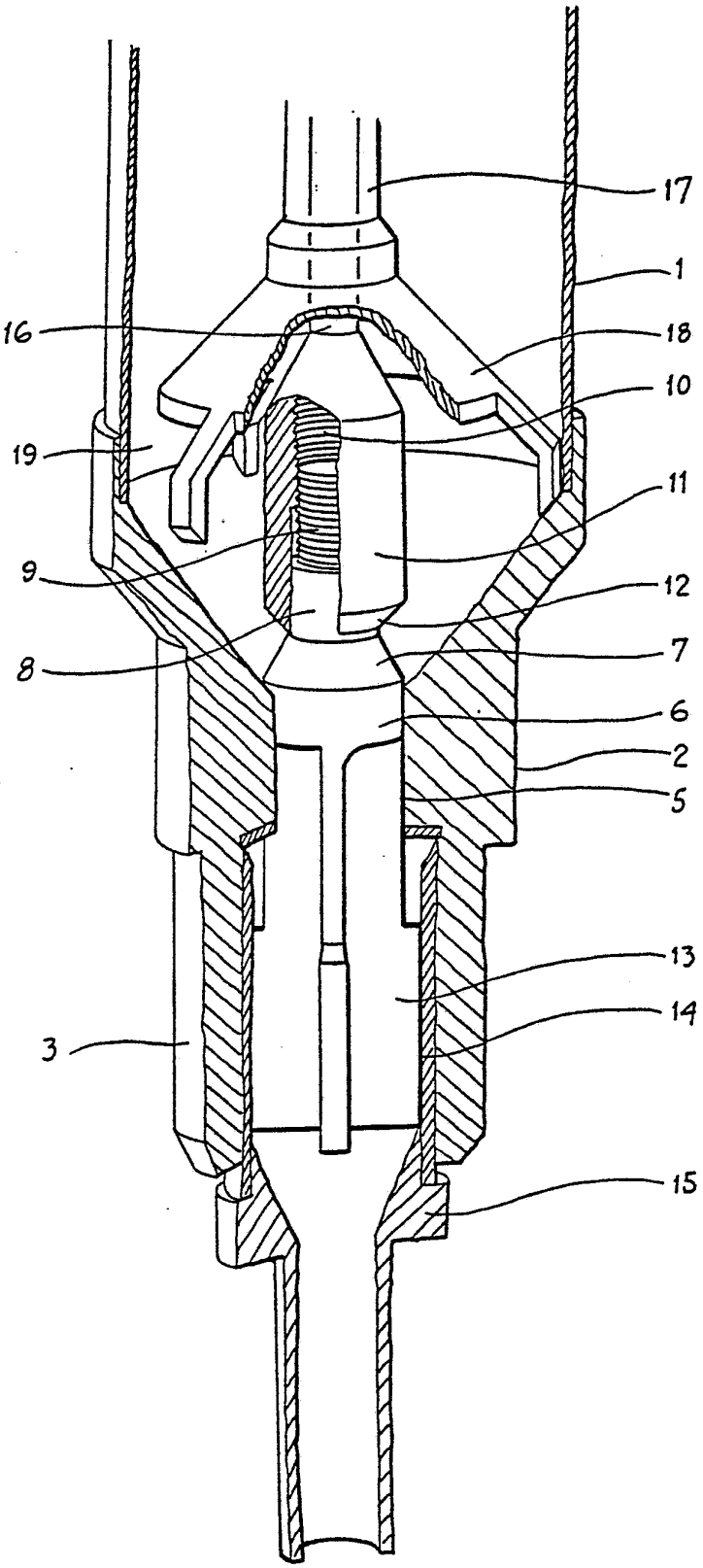


FIG. 2



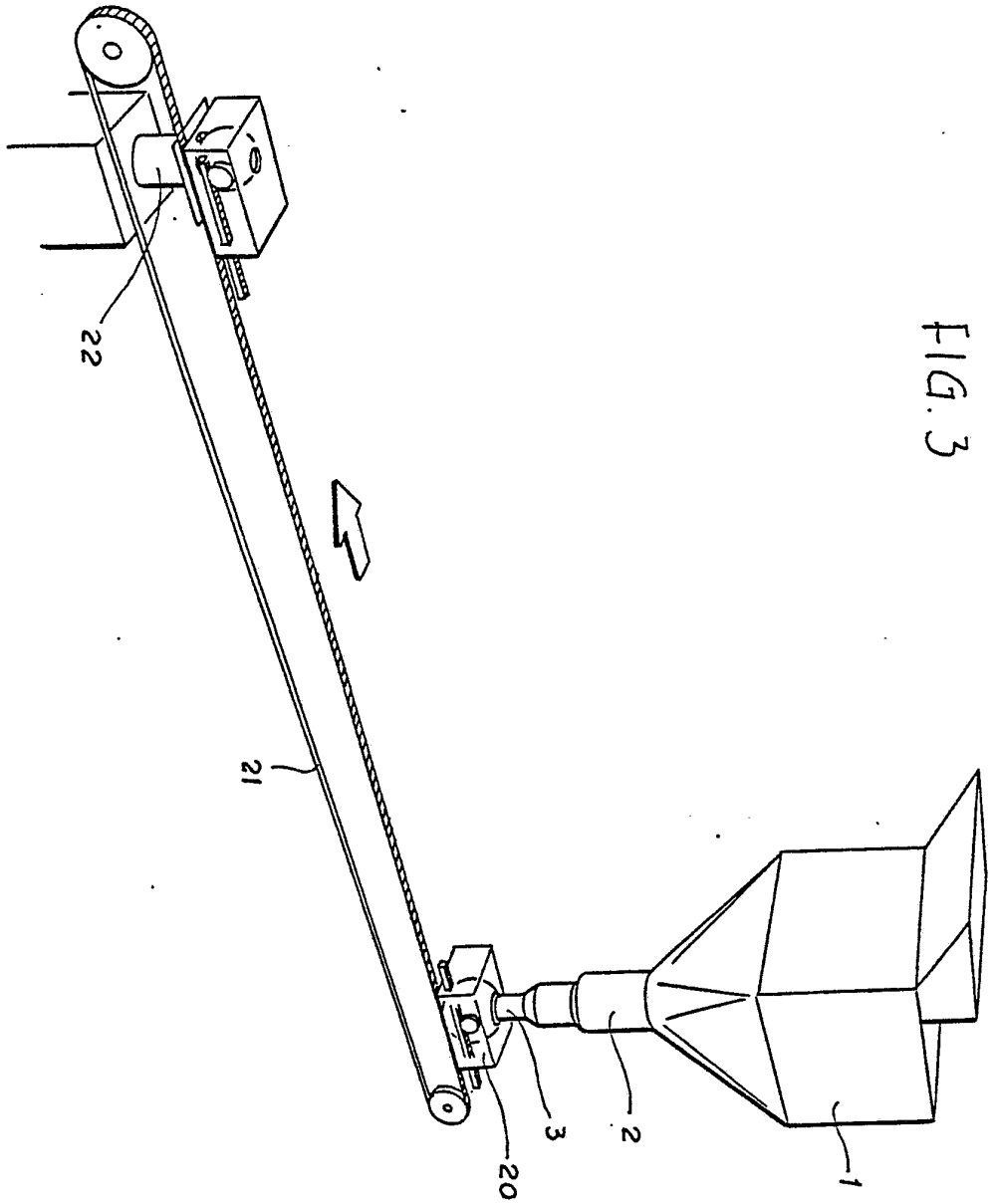


FIG. 3

FIG. 4

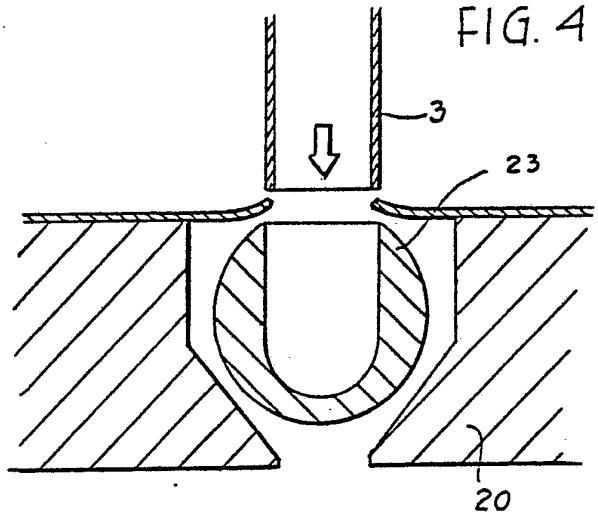


FIG. 5

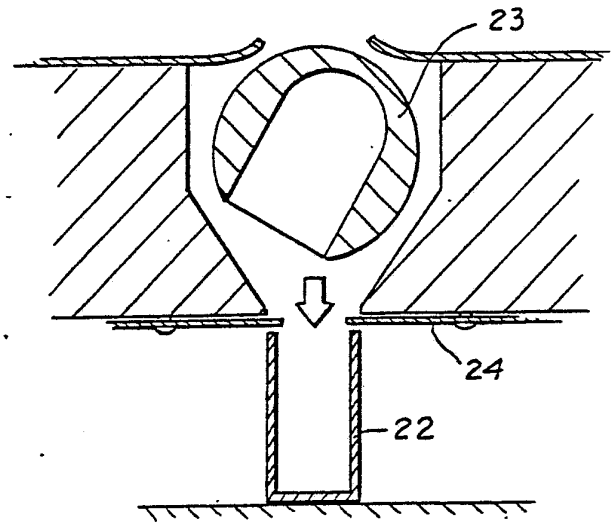


FIG. 6

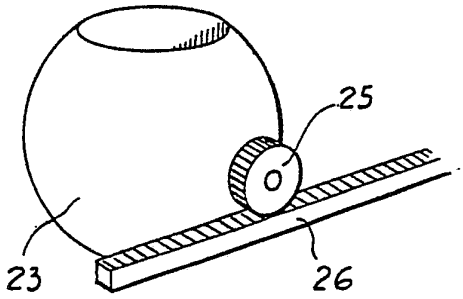
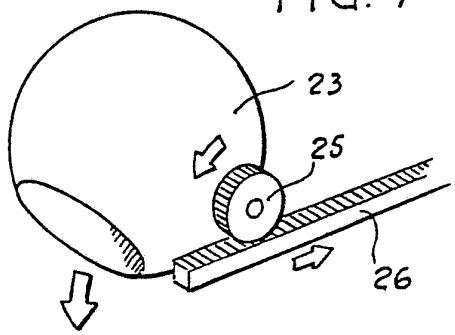


FIG. 7



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE83/00010

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC 3

B 65 B 1/38, 37/00

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC 3	B 65 B: 1/04, 30, 36, 38, 3/26, 30, 32, 37/00, 16, 20 G 01 F 11/10, 24, B 65 D 83/06
National Cl	81a:5/01 .../...

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [5]

SE, NO, DK, FI classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
X	US, A , 2 122 216 (SEAWELL J M) 28 June 1938	1-3
X	DE, A1, 3 043 520 (REXHAM CORP) 11 June 1981	4-6

* Special categories of cited documents: [15]

"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

"L" 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 [2]	Date of Mailing of this International Search Report [2]
1983-03-29	1983 -04- 11
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Swedish Patent Office	Leif Hagström

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

US Cl	141:86-88, 250-251, 258-261, 275-276; 222:73, 216, 217, 282-285, 305, 307-308, 509, 522-525	

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [10]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers ..... because they relate to subject matter [12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers....., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [13], specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [11]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.