(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 093 473**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **83200606.8**

(22) Date of filing: **28.04.83**

(51) Int. Cl.³: **B 28 C 7/04**
B 28 C 7/10, B 28 C 7/16
B 28 C 5/46, B 28 C 7/00

(30) Priority: **30.04.82 BE 1010502**

(43) Date of publication of application:
09.11.83 Bulletin 83/45

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

(71) Applicant: **Janssen, Wilhelmus Gerardus Elisabeth**
Ubroekweg 39-41
NL-5928 NM Venlo-Blerick (L)(NL)

(71) Applicant: **Janssen, Hervé Johannes Wilhelmus**
Ubroekweg 39-41
NL-5928 NM Venlo-Blerick (L)(NL)

(72) Inventor: **Janssen, Wilhelmus Gerardus Elisabeth**
Ubroekweg 39-41
NL-5928 NM Venlo-Blerick (L)(NL)

(72) Inventor: **Janssen, Hervé Johannes Wilhelmus**
Ubroekweg 39-41
NL-5928 NM Venlo-Blerick (L)(NL)

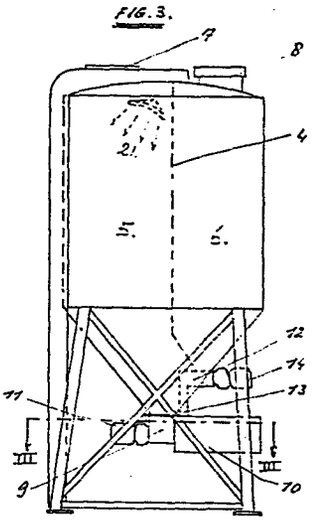
(74) Representative: **de Boer, Hindrik Geert Jan**
de Boer & Wigman P.O. Box 5265 De Lairessestraat 131-135
NL-1007 AG Amsterdam(NL)

(54) Process and apparatus for the preparation of mortars.

(57) A process and apparatus for the preparation of mortar from an aggregate and a binder is disclosed which comprises the use of a silo provided with at least one partition so as to create in the silo two or more compartments for the separate storage of the aggregate and the binder, the compartments being provided with conveyor screws, the speeds of which can be adjusted to control the volumetric flow of the components to a mixing chamber. A metering valve for water may also be connected to the mixing chamber. The silo compartment for the aggregate may be provided with a heating element to safeguard the mechanically operated slide valve against freezing. The conveyor screw in the outlet for the binder may be provided with a cam and a plunger rod with transverse projections to prevent arching in the compartment for the storage of the binder.

The apparatus may be mounted on a truck to facilitate transport to the building site.

FIG. 3.



EP 0 093 473 A2

HdB/MLD/60.90.488

JANSSEN, Wilhelmus Gerardus Elisabeth and
JANSSEN, Hervé Johannes Wilhelmus

Process and Apparatus for the Preparation of Mortars

The invention relates to a process and apparatus for the preparation of mortar, such as jointing mortar.

It is known that ready-made mortars can be prepared in a mortar plant where the aggregate, binding agents and water are weighed out for a definite batch and then conducted to a mixing chamber. The product is referred to as wet mortar to which a retarder can be added in order to keep the mortar workable for a longer period. The wet mortar is conveyed to the building site by trucks having rotating (mixing) drums mounted on them.

It is also known that dried and premixed mortars can be prepared in a special drying and mixing plant, whereupon the dry mortars are transported to the building site by bulk lorry. At the building site the dry mortar is dumped into a storage bunker positioned over a mixing device for mixing the dry mortar with water so as to obtain a workable mortar.

The known processes and apparatus have the following drawbacks:

- The aggregate must be predried in order to obviate partial hardening with the previously mixed binding agent, a rather costly step in view of the expenditure of energy.

- As the aggregate is not completely dry in actual practice, the dry mortar has only limited keeping qualities.

- The completely weighed-out batch from the storage bunkers must invariably be mixed with water, which leads to waste of mortar not needed for immediate use.

The object of the present invention is to provide an improved process and apparatus of the type described hereinbefore. To this end, the process is designed such that a silo located on a storage yard or in a storage space for aggregate and binding agents is filled in such a fashion that the aggregate and the binder are contained in separate compartments within one silo which is then conveyed to the building site where the volumetric flows of aggregate and binder are mutually adjusted, whereupon the aggregate and the binder are mixed together with addition of water, yielding the mortar ready for use at the building site.

The new process with associated apparatus has the following advantages:

- The aggregate need not be predried.
- The composition of the mix is not attained by weighing, which obviates the use of fairly expensive weighing equipment.
- At the building site the quantities of mortar needed for immediate use can at all times be mixed.
- The volumetric flows can be mutually adjusted by very simple means, and the set value can be maintained effectively.
- There is no need for dosing auxiliary substances such as retarder and air-entraining agents, hence no risk of adding too large doses of retarder and air-entraining agents.

For the application of the new process, it is preferred to use a silo which is provided at the bottom with a funnel-shaped section and which has been mounted on an undercarriage such that the silo can stand upright, the said silo according to the invention having at least one partition for the separate storage of the aggregate and the binder in individual compartments, each of which has one outlet, of which the outlet for the aggregate is provided with a conveyor screw, whilst the outlet for the binding agent has another conveyor screw, in such a way that the two conveyor screws discharge into a mixing chamber and that the speeds of the conveyor screws for the binder and for the aggregate are adjustable relative to one another.

The said mixing chamber may be provided with a metering valve for water discharging into it. Furthermore, the silo may be designed such that it can, with fittings and accessories, be loaded on a truck and conveyed as a container.

The advantage of this design are that it permits

- a compact storage with a volumetric adjustment of the amounts of aggregate and binder;
- a simple metering of water;
- efficient transport of the silo to the building site with the aid of special container trucks.

In addition, the outlet for the aggregate may be provided with a mechanically operated slide, safeguarded against freezing fast by heating, with a further heating element mounted high up in the silo compartment for the aggregate, so that in the event of slight night frost jamming of the slide and clogging together of the aggregate can quickly be undone through heating.

Moreover, in order to prevent any arching in the binder, the shaft of the conveyor screw for the binder has been proveded with a cam against which a plunger rod rests; this rod terminates in the binder compartment and carries transverse projections.

To elucidate the invention, an embodiment will be described by way of example, with reference to the attached drawings, where :

Figure 1 shows a top view of a silo;

Figure 2 shows a front view of the silo;

Figure 3 shows a lateral view of the silo;

Figure 4 presents a detailed view of two conveyor screws and a mixing chamber, drawn to a larger scale that in Figure 3;

Figure 5 presents a detailed top view, also drawn to a larger scale, of the conveyor screw for the aggregate and the mixing chamber following the section at III-III in Figure 3; and

Figure 6 is a lateral view of the mixing chamber.

The apparatus comprises a silo 1 with a funnel-shaped section 2 which is provided with an undercarriage 3. The silo is divided by means of a partition 4 into the compartments 5 and 6. Compartment 5 has a filling hole 7 for the aggregate and compartment 6 a filling hole 8 for the binder. At the bottom of the funnel-shaped section 2 there is a conveyor screw 9 with a mixing chamber 10, the said conveyor screw 9 being driven by an electric motor 11 at a constant speed of rotation. At the bottom of compartment 6 a second conveyor screw 12 is mounted which communicates through a transfer line 13 with the mixing chamber 10. The conveyor screw 12 is driven by an electric motor 14 with infinitely variable speed regulator. The mixing chamber 10 is provided with a branch 15 which has a metering valve for the supply of water.

Mortar of the desired composition is prepared in the following way. From compartment 5, aggregate passes onto the conveyor screw 9 which transports the aggregate at a constant speed to the mixing chamber 10. At the same time, the binder is led from compartment 6 to the second conveyor screw 12 which transports the binder also to the mixing chamber 10 through line 13. The conveying speed of the conveyor screw 12 can be selected at will with the aid of the infinitely variable speed regulator of the electric motor 14. The magnitude of the adjusted speed at which the second conveyor screw 12 is driven should be determined experimentally in such a fashion that the desired mixing ratio of aggregate to binder for the jointing or concrete mortar is obtained. The speed of the conveyor screw 9 and the mixer in mixing chamber 10, however, remains constant at all times.

Mortar can be prepared in the way outlined above by a continuous process. Dosing of the aggregate and the binder can be effected without valves. In consequence, the two conveyor screws 9 and 12 fulfil the dual function of dosing and conveying.

The outlet at the bottom of the aggregate compartment can be closed with a slide 20 in order to permit the mixing chamber to be emptied. After slide 20 has been closed and the supply of binder stopped, the mixing chamber 10 is emptied and flushed clean with water.

To permit operation of slide 20 in frosty weather, an electric heating cable has been mounted near the supporting edge of the slide. In addition, a heating element 21 is provided high up in the aggregate compartment so as to eliminate or prevent any clogging together of the aggregate.

Arching in the binder compartment is obviated by the provision of a plunger rod 16 with transverse projections 17 moving up and down in the said compartment. Up and down movement of the rod 16 is brought about by means of cam 18.

CLAIMS

1. A process for the preparation of mortar, such as jointing mortar, characterized in that a silo located on a storage yard or in a storage space for aggregate and binders is filled in such a way that the aggregate and the binder are contained in separate compartments within one silo, which is then conveyed to the building site where the volumetric flows of aggregate and binder are mutually adjusted, whereupon the aggregate and the binder are mixed together with addition of water, yielding the mortar ready for use at the building site.

2. Apparatus for conducting the process according to claim 1, comprising a silo which is provided at the bottom with a funnel-shaped section and which has been mounted on an undercarriage such that the silo can stand upright, characterized in that the silo has at least one partition for the separate storage of aggregate and binder in individual compartments, each compartment having one outlet, of which the outlet for the aggregate is provided with a conveyor screw, whilst the outlet of the binder compartment is provided with another conveyor screw, in such a way that the two conveyor screws discharge into a mixing chamber and that the speeds of the conveyor screws for the binder and the aggregate are adjustable to one another.

3. Apparatus according to claim 2, characterized in that provision is made for a valve metering water into the mixing chamber.

4. Apparatus according to claim 2, characterized in the apparatus consisting of a silo with fittings and accessories can be loaded on a truck and transported as a container.

5. Apparatus according to claim 2, characterized in that the outlet for the aggregate is provided with a mechanically operated slide, safeguarded against freezing fast by heating.

6. Apparatus according to claim 2, characterized in that a heating element is mounted high up in the silo compartment for the aggregate.

7. Apparatus according to claim 2, characterized in that the shaft of the conveyor screw for the binder carries a cam against which a plunger rod rests, which rod terminates in the binder compartment and is provided with transverse projections.

0093473

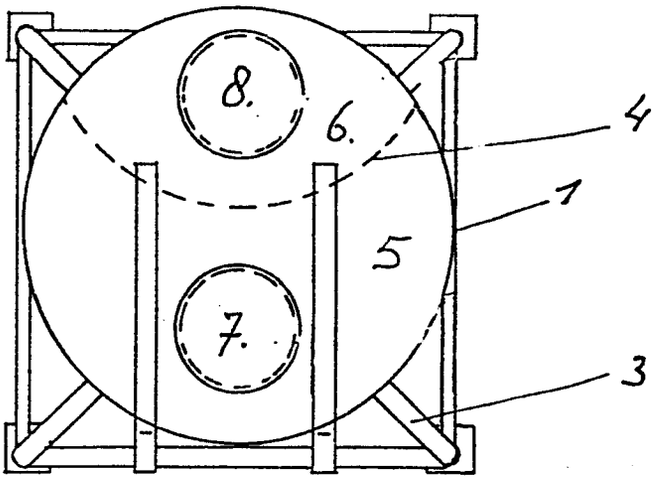


FIG. 1.

FIG. 2.

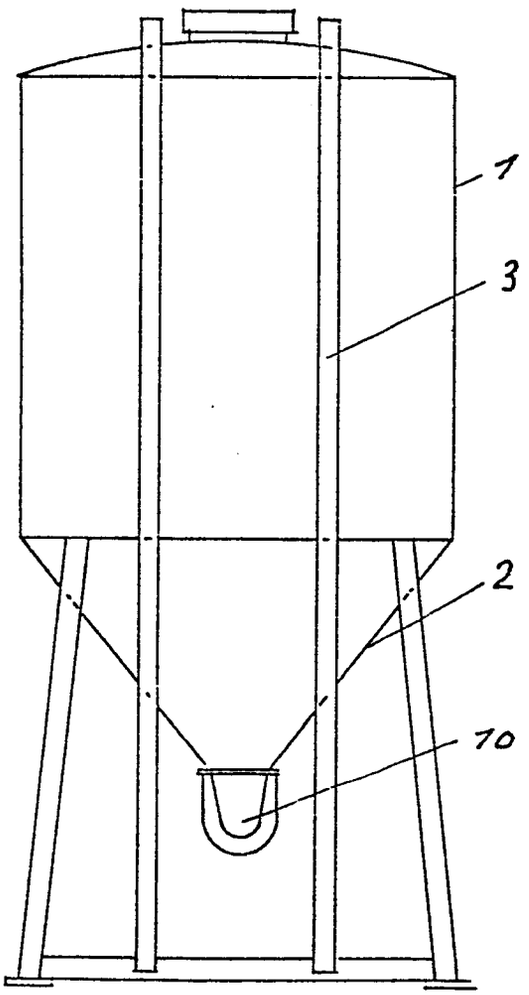
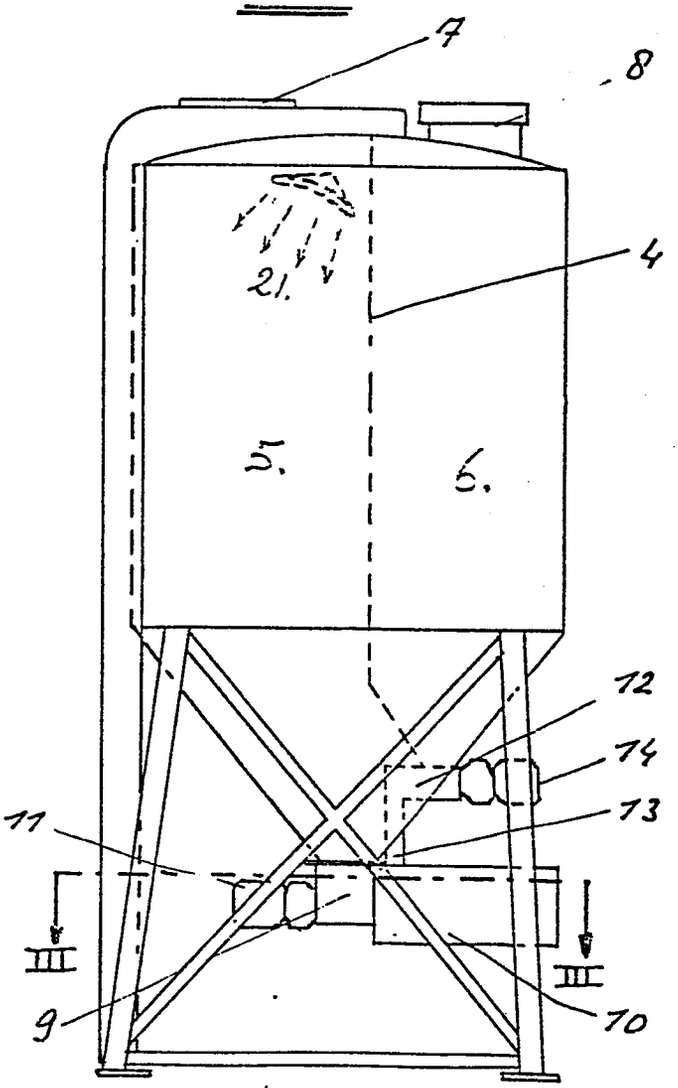


FIG. 3.



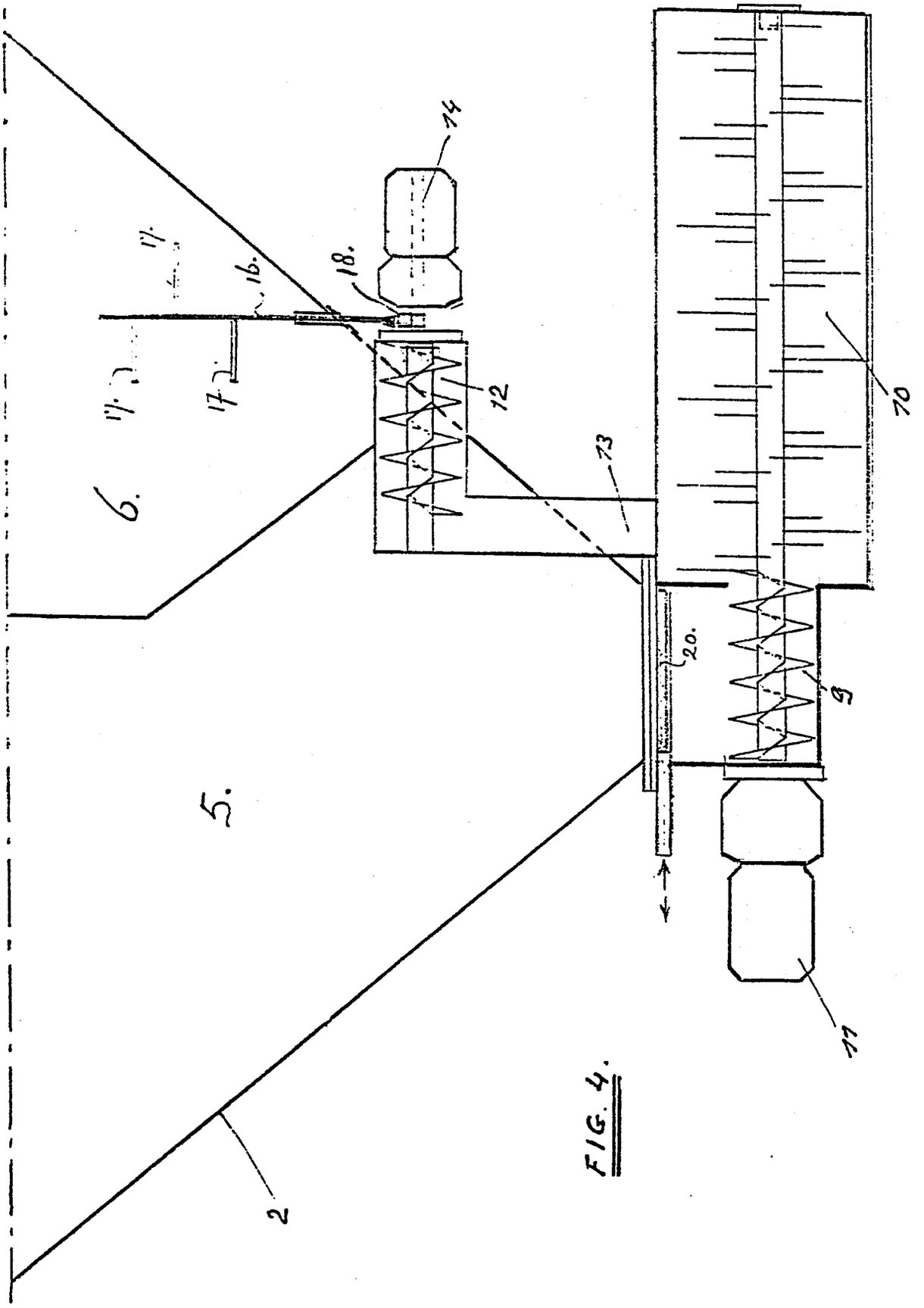


FIG. 4.

0093473

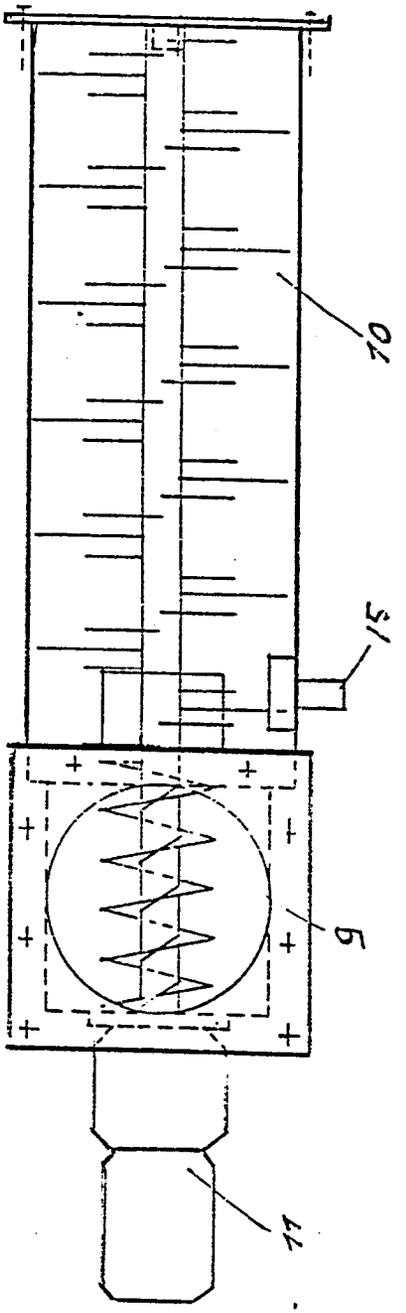


FIG. 5.

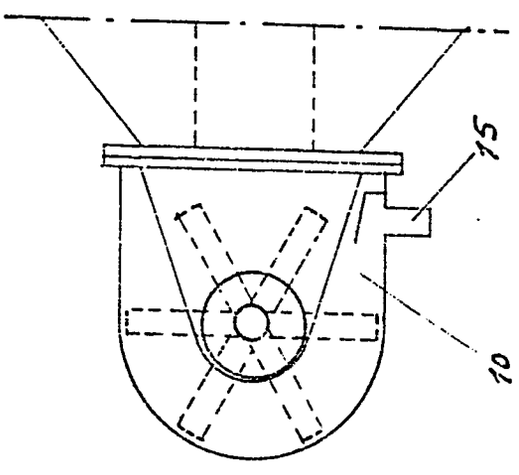


FIG. 6.