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(54) **Batching and flowing system for powders in silos**

(57) A batching and flowing system (1) is disclosed for powdery products stored in silos, comprising: a support body (8); one main motored shaft (5); one connecting rod (9) connected to the main shaft (5); one crank (11) connected to the connecting rod (9); and at least one net (13) operatively connected to the crank (11) in order to move when it is driven by the mechanism composed of shaft (5) - connecting rod (9) - crank (11) to detach the powdery products from the silos walls.

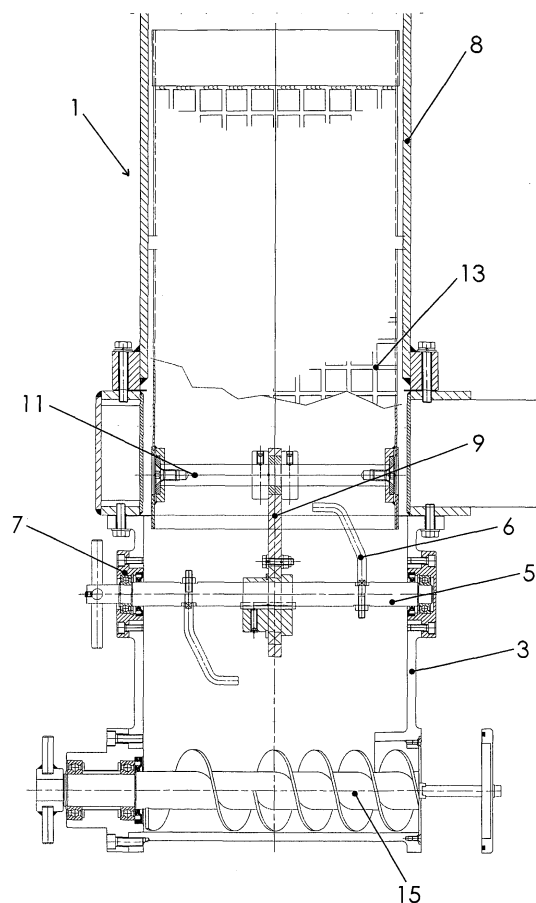


Fig. 1

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Description

[0001] The present invention refers to a system that allows batching and makes the flowing easier for any type of powdery products stored in silos.

[0002] The powdery products stored in silos sometimes do not descend towards the supplying Archimedean screws, because they create "bridges" above such Archimedean screws that prevent a correct batching of the product when its supply is needed. In order to solve the problem of descending powdery products towards the supplying hoppers, some systems (for example the one disclosed in document CH-A-674348) are known in the art, and are equipped with vibrators that agitate the powder in the silo making it fall downwards.

[0003] These systems, however, have cost and manufacturing problems, because they require additional parts, and above all they adopt complex solutions such as the vibrators, eventually coupled with other linkages, that, though making the powdery products descend, are noisy and often difficult to be installed in silos with reduced sizes; they also imply installation problems because they require the presence of electric wires or air pipes.

[0004] Object of the present invention is solving the above prior-art problems, by providing a system that can be easily manufactured and immediately assembled on the silos, that allows breaking the bridges created by the powdery product above the supplying Archimedean screw, in addition to any point in the silo, providing a correct product batching for any type of stored powder.

[0005] A further object of the present invention is providing a system of the above-mentioned type that simultaneously allows scraping the silos walls to remove therefrom possible parts of the product that remained attached thereto.

[0006] A further object of the present invention is providing a system of the above-mentioned type that allows speeding up the batching: in fact, the system of the invention always keeps the supplying Archimedean screw full and consequently allows fully exploiting its pitch. The system also allows speeding up the supply of the products descending from the silo.

[0007] The above and other objects and advantages of the invention, as will appear from the following description, are obtained by a system as claimed in Claim 1. Preferred embodiments and non-trivial variations of the present invention are claimed in the dependent Claims.

[0008] The present invention will be better described by some preferred embodiments thereof, given as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 is a side sectional view of an embodiment of the system according to the present invention;
- Figure 2 is a perspective view of part of the system in Fig. 1; and

- Figure 3 is a view from another perspective of part of the system in Fig. 1.

[0009] With reference to the Figures, a preferred embodiment of the system of the present invention is shown and described. It will be immediately obvious to the skilled people in the art that numerous variations and modifications (for example related to shape, sizes and parts with equivalent functionalities) could be made to the described system without departing from the scope of the invention as claimed in the enclosed Claims.

[0010] The system 1 for batching and facilitating a flowing for powders in silos of the present invention is adapted to be placed on the part of the silo in which the silo itself narrows, in order to break the bridges of powdery products stored therein; moreover, another function of its is breaking the powdery suspension halfway in the silos, that are typically stiff. In this way, it is able to detach the powder from the silos walls and to fill-in the supplying hopper 3 without any help from any other traditionally-used device, such as the vibrators.

[0011] The system 1 substantially comprises:

- a support body 8;
- at least one main motored shaft 5 rotatably connected to the support body 8 and to a hopper 3 for supplying the products from the silos (in a known way, the hopper 3 contains an Archimedean screw 15 that facilitates the products supply);
- at least one connecting rod 9 connected at one of its ends to the main shaft 5;
- at least one crank 11 to which such connecting rod 9 is connected at another one of its ends; and
- at least one net 13 housed inside the support body 8 and operatively connected to the crank 11 in order to move when it is driven by the mechanism composed of shaft 5
- connecting rod 9 - crank 11 to detach the powdery products from the silos walls.

[0012] The system 1 is operatively placed upstream of the Archimedean screw 15 for supplying the powdery products with respect to the advancement direction of the products going out of the silos. The placement is preferably performed, as can be seen from the Figures, in a vertical arrangement to favour the powdery products fall by gravity.

[0013] For an optimum operation, the net 13 is composed of a cylindrical body equipped with wide meshes, is preferably made of steel, and performs a movement for about 1.5 cm that allows it to detach the powdery products from the silos walls.

[0014] In order to complete the functionalities of the system 1 of the invention, the main shaft 5 is further equipped with at least one shaped rod 6, preferably made of steel, to scrape the hopper 3 from possible powdery products remained attached to its walls.

[0015] The shaped rods 6 are two and have a partic-

ular shape (as can be seen in Figures 2 and 3) adapted to best realise their scraping function, and are placed in a mutually opposed operating position in order to perform a continuous scraping of the hopper 3.

[0016] Still more, the main shaft 5 is connected to the hooper 3 by at least one shielded bearing 7, and is motored through a dedicated motor (not shown).

[0017] Alternatively, the main shaft 5 is motored through transmissions (not shown).

[0018] With the system 1 of the present invention, thereby, it is possible to make all types of powdery products (also those that were not previously affected by known vibrators) descend towards the supplying Archimedean screw 15, and further the batching process for such powders is extremely speeded-up.

Claims

1. Batching and flowing system (1) for powdery products stored in silos, **characterised in that** it comprises:

- a support body (8);
- at least one main motored shaft (5) rotatingly connected to said support body (8) and to a hopper (3) for supplying the products from the silos;
- at least one connecting rod (9) connected at one of its ends to said main shaft (5);
- at least one crank (11) to which said connecting rod (9) is connected at another one of its ends; and
- at least one net (13) housed inside said support body (8) and operatively connected to said crank (11) in order to move when it is driven by the mechanism composed of shaft (5) - connecting rod (9) - crank (11) to detach the powdery products from the silos walls.

2. System (1) according to Claim 1, **characterised in that** said system (1) is placed upstream of the Archimedean screw (15) for supplying the powdery products with respect to the advancement direction of the products going out of the silos.

3. System (1) according to Claim 1, **characterised in that** said net (13) is composed of a cylindrical body equipped with wide meshes.

4. System (1) according to Claim 3, **characterised in that** said net (13) performs a movement for about 1.5 cm in order to detach the powdery products from the silos walls.

5. System (1) according to Claim 1, **characterised in that** said at least one main shaft (5) is further equipped with at least one shaped rod (6) to scrape

the hopper (3).

6. System (1) according to Claim 5, **characterised in that** said shaped rods (6) are two and are placed in a mutually opposed operating position in order to perform a continuous scraping of the hopper (3).

7. System (1) according to Claim 1, 5 or 6, **characterised in that** said net (13) and said rods (6) are made of steel.

8. System (1) according to Claim 1, **characterised in that** said at least one main shaft (5) is connected to said hooper (3) by at least one shielded bearing (7).

9. System (1) according to Claim 1, **characterised in that** said at least one main shaft (5) is motored through a dedicated motor.

10. System (1) according to Claim 1, **characterised in that** said at least one main shaft (5) is motored through transmissions.

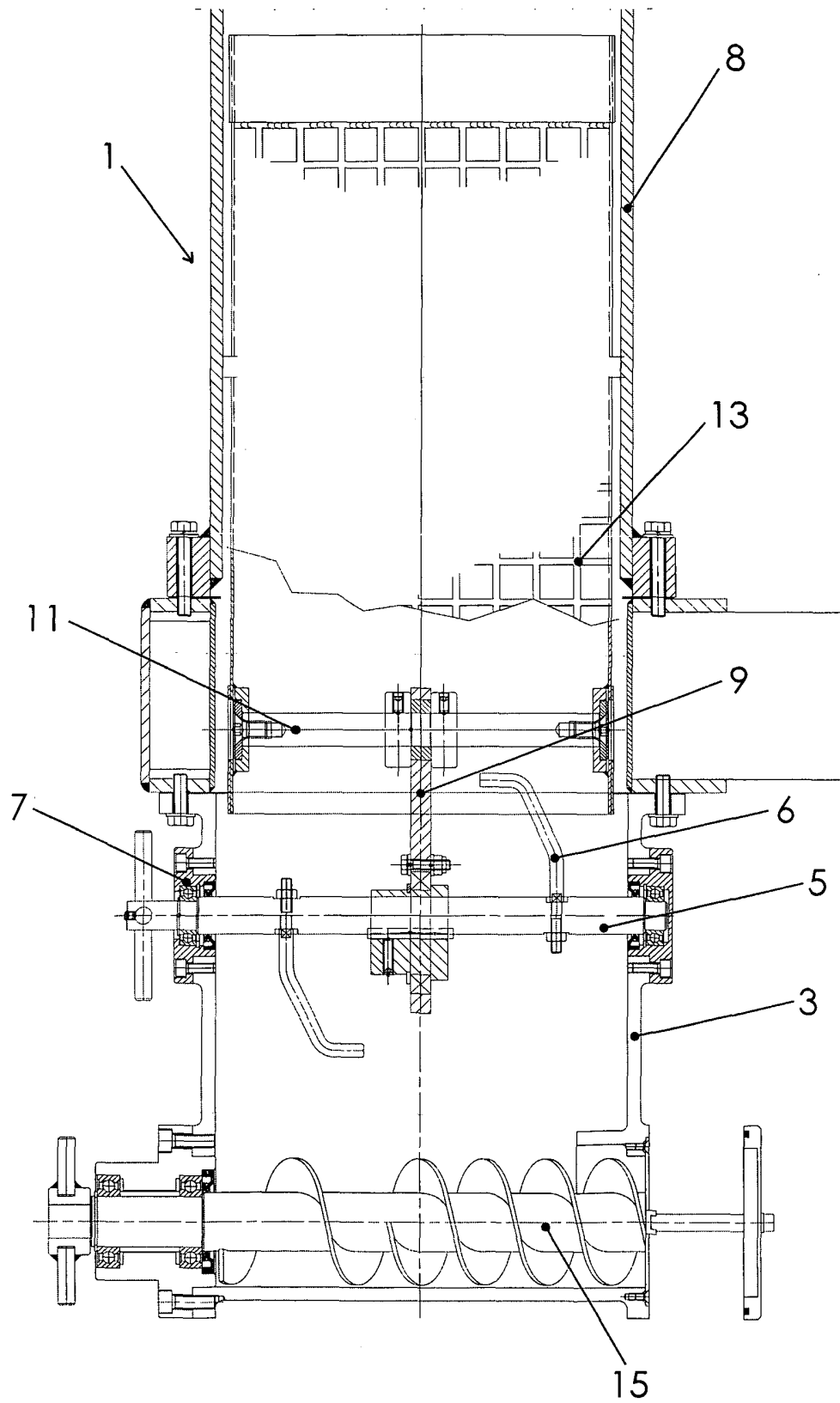


Fig. 1

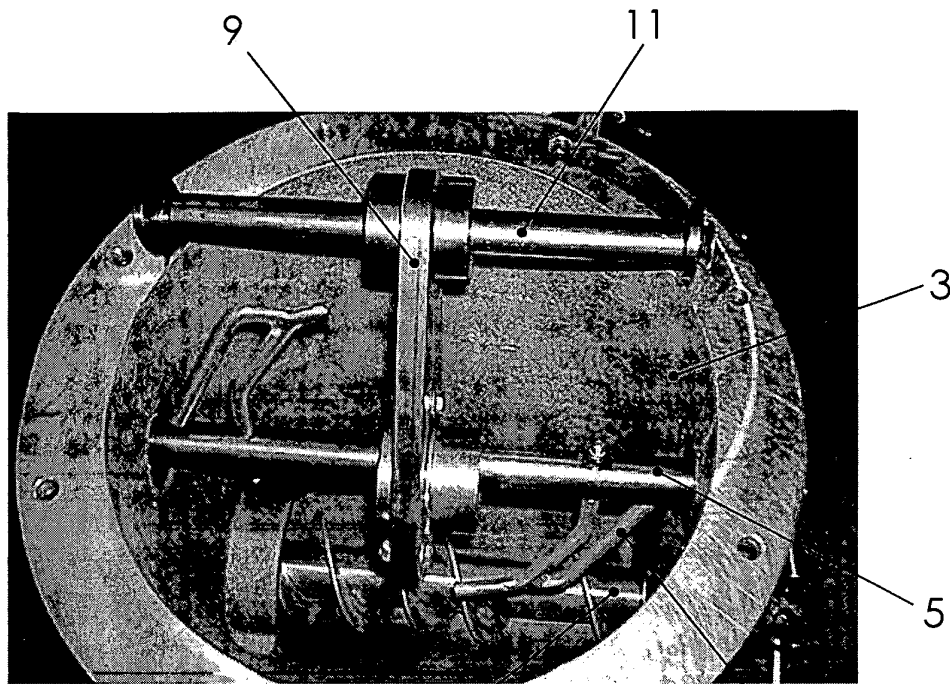


Fig. 2

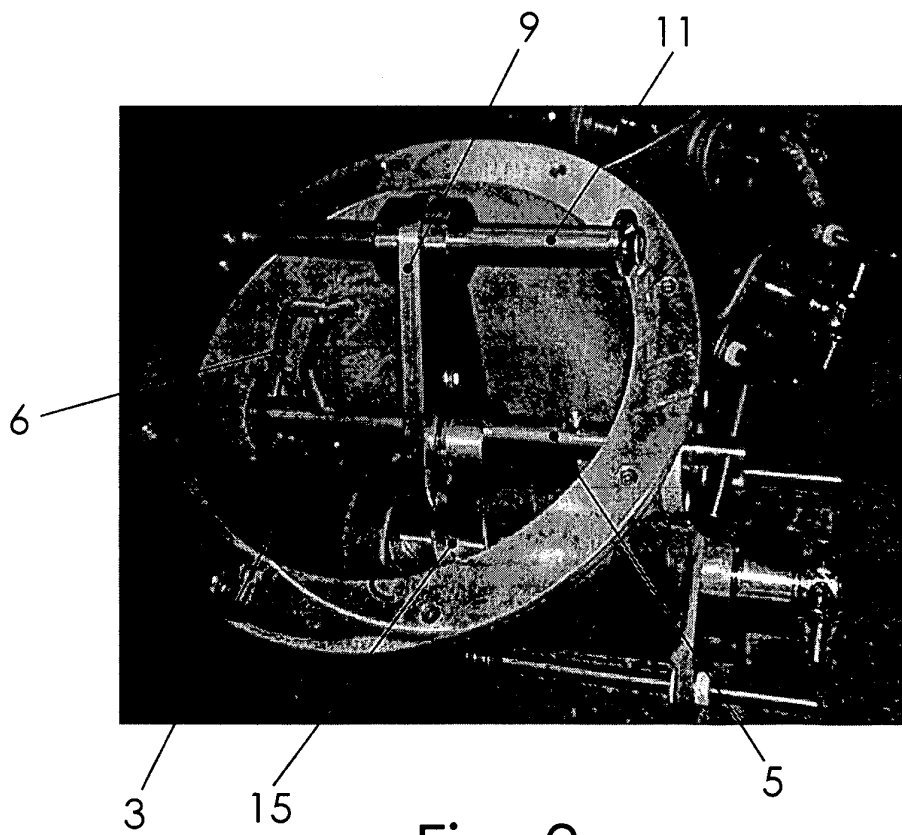


Fig. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 03 02 3992

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 February 2004	Examiner Zanghi, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 03 02 3992

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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