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(54) **BUCKET AND METHOD FOR SCREENING INERT MATERIAL**

(57) The invention relates to a screening bucket (1) for screening inert material comprising a support structure (2) and being attached to an end of an articulated arm of a machine for civil engineering use; said bucket (1) comprises: (a) a screening drum (3) attached to the support structure (2) such that said screening drum (3)

can turn about an axis of rotation (x); (b) and wherein the screening drum (3) is connected with means to impart to said screening drum (3) a rotational movement about said axis of rotation (x); comprising means configured for vibrating a said screening drum (3) as it turns.

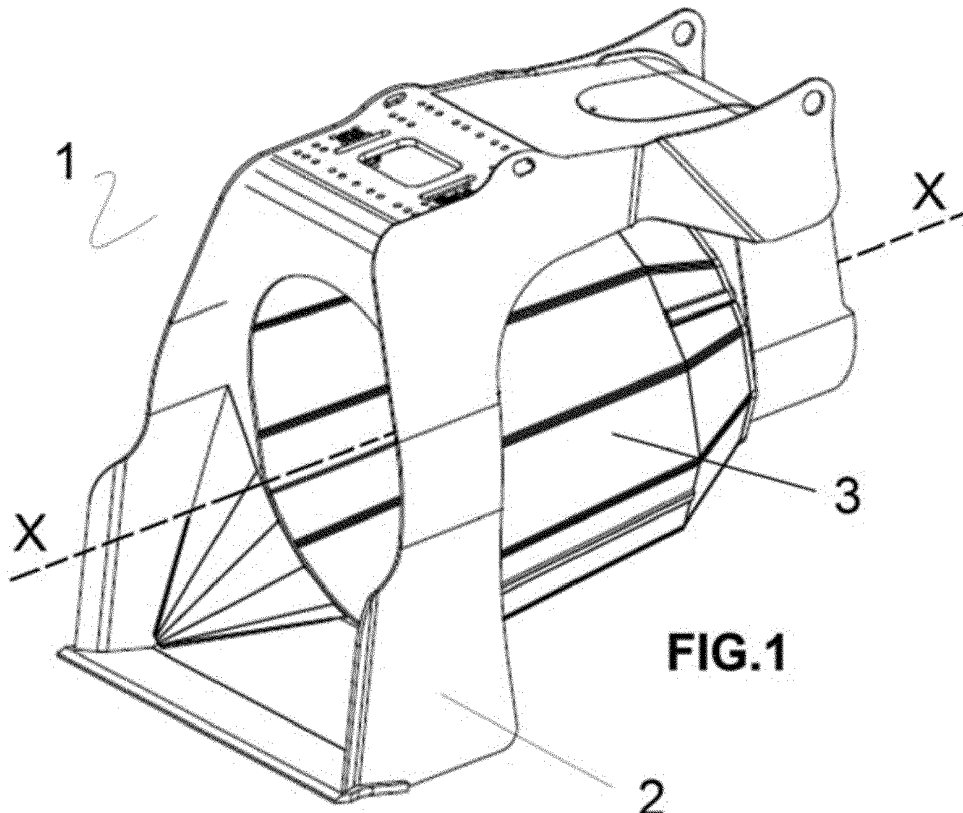


FIG.1

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Description

Object of the Invention

[0001] The object of the present invention relates to a bucket of the type used by public work machinery for screening inert material (stones and rubble left from excavation or demolition work) at the actual site location, and to the screening method, as described in the preamble of the independent claims.

State of the Art

[0002] Buckets that can be applied to the end of the arm of an excavating machine and comprise an outer shell are known in the technical field of reference, said machine being configured to select and check the inert material (basically stone, earth and gravel) resulting from excavation and/or demolition operations in civil works.

[0003] A screening bucket conventionally consists of an outer structure that can be connected to the end of an arm of the operating machine and comprises a drum turning inside a fixed structure by means of an assembly consisting of a hydraulically-operated motor and a gear reducer.

[0004] Furthermore, the outer part of the drum comprises a mesh with holes having dimensions suitably selected to only allow the passage of material with dimensions below a predetermined size. Nevertheless, during rotation of the drum, the material inside said drum naturally rotate as well, such that the inert material comes into contact with the mesh and is separated or screened with the dimensions of the material itself: the material having a size smaller than the holes of the mesh of the drum will fall due to gravity, while the material having a larger size will remain in the drum and be discharged once the work cycle ends, the operation being repeated as many times needed. An example of this type of bucket is described in EP 0 284 643 or in EP 1 577 023.

[0005] One of the problems associated with these devices relates to the build up of material on the inner side walls of the drum, taking place as a result of the rotation of said drum. It is obvious for the person skilled in the art that as a result of the increase in rotational speed of the drum, on one hand greater productivity is obtained, productivity being understood as an amount of material screened per unit of time, and on the other hand, there will be greater build up of material having a larger size on the side walls.

[0006] The excessive build up of material on the side walls tends to block precisely the outlet holes for the smallest material, which prevents proper screening of the inert material, and in fact represents a limitation for bucket productivity, so the rotational speed must necessarily be limited.

[0007] Patent document WO 20122007921 describes a screening bucket that tries to solve this problem by

changing the rotational speeds of the drum between two speeds depending on the angular position thereof. Nevertheless, this solution is complex because it requires detection means and switching means to switch between operating modes which: (a) make the bucket manufacturing process, and therefore the end product, more expensive; and (b) simplicity and robustness are fundamental in the design of public work machines because said machines are subjected to constant mechanical stresses in an aggressive environment, because due to a greater technical complexity, more inspections, greater specialization of the staff responsible for operating the machines and more frequent and more expensive maintenance are all required.

Description of the Invention

[0008] To overcome the problems mentioned in the state of the art, the present invention describes a screening bucket for screening inert material comprising a support structure and being attached to an end of an articulated arm of a machine for civil engineering use; said bucket comprises a screening drum attached to the support structure such that said screening drum can turn about an axis of rotation; and wherein said screening drum comprises a side wall provided with through holes dimensionally suitable for allowing the passage of inert material of a predetermined size. The screening drum is connected with means to impart to said screening drum a rotational movement about said axis of rotation. Furthermore, the invention comprises means configured for vibrating said screening drum as it turns, which prevents the material from building up on the side walls of the drum.

[0009] A second aspect of the invention relates to a screening method for screening inert material resulting from a civil engineering operation by means of a screening bucket comprising a support structure which is attached in an articulated manner to an end of an arm of a machine for civil engineering use and a screening drum rotationally connected to the structure such that said screening drum turns about an axis of rotation comprising a step of vibrating the screening drum at the same time as it turns during the rotational movement about the axis.

[0010] Throughout the description and claims the word "comprises" and variants thereof do not seek to exclude other technical features, additions, components or steps. For persons skilled in the art, other objects, advantages and features of the invention will be inferred in part from the description and in part from putting the invention into practice. The following examples and drawings are provided by way of illustration and do not seek to restrict the present invention. Furthermore, the present invention covers all the possible combinations of particular and preferred embodiments herein indicated.

Brief Description of the Drawings

[0011] A series of drawings which help to better under-

stand the invention and which are expressly related to an embodiment of said invention presented as a non-limiting example thereof will be very briefly described below.

Figure 1 shows a perspective view of the bucket object of the present invention.

Figure 2 shows a view of the bucket of Figure 1 without protections or shells.

Figure 3 shows an isolated view of the means for vibration the drum that are part of the bucket object of the invention.

Preferred embodiment of the Invention

[0012] As can be seen in the attached drawings, the screening bucket 1 object of the present invention comprises a support structure 2 which is attached in an articulated manner to an end of an articulated arm of a machine of the type commonly used in civil works, which is not shown the attached drawings.

[0013] Said support structure 2 houses a frustoconical-shaped screening drum 3 with an opening that is broader than the rear part thereof, the side walls of which are provided around the perimeter with a plurality of through holes dimensionally suitable for allowing the passage of the inert material of a predetermined size.

[0014] The screening drum 3 is connected with means to impart a rotational movement about an axis of rotation (x) which is the axis of revolution of the solid defined by the screening drum 3 itself, i.e., the axis of revolution of the solid of revolution, which is the drum itself.

[0015] The rotation means comprise a ring 4 arranged around the perimeter of the rear cover 3a of the screening drum 3 and integrally attached to said rear cover 3a. The ring 4 turns as a result of a bearing 5 and as a result of the movement exerted by a first motor 6, which is preferably hydraulic, which movement is transmitted to the ring assembly 4 by means of a belt or pulley 7.

[0016] In addition, the screening bucket 1 object of the present invention has the particularity of having means configured for vibrating the screening drum 3. These means comprise an eccentric weight 8 integrally attached to the shaft of a second hydraulic motor 9 through an elastic coupling 10.

[0017] Therefore, during operation of the bucket 1 the rotation means (4, 5, 6, 7) will activate the drum 3 in a rotational manner with respect to the axis of rotation (x) in a conventional manner, while at the same time, the vibration means (8, 9, 10) exert a vibrational movement on the screening drum 3, rotating at its normal work speed. This vibrational movement has the particularity of preventing the inert material from building up on the side walls due to the centrifugal force of the rotational movement, and therefore improving productivity, which is understood as the amount of material screened per unit of time, in a robust and simple manner.

Claims

1. A screening bucket (1) for screening inert material, comprising a support structure (2) and being attached to an end of an articulated arm of a machine for civil engineering use; said bucket (1) comprises:

(a) a screening drum (3) attached to the support structure (2) such that said screening drum (3) can turn about an axis of rotation (x);

(a.1) and wherein said screening drum (3) comprises a plurality of through holes dimensionally suitable for allowing the passage of inert material of predetermined size;

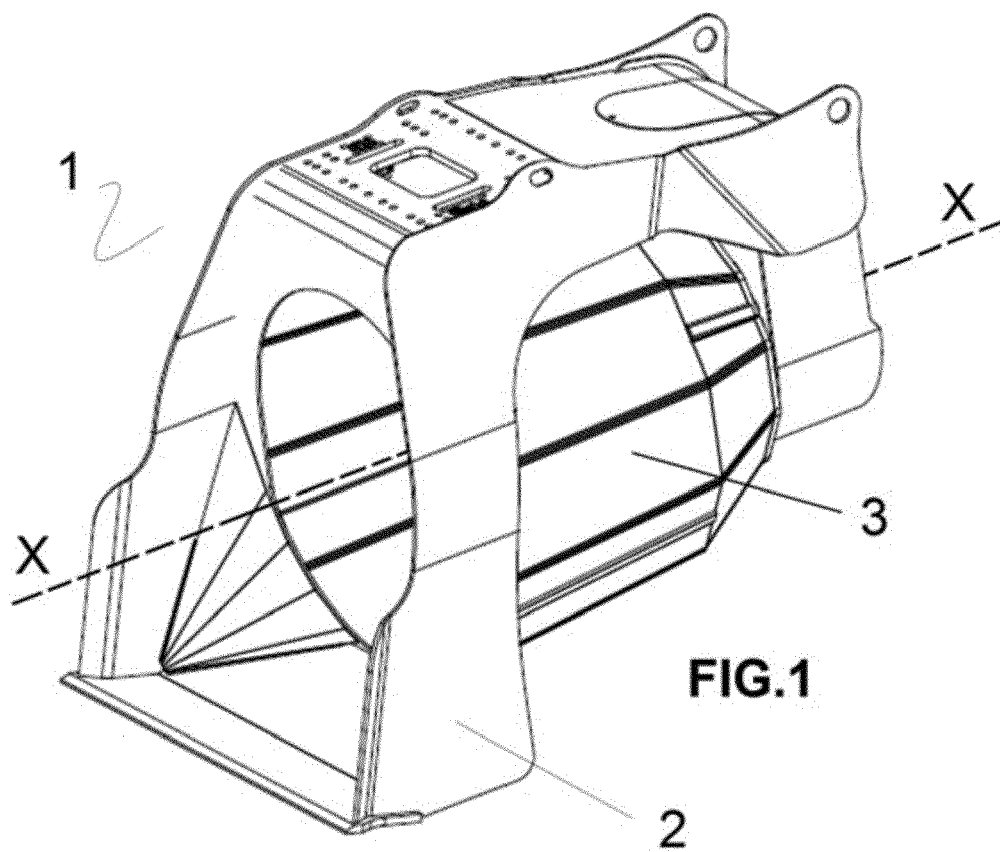
(b) and wherein the screening drum (3) is connected with means to impart to said screening drum (3) a rotational movement about said axis of rotation (x);

characterized in that it comprises means configured for vibrating said screening drum (3) as it turns.

2. The bucket (1) according to claim 1, wherein the rotation means comprise a ring (4) arranged around the perimeter of a rear cover (3a) of the screening drum (3) and integrally attached to said rear cover (3a); and wherein the ring (4) turns as a result of a bearing (5) and as a result of the movement exerted by a first motor (6), which movement is transmitted to the ring assembly (4) by means of a pulley (7).

3. The bucket (1) according to any of claims 1-2, wherein the means configured for vibrating the screening drum (3) comprise an eccentric weight (8) integrally attached to the shaft of a second motor (9) through an elastic coupling (10).

4. A screening method for screening inert material resulting from a civil engineering operation by means of a screening bucket (1) according to any of claims 1 to 3, comprising a support structure (2) which is attached in an articulated manner to an end of an arm of a machine for civil engineering use and a screening drum (3) rotationally connected to the structure (2) such that said screening drum (3) turns about an axis of rotation (x), **characterized in that** it comprises a step of vibrating the screening drum (3) at the same time as it turns during the rotational movement about the axis (x).



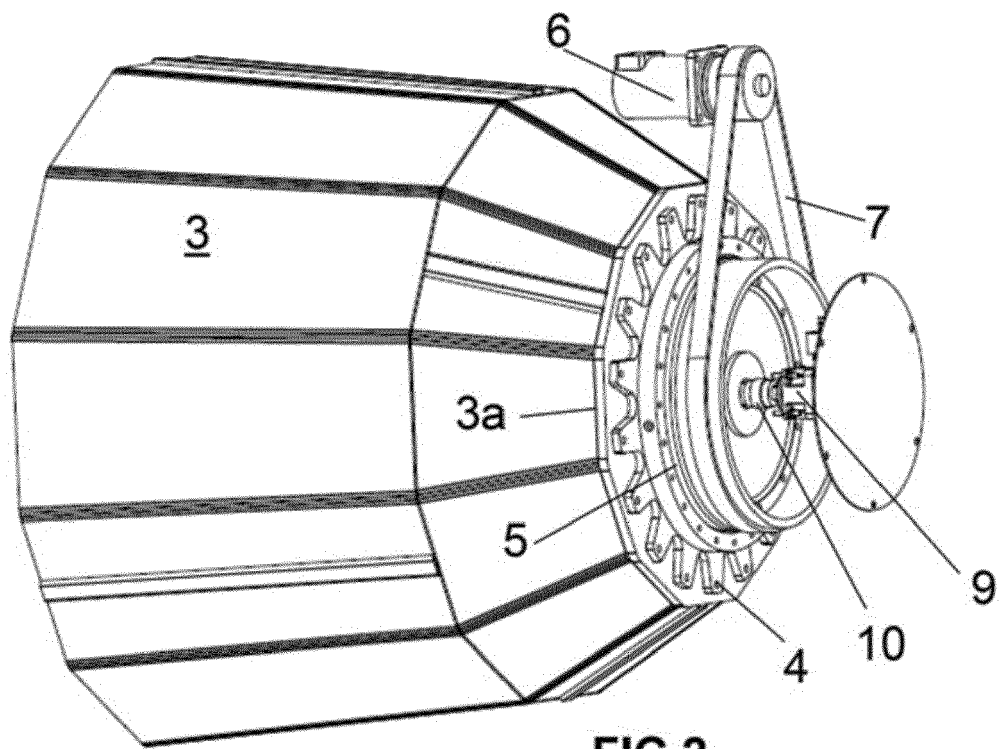
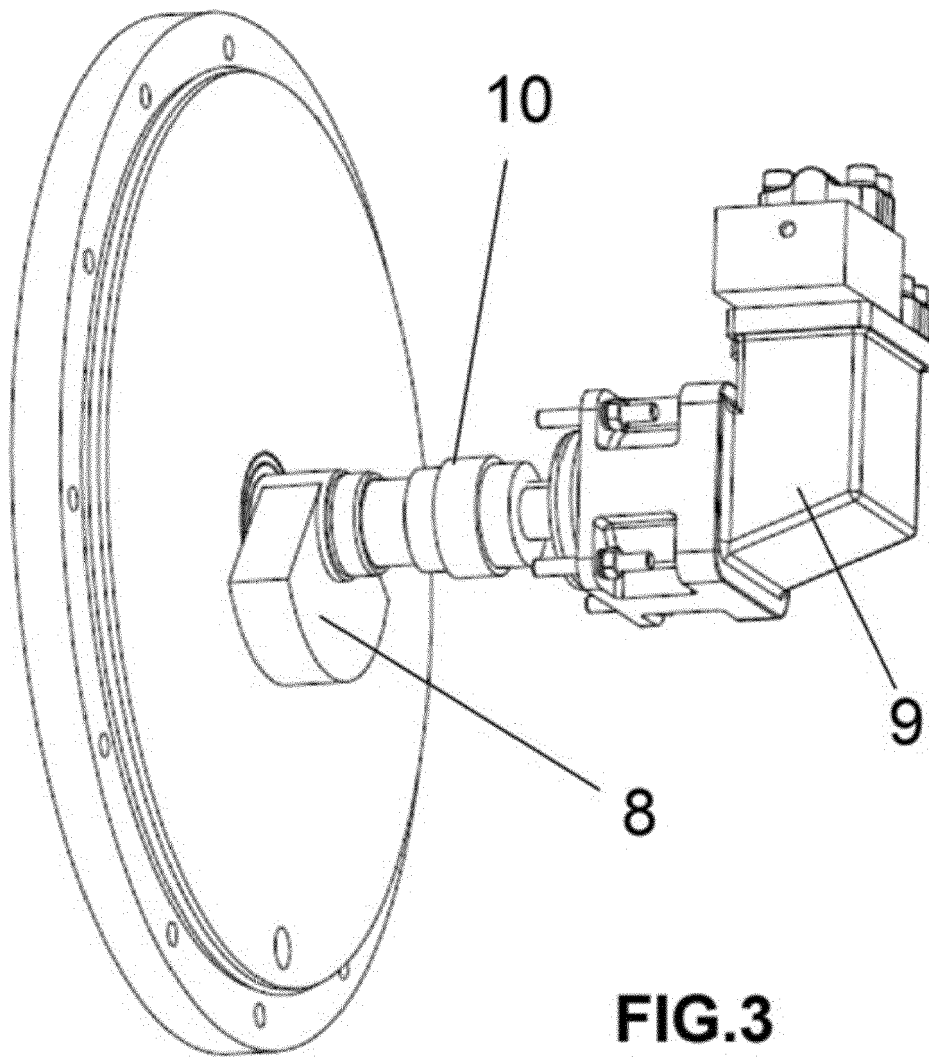


FIG.2





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