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(54) Screening and blending bucket

(57) A screening and blending bucket (1) is disclosed, comprising a structure (2) in which a loading mouth (3) for the material to be screened and blended is arranged and to which a screening drum (4) is associated, said drum defining a rotation axis (X) parallel to the loading direction, on which the drum (4) is being ro-

tated by driving means (5). The screening drum (4) consists of a frame (13) held by support means (6) belonging to the structure (2) and provided with a screening surface (14), at least part of said surface consisting of foraminous panels (14a) removably coupled to the frame (31) through fastening means (15).

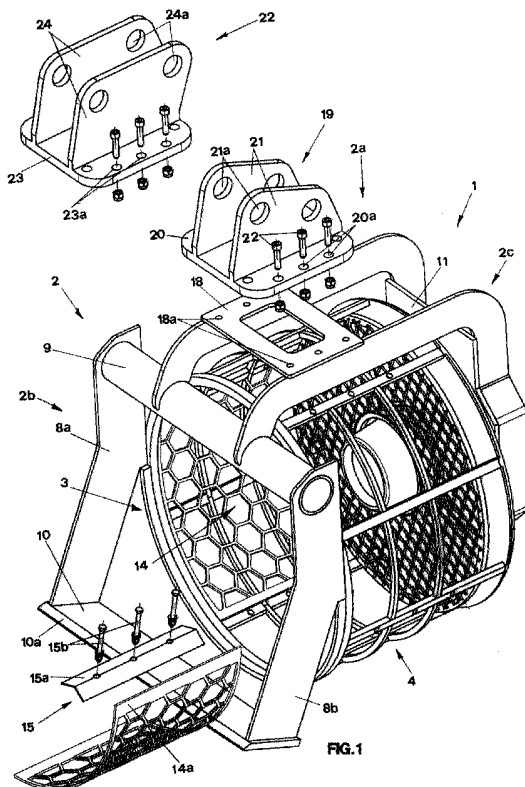


FIG. 1

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Description

[0001] The present invention relates to a screening and blending bucket particularly adapted to be mounted on working machines and to carry out screening of material when digging.

[0002] It is well known that working machines such as excavators are used for soil digging and handling operations, and are provided with a mechanical articulated arm moved by hydraulic jacks and with an end bucket.

[0003] Sometimes the material which is being dug must also be suitably screened so as to select its components according to their size.

[0004] For this purpose proper screening and blending buckets are used, that according to the prior art consist of a structure having a loading mouth for the material to be screened and blended, arranged in connection with a screening drum associated to said structure.

[0005] The screening drum defines an axis which is generally parallel to the loading direction and is rotated by proper driving means that preferably comprise a hydraulic control case belonging to the working machine.

[0006] The rotation of the screening drum allows to separate the dug material according to the desired grain during the digging operation.

[0007] A known bucket corresponding to the above mentioned features is the screening and blending bucket disclosed in Italian patent application serial number PD960081.

[0008] Said screening and blending bucket as well as other known screening and blending buckets available on the market, shows however some drawbacks.

[0009] A first drawback consists in that the screening drum becomes worn with time and therefore must be entirely replaced. This obviously involves a number of costs relating to the purchase of a new drum and labour to effect the replacement, in addition to the costs arising from the machine stop.

[0010] Another drawback consists in that the user for screening materials with different grain, must have at disposal buckets with screening drums provided with foraminous surfaces of different size, each surface being adapted to screen a particular grain.

[0011] It is clear that this obliges the user to purchase an indeterminate number of screening buckets.

[0012] Another drawback of the known screening and blending buckets consists in that the attachments of the bucket to the movable arm of the working machines are not universal and therefore cannot allow connection of the bucket to movable arms of different working machines.

[0013] Therefore the user is obliged to have at disposal several buckets, each bucket being provided with connection means adapted to couple the bucket with a corresponding working machine.

[0014] The present invention aims at overcoming the above mentioned drawbacks.

[0015] More particularly a first object of the invention

is to provide a screening and blending bucket that does not require the replacement of the entire screening drum when the screening surface is worn.

[0016] Another object is to provide a screening and blending bucket that can be connected to the driving members of different working machines.

[0017] Said objects are attained by providing a screening and blending bucket comprising a structure having a loading mouth for the material to be screened and blended, to which a screening drum is associated, defining an axis of rotation parallel to the loading direction, on which axis said drum is rotated by driving means, said bucket being characterized in that said screening drum consists of a frame held by support means belonging to said structure and provided with a screening surface, at least a part of said surface consisting of foraminous panels removably coupled to said frame through fastening means.

[0018] According to the preferred embodiment described hereinafter, the screening drum has a cylindrical shape and the foraminous panels defining the side surface of the screening drum have a curved contour.

[0019] The structure defining the bucket of the invention at the upper part has a universal flange with a plurality of holes adapted to removably receive different shaped brackets for connection of the bucket to the driving members of different working machines.

[0020] Advantageously the screening and blending bucket of the invention may be equipped with foraminous panels with holes of different sizes, so that the same bucket can be used for screening materials with different grain.

[0021] Also advantageously the possibility of using the same bucket on different working machines, allows to reduce the investment costs for purchasing and locking the buckets.

[0022] The assembling and disassembling easiness of the fastening means of the foraminous panels to the frame, allows in a still advantageous way, the quick replacement of the foraminous panels and reduces the intervention times of the operators and the machine idle time.

[0023] The above mentioned objects and advantages will be better understood from the description of a preferred embodiment of the invention which is given as an illustrative and non-limiting example with reference to the accompanying sheets of drawings in which:

- Fig. 1 is an isometric view of the bucket of the invention and of different interchangeable shaped brackets for attachment to a working machine;
- Figs. 2 and 3 are two different isometric views of the bucket of Fig. 1;
- Fig. 4 is a sectional side view of the bucket of Fig. 1;
- Fig. 5 is a rear view of the bucket of Fig. 1; and
- Fig. 6 is the detail of the screening drum of the bucket of Fig. 1 with an exploded illustration of its components.

[0024] The screening and blending bucket of the invention is shown in Figs. 1 to 5 where it is generally indicated by reference numeral 1.

[0025] It is to be noted that the bucket comprises a structure generally indicated with numeral 2 and preferably made of steel, having a loading mouth indicated with numeral 3, for the material to be screened and blended, a screening drum generally indicated with numeral 4 being associated to said mouth, defining a rotation axis X generally parallel to the loading direction, on which the drum is rotated by driving means that can be seen in greater detail in Figs. 2 and 4 where they are generally indicated with numeral 5.

[0026] Preferably said driving means 5 comprise a hydraulic motor 5a coupled to a reduction unit 5b connected to the screening drum 4.

[0027] The structure of the bucket 1 generally indicated by numeral 2, has a general C shape receiving the screening drum 4 and consists of an upper part generally indicated with numeral 2a, a front part generally indicated with numeral 2b where the loading mouth 3 is located and a rear part generally indicated with 2c provided with the support means for the screening drum consisting of a disc 6 as shown in Figs. 2, 4 and 5.

[0028] More particularly the upper part 2a of the structure 2 consists of a couple of plain profiles 7a, 7b parallel to each other.

[0029] As to the front part 2b, the loading mouth 3 defined therein, consists of a couple of plain uprights 8a, 8b arranged parallel to each other and spaced by a distance which is at least equal to the width of the screening drum 4. The uprights are connected to each other at their upper part by a main member 9 which is in turn fixed to both plain profiles 7a, 7b of the upper part 2a.

[0030] Finally a blade 10 for collecting the material to be screened connects the plain uprights 8a, 8b at their lower part.

[0031] One can see that the blade 10 is inclined upwards by an angle α according to the digging direction and has an attack edge 10a which is beveled to make easier penetration into the ground.

[0032] In another not shown embodiment, the blade 10 could also be provided with teeth.

[0033] The rear part 2c of structure 2 generally consists of a plate 11 fixed to the plain profiles 7a, 7b of the upper part 2a of structure 2, supporting said disc 6 and the driving means 5 associated to the disc 6, causing the screening drum 4 to rotate.

[0034] According to the invention and with particular regard to Fig. 6, the screening drum 4 consists of a frame 13 supported by the disc 6 and provided with a screening surface generally indicated with numeral 14, consisting of foraminous panels 14a removably coupled to frame 13 through fastening means 15. More particularly the fastening means 15 comprise pressing plates 15a and blocking screws 15b.

[0035] As to the foraminous panels 14a, in the preferred embodiment herein described, they have a

curved contour defining the surface of the screening drum 4 which therefore takes a cylindrical shape.

[0036] It is anyway clear that the form of the foraminous panels 14a could be of any shape so as to give any kind of form to the screening drum.

[0037] The frame 13 is also provided with a closed bottom 16 connected to the reduction unit 5b by which it is rotated and a foraminous bottom 17 spaced from the closed bottom, so as to have at disposal a screening surface also at the bottom of said screening drum 4.

[0038] In a way similar to the lateral surface 14, even the foraminous bottom 17 could be removable.

[0039] It is to be understood that the possibility of removing the foraminous panels 14a defining the lateral surface 14 of the screening drum 4 and possibly also of the foraminous bottom 17, allow to restore easily the screening surface of the drum when it might become worn, simply removing the fastening means 15 and replacing the worn foraminous panels by new ones.

[0040] This avoids to disassemble the entire screening drum 4 and its substitution with a new one that obviously would involve considerably higher costs.

[0041] In Figs. 1, 2 and 3 one can see also that at the upper part 2a of structure 2 of the bucket 1 there is a flange 18 provided with holes 18a and fixed to the plain profiles 7a, 7b.

[0042] The flange 18 is adapted to receive coupling of a shaped bracket 19 which as shown in Fig. 1 consists of a counter flange 20 with holes 20a having the same arrangement of holes 18a of flange 18 and a couple of ribs 21 provided with through holes 21a.

[0043] The shaped bracket 19 is connected to the bucket 1 by coupling the counter flange 20 to the flange 18, which are fixed to each other by screws 22 passing through the corresponding holes 18a and 20a.

[0044] At this point the bucket 1 may be connected to the movable arm of the working machine by pins, not shown in the drawings and belonging for instance to said movable arm, which are inserted in the through holes 21a.

[0045] The manufacturer may supply together with the bucket, a plurality of shaped brackets, all having the same arrangement of holes for connection to flange 18 of the bucket, however each bracket having ribs with different through holes as to distance between centers and possibly diameter, adapted to allow the connection of the same bucket to the movable arms of different working machines.

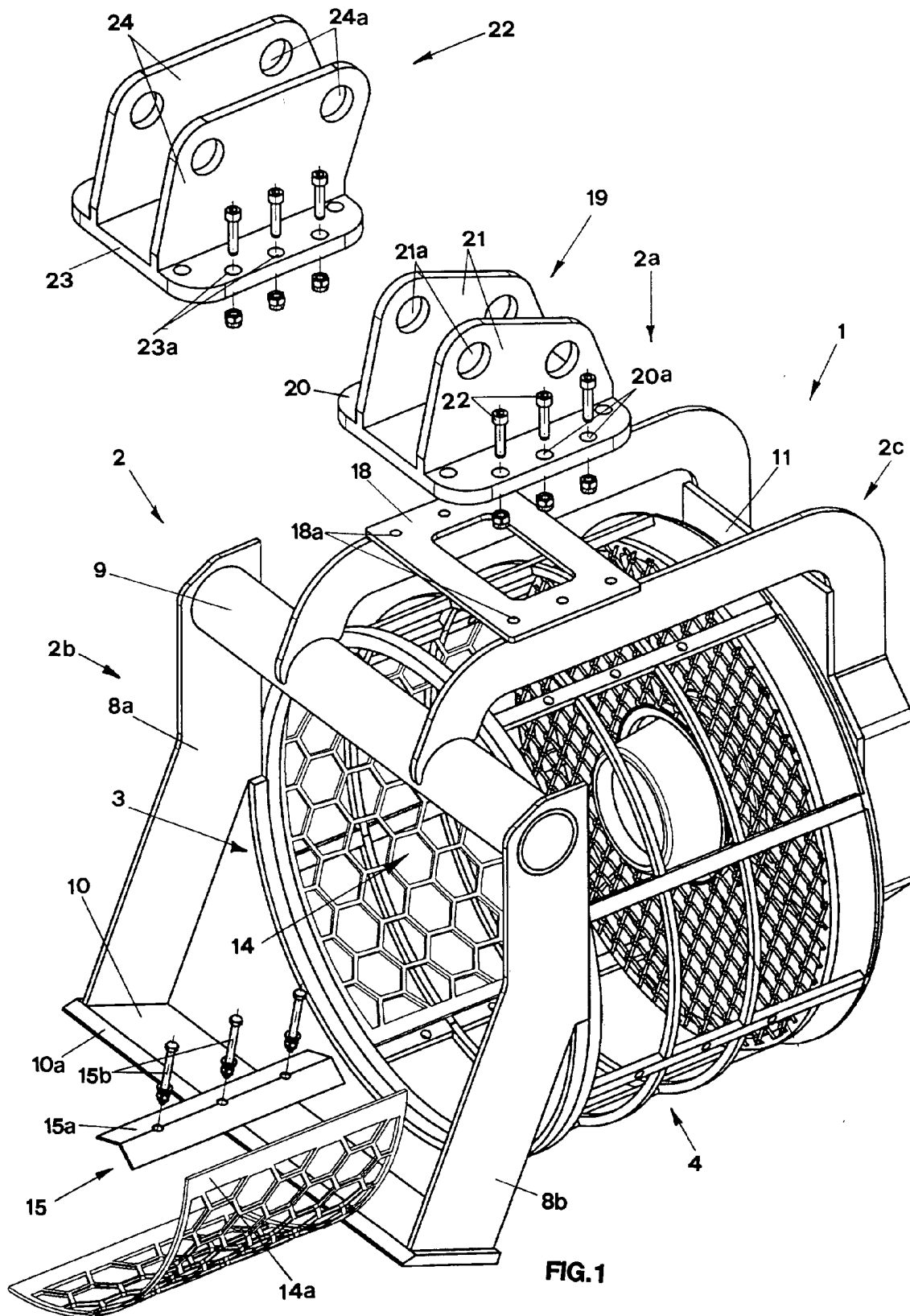
[0046] Another shaped bracket, generally indicated with numeral 22, is shown as an example in Fig. 1 where one can see that the bracket has a counter flange 23 provided with holes 23a matching the holes 18a of flange 18 of the bucket and ribs 24 with through holes 24a with different position and distance between centers, adapted to allow attachment of the same bucket 1 to another working machine.

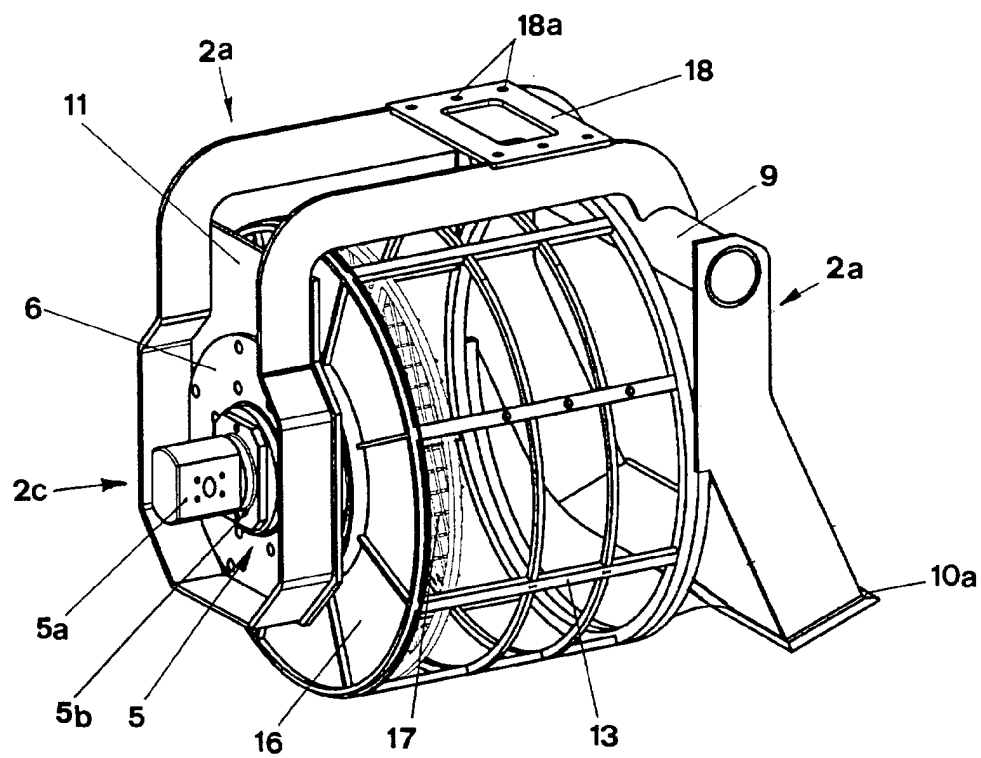
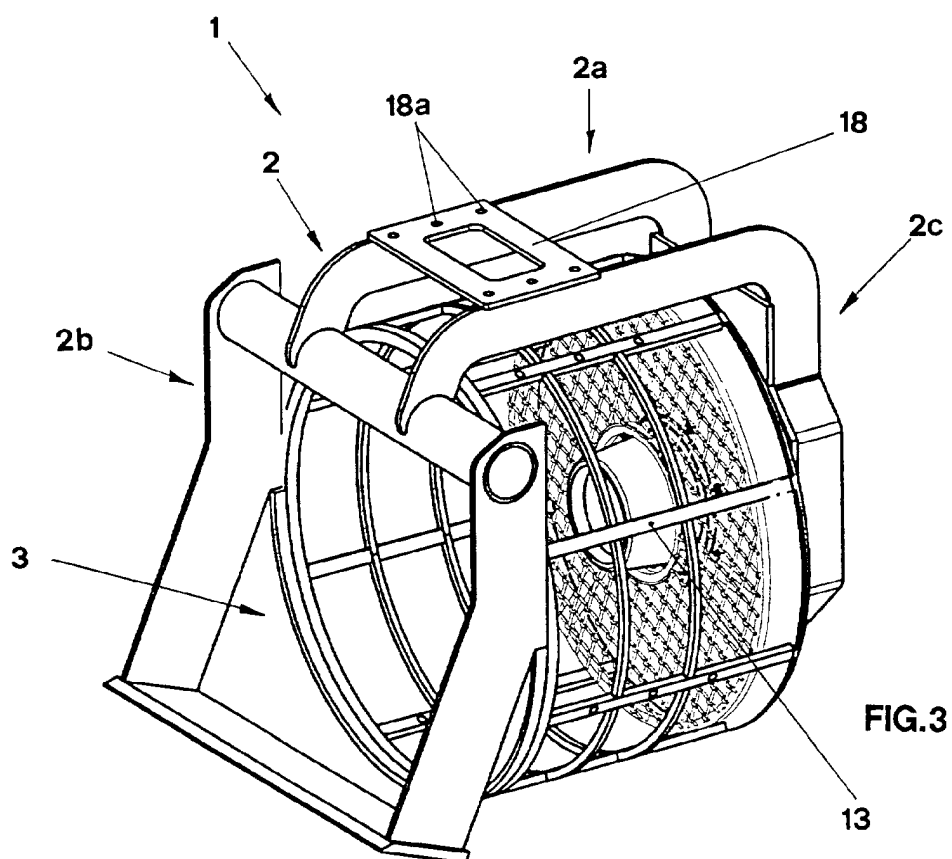
[0047] In view of the foregoing one can see that the bucket of the invention attains all the intended objects.

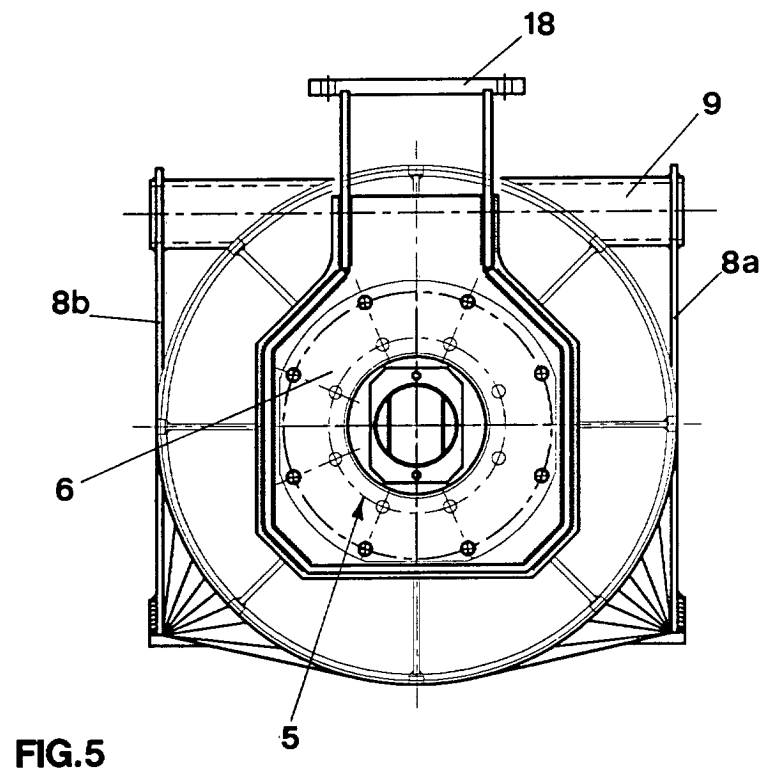
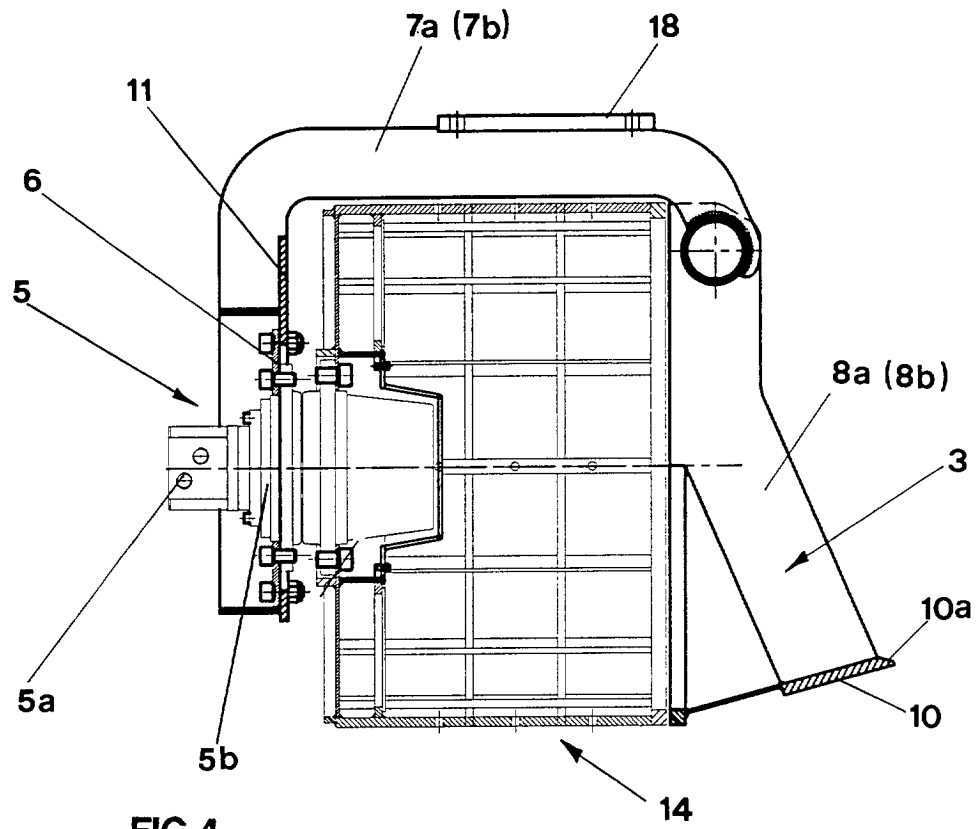
[0048] It is clear that in the constructional stage many modifications not shown in the drawings may be made to the bucket of the invention, and when said modifications are falling within the scope of the appended claims, they should be considered all covered by the present patent.

Claims

1. A screening and blending bucket (1) comprising a structure (2) in which there is a loading mouth (3) for the material to be screened and blended, a screening drum (4) being associated to said structure and defining a rotation axis (X) parallel to the loading direction, on which said drum (4) is rotated by driving means (5), **characterized in that** said screening drum (4) consists of a frame (13) held by support means (6) belonging to said structure (2) and provided with a screening surface (14), at least part of said surface consisting of foraminous panels (14a) removably coupled to said frame (31) by fastening means (15).
2. The bucket (1) according to claim 1 **characterized in that** said foraminous panels (14a) have a curved contour and are arranged juxtapose one beside the other in mutual contact to define the cylindrical lateral surface of said screening drum (4).
3. The bucket (1) according to claim 1 **characterized in that** said structure (2) has a generally C shape adapted to receive said screening drum (4) and comprises:
 - an upper part (2a) to which attachment means (19, 22) of said bucket (1) to a working machine are applied;
 - a front part (2b) defining said loading mouth (3);
 - and a rear part (2c) comprising support means (6) for said screening drum (4).
4. The bucket (1) according to claim 3 **characterized in that** said upper part (2a) of said structure (2) has a flange (18) provided with holes (18a) for connection to a corresponding counter flange (18, 23) of different shaped brackets (19, 22), each bracket having couples of ribs (21, 24) provided with through holes (21a, 24a) with different distance between centers and positions for attachment of said bucket (1) to the driving members of different working machines.
5. The bucket (1) according to the claim 4 **characterized in that** said upper part (2a) of said structure (2) consists of a couple of plain profiles (7a, 7b) parallel to each other and spaced from said flange (18).
6. The bucket (1) according to claim 3) **characterized in that** said loading mouth (3) is defined by a couple of plain uprights (8a, 8b) arranged parallel to each other and spaced by a length at least equal to the width of said screening drum (4), said plain uprights (8a, 8b) being connected to each other at one end by a main member (9) which is fixed to said upper part (2a) of said structure (2) and at the other end by a blade (10) for collection of the material to be screened.
7. The bucket (1) according to claim 6) **characterized in that** said collection blade (10) is inclined upwards by an angle α according to the digging direction.
8. The bucket (1) according to claim 3) **characterized in that** said rear part (2c) of said structure (2) consists of a generally plain plate (11) fixed to said upper part (2a) and provided with support means (6) for said screening drum (4).
9. The bucket (1) according to claim 8) **characterized in that** said support means consist of a disc (6) fixed to said plain plate (11), said driving means (5) for rotating said screening drum (4) being associated to said disc (6).
10. The bucket (1) according to claim 1) **characterized in that** said driving means (5) comprise a hydraulic motor (5a) connected to a reduction unit (5b).
11. The bucket (1) according to claim 1) **characterized in that** said fastening means (15) comprise pressing plates (15a) and blocking screws (15b).







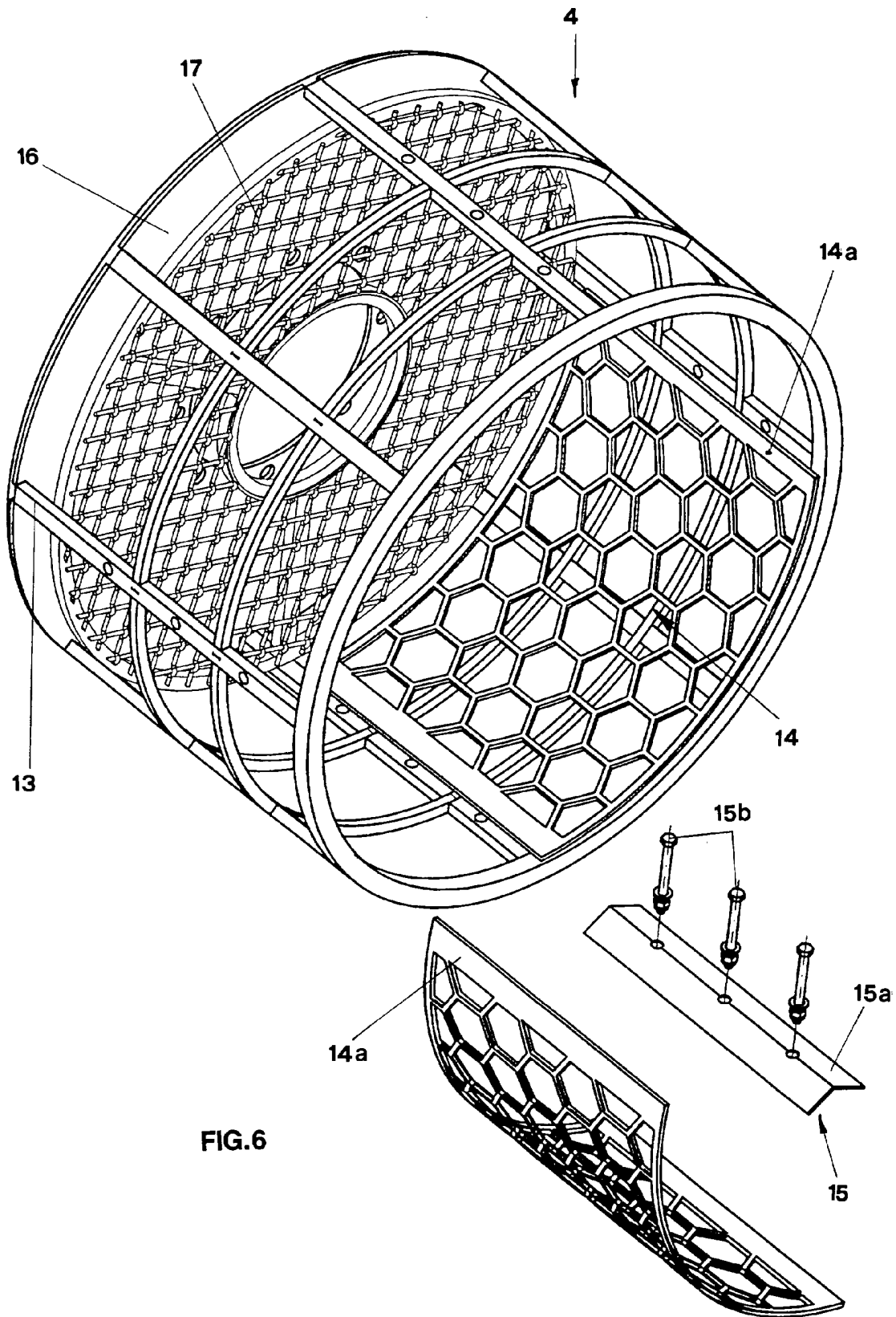


FIG. 6



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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 1 November 2001	Examiner Van der Zee, W
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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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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