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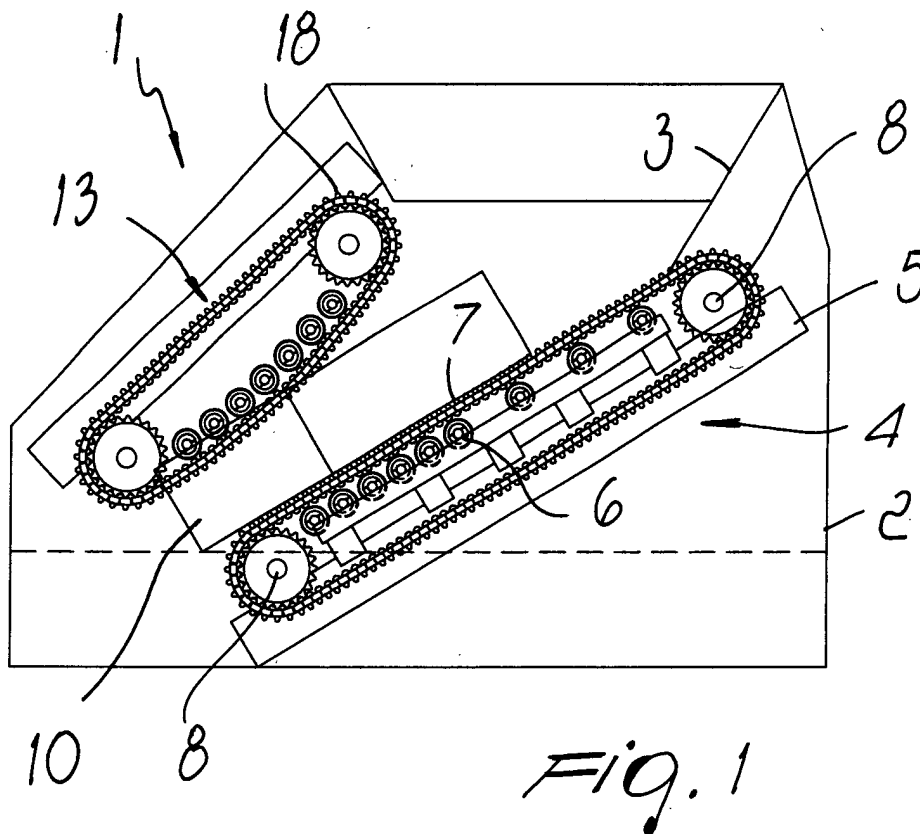
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(54) **Continuous compactor particularly for waste and the like**

(57) A material compactor, particularly for waste and the like, comprising a body (2) that has an upper hopper-like inlet (3) for introducing material to be compacted,

and compaction means (4,10,11,13) arranged along two mutually perpendicular planes, in order to form, in the space within the body, a funnel for the passage and compaction of the material.



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Description

[0001] The present invention relates to a continuous compactor particularly for waste and the like. More particularly, the invention relates to a compactor suitable to compress bulky nonrigid objects.

[0002] It is known that presses are normally used to compact materials such as waste and the like; however, such presses have the drawback of requiring a very bulky and complicated apparatus for their use while providing an extremely low yield of compacted material.

[0003] The aim of the present invention is to provide a compactor, particularly for waste and the like, that offers a substantially higher yield.

[0004] Within this aim, an object of the present invention is to provide a compactor, particularly for waste and the like, that allows to achieve an accurate adjustment of the thickness of the compacted material that exits from the device.

[0005] Another object of the present invention is to provide a compactor that has a safety system in order to prevent any attempt to compact rigid materials.

[0006] Another object of the present invention is to provide a compactor that allows to screen not only the thickness of the layer of compacted material but also its density, according to requirements and according to the material to be treated.

[0007] Another object of the present invention is to provide a continuous compactor, particularly for waste and the like, that is highly reliable, relatively simple to provide and at competitive costs.

[0008] This aim and these and other objects that will become better apparent hereinafter are achieved by a material compactor, particularly for waste and the like, characterized in that it comprises a body that has an upper hopper-like inlet for introducing material to be compacted, and compaction means arranged along two mutually perpendicular planes, in order to form, in the space within said body, a funnel for the passage and compaction of said material.

[0009] Further characteristics and advantages of the invention will become better apparent from the description of preferred but not exclusive embodiments of the compactor according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a side elevation view of the compactor according to the present invention;

Figure 2 is a top plan view of the compactor according to the present invention;

Figure 3 is a detail view of one of the belts of the compactor according to the present invention;

Figure 4 is a detail view of a second belt of the compactor according to the present invention; and

Figure 5 is a detail view of a third belt and fourth belt of the compactor according to the present invention.

[0010] With reference to the figures, and initially with reference to Figures 1 and 2, the compactor according to the present invention, generally designated by the reference numeral 1, comprises a substantially parallelepipedal body 2 which has an upper hopper-like inlet arranged at the top of the body 2 and designated by the reference numeral 3.

[0011] The inlet 3 is shaped like a hopper in order to allow the insertion of material to be compacted into the body 2 of the compactor 1.

[0012] The particularity of the invention is that the compactor 1 comprises means suitable to form a sort of funnel for the passage of the material to be compacted; said means are arranged directly below the inlet 3 of the body 2.

[0013] The means suitable to form a funnel for the material to be compacted comprise a first belt 4, which is arranged at an angle with respect to the inlet 3 and is constituted by a frame 5 which supports a plurality of rollers 6 on which steel plates 7 slide which are fixed to a chain driven by a pair of sprockets 8.

[0014] Two belts 10 and 11 are arranged above the first belt 4 so that their axis is perpendicular to the axis of the belt 4 and are set at an angle that converges at the end of the body 2 that lies opposite the end where the inlet 3 is provided.

[0015] Substantially, the two belts 10 and 11 are arranged so as to form, above the first belt 4, a funnel-like passage in which the material to be compacted must pass.

[0016] Finally, above the belts 10 and 11 there is a fourth belt 13, which is arranged so that its surface that is suitable to make contact with, and therefore compact, the material that passes within the body 2 of the device is directed toward the surface of the belt 4 on which the material to be compacted advances.

[0017] The fourth belt 13 is arranged at an angle with respect to the belt 4, i.e., the surface of the belt 13 that makes contact with the material to be compacted is arranged at an angle with respect to the surface of the first belt 4 that makes contact with the material to be compacted, forming a funnel.

[0018] Substantially, the means suitable to form a funnel, constituted by the four belts 4, 10, 11 and 13, form a funnel on two mutually perpendicular planes: a plane in which the first belt 4 and the fourth belt 13 are arranged, and a plane in which the belts 10 and 11 are arranged. The expression "plane in which the belts are arranged" is understood to designate a plane that passes through the surfaces of the belts at right angles to said surfaces. In this case there are two planes, one which passes transversely to the surfaces of the belts 4 and 13 and another one that passes transversely to the surfaces of the belts 10 and 11.

[0019] The intersection of the two planes in space thus forms a three-dimensional funnel that allows to compact the material introduced in the inlet 3 of the body 2 of the compactor according to the invention.

[0020] In detail, the first belt 4 is as shown in Figure 3, which illustrates the sprockets 8, one of which is motorized while the other one rotates freely, and the plurality of rollers 6 on which the above cited plates 7 are arranged.

[0021] The structure of the belts 10, 11 and 13 is substantially similar to the structure of the belt 4, the only difference being that the belts 10, 11 and 13 are adjustable as regards the distance between the driving shaft and the freely rotating shaft, i.e., the mutual distance of the two sprockets is adjustable, so as to have a belt shape that is straight or curved, as shown for example in Figures 4 and 5.

[0022] Moreover, the speed and direction of motion can be adjusted in each belt 4, 10, 11 and 13 independently of the others by means of a dedicated control unit.

[0023] In the straight position, i.e., with the maximum possible distance between the sprockets 8, the belts 10, 11 and 13 can be used to obtain a longer contact time between the belts for compacting the material to be compacted, for example if it is necessary to treat materials that are difficult to compact. Otherwise, when the materials are easy to compact, it is possible to use the shape of the belts 10, 11 and 13 that allows to save energy and to subject an entire device to less wear.

[0024] The direction of motion and the speed of each one of the four belts can be changed independently of the other belts, as previously mentioned, and it is possible, by using differentiated speeds, to achieve a disaggregation effect or facilitate the crushing of very bulky objects, provided they are not rigid.

[0025] The fourth belt 13 is arranged above the remaining belts, so that it can oscillate about a pivoting point 18 to be raised if a non-deformable rigid body is passing.

[0026] For this purpose, the belt 13 is connected to a sensor which, according to the stress, detects the presence of a non-deformable rigid body and thus transmits a signal to a hydraulic lifting system, which raises the belt 13, turning about its fulcrum 15. The unwanted bodies thus encounter no hindrance in exiting from the compactor without causing damage.

[0027] In order to facilitate the extraction of the material to be compacted, it is possible to install on the walls of the inlet 3 of the body 2, two paddle-type belts which, by way of their movement, break any bridges and precompress the material before it reaches the funnel formed by the four belts 4, 10, 11 and 13.

[0028] In order to process thermoplastic material, which shrinks when heated, there is a heating step, in order to increase the compaction capacity of the entire device. Heating can be performed by using various heat sources (for example electric resistors, steam, et cetera) according to the type of material to be compacted.

[0029] In practice it has been found that the compactor according to the present invention fully achieves the intended aim and objects, since it allows to obtain a compaction of material so as to have in output from the

device a mat having a fixed width but a variable consistency and thickness.

[0030] The operator can in fact vary the density of the thickness of the layer of compacted material, applying a greater or smaller load to the fourth belt 13 and appropriately varying the relative speed of all the belts.

[0031] The compactor thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with other technically equivalent elements.

[0032] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0033] The disclosures in Italian Patent Application No. MI2001A000451 from which this application claims priority are incorporated herein by reference.

[0034] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A material compactor, particularly for waste and the like, **characterized in that** it comprises a body that has an upper hopper-like inlet for introducing material to be compacted, and compaction means arranged along two mutually perpendicular planes, in order to form, in the space within said body, a funnel for the passage and compaction of said material.
2. The compactor according to claim 1, **characterized in that** said compaction means comprise traction and compaction belts.
3. The compactor according to claim 2, **characterized in that** said compaction means comprise a first belt and a fourth belt which are arranged along a substantially vertical plane, said fourth belt being arranged above said first belt, and a second belt and third belt which are arranged along a substantially horizontal plane at right angles to the plane of said first and fourth belts.
4. The compactor according to one or more of the preceding claims, **characterized in that** the respective surfaces of said first and fourth belts that are suitable to contact and compact said material face each other and the surfaces of said second and third belts meant to contact and compact said material face each other.
5. The compactor according to one or more of the pre-

ceding claims, **characterized in that** said first belt is arranged substantially at an angle with respect to said fourth belt, so as to form a narrower region for the passage of said material, said narrower region being arranged opposite said inlet.

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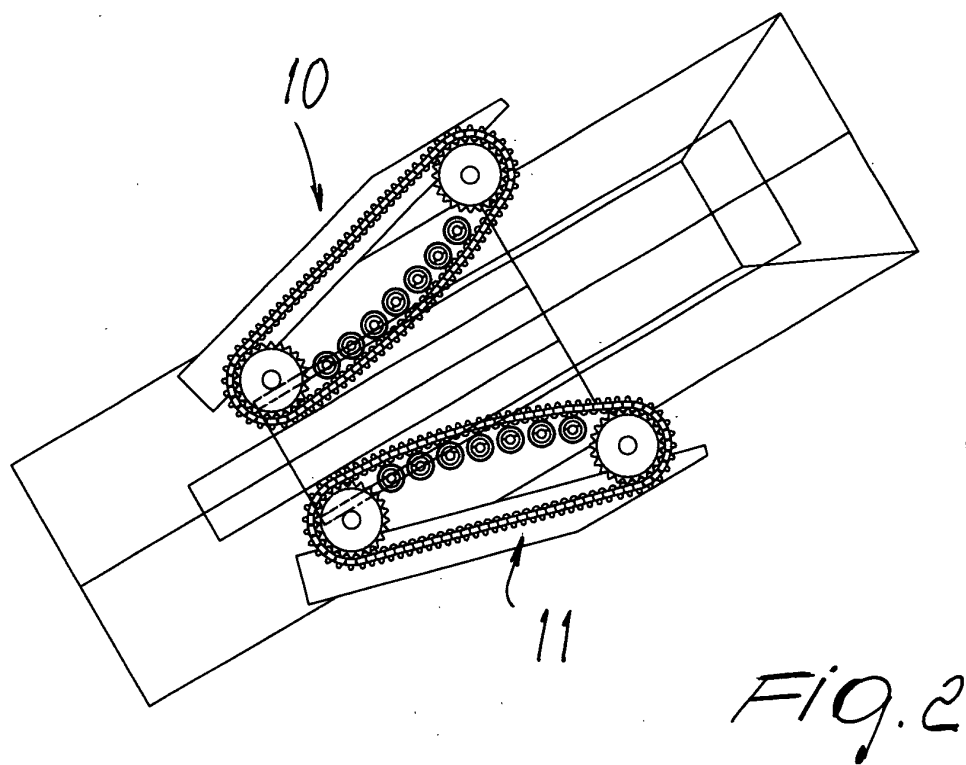
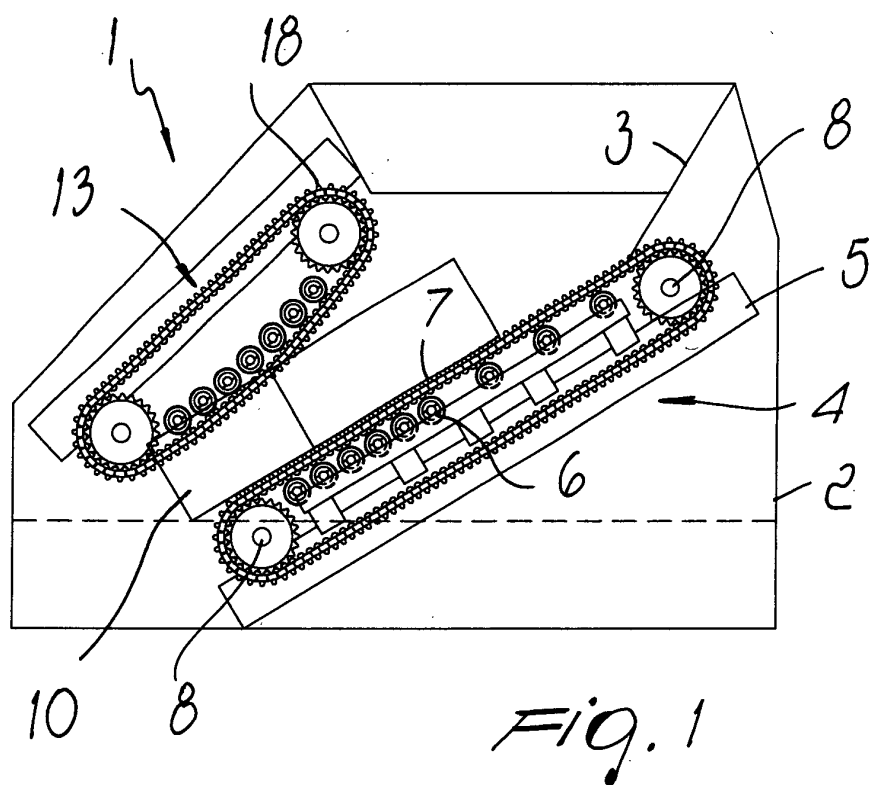
6. The compactor according to one or more of the preceding claims, **characterized in that** said second and third belts are arranged at an angle to each other, so as to form a narrower region that lies opposite said inlet of the body of the compactor. 10
7. The compactor according to one or more of the preceding claims, **characterized in that** said fourth belt has an adjustable angle with respect to said first belt and can be lifted into a position that is substantially parallel to said first belt, in the case of passage of nondeformable rigid materials. 15
8. The compactor according to one or more of the preceding claims, **characterized in that** each one of said first, second, third and fourth belts is constituted by a frame that is suitable to support a plurality of rollers on which steel plates slide which are fixed by a chain which is moved by the pair of sprockets. 20 25
9. The compactor according to one or more of the preceding claims, **characterized in that** said second, third and fourth belts are adjustable, the respective sprockets of said belts being movable toward each other in order to give said belts a curved shape. 30
10. The compactor according to one or more of the preceding claims, **characterized in that** said fourth belt has a sensor for detecting the force applied by said fourth belt to said material to be compacted. 35

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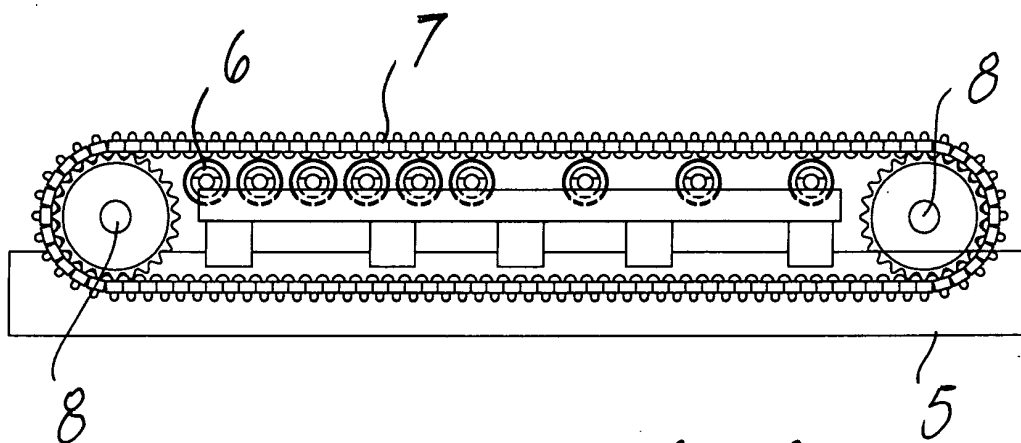


Fig. 3

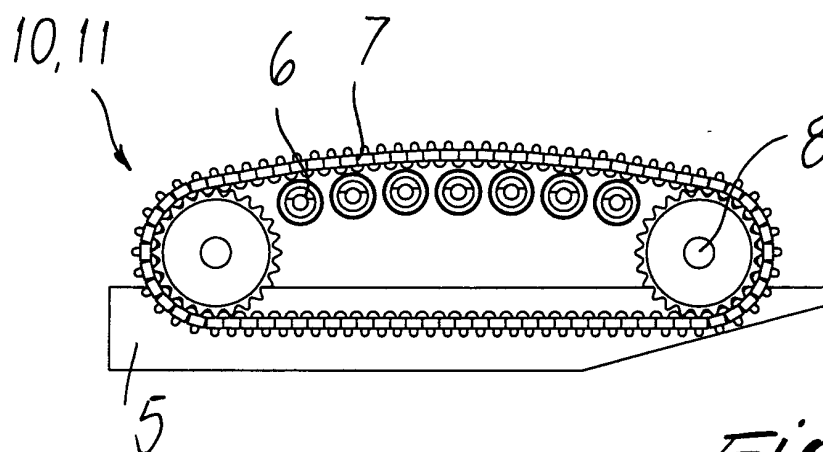


Fig. 4

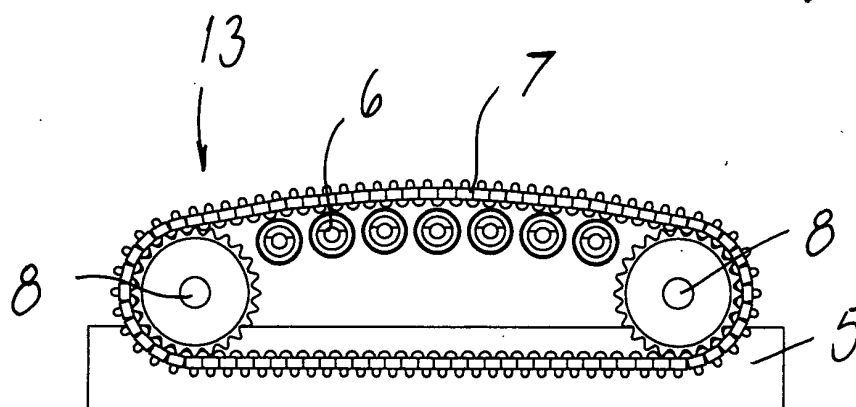


Fig. 5