

[54] **COMPACTED REFUSE CUTTING DEVICE  
IN REFUSE COMPACTOR**

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[51] Int. Cl..... **B65b 63/02**

[58] Field of Search..... 53/124 E; 100/229 A;  
141/71

[56] **References Cited**

**UNITED STATES PATENTS**

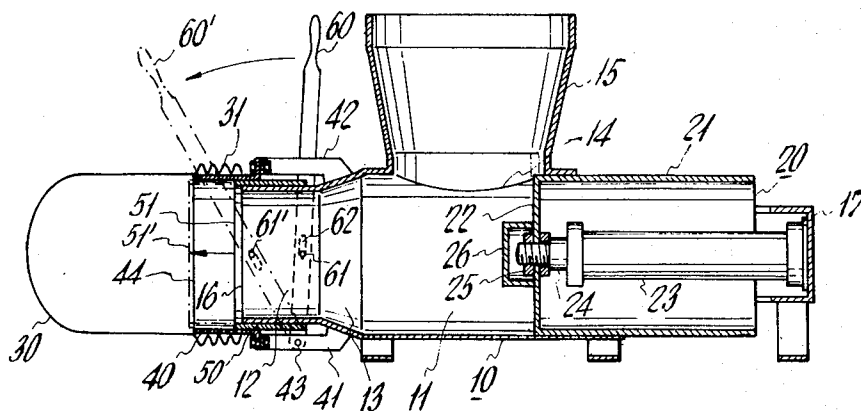
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*Primary Examiner*—Travis S. McGehee

[57] **ABSTRACT**

A refuse compactor having a compacting cylinder, a compacting ram movably disposed within the cylinder for compacting refuse fed into an opening in one side of the cylinder and discharging it from the end of the cylinder, and means for cutting the compacted refuse into sections which includes a guide cylinder surrounding said compacting cylinder, a movable sleeve slidably engaging the gap between the compacting and guide cylinders and means for moving said sleeve.

**2 Claims, 3 Drawing Figures**



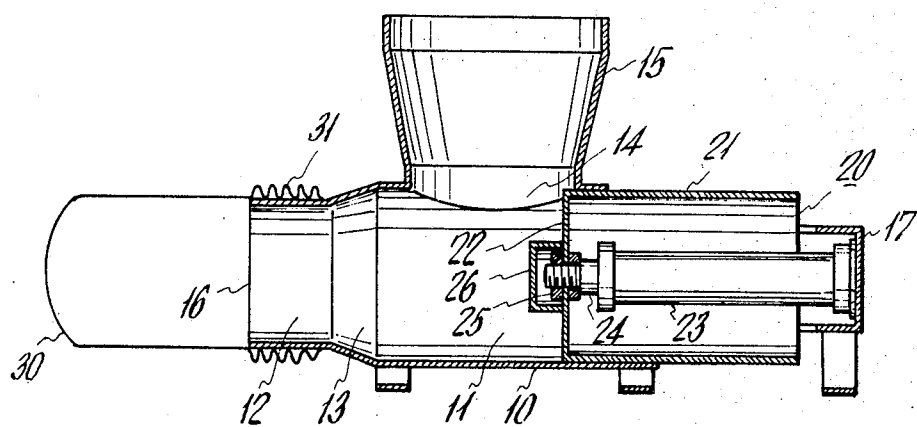


FIG. 1 (PRIOR ART)

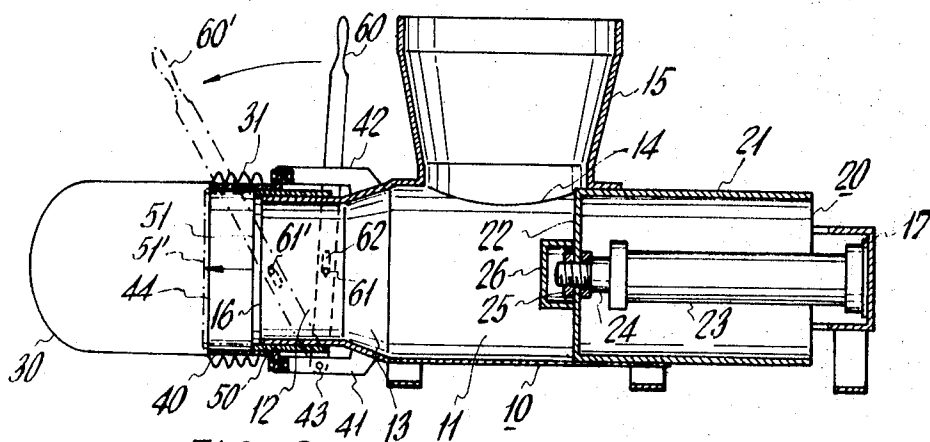


FIG. 2

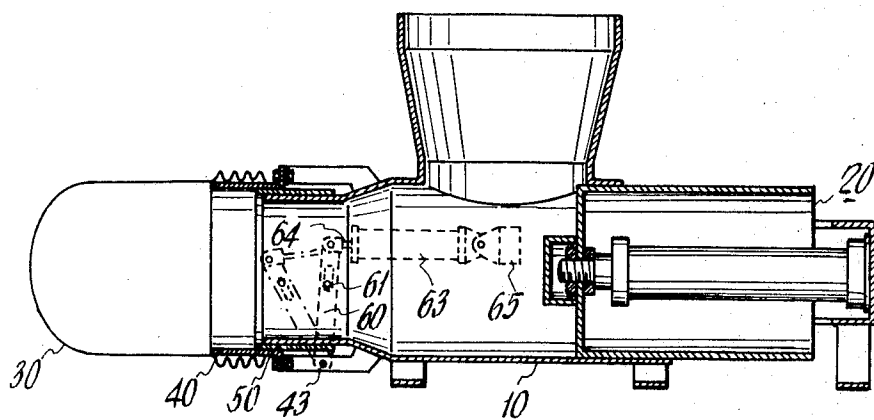


FIG. 3

## COMPACTED REFUSE CUTTING DEVICE IN REFUSE COMPACTOR

This invention relates to an improved refuse compactor, and more specifically to a device for cutting a continuous body of compacted refuse which is continuously discharged from the refuse compactor.

In prior refuse compactors of the type concerned, the refuse is continuously compacted and discharged in a shape of rod and fed into a long tubular packing bag. Thereafter, the packed refuse is cut into suitable lengths for transportation by tying the refuse bag with a string and tightening the string until the refuse is separated at that position. However, such a packing and cutting process is executed generally by hand and requires substantial labour and time. Moreover, the continuously discharged refuse is often scattered about about the floor when changing bags.

Therefore, an object of this invention is to provide a refuse compactor with an improved refuse cutting device and to improve an efficiency of the refuse packing process by overcoming the abovementioned difficulties.

According to this invention, the refuse compactor comprises a refuse compacting cylinder consisting of a fore chamber having a refuse inlet, a rear chamber having an outlet and a diameter less than that of the fore chamber and a middle chamber having a tapered wall and connecting the both fore and rear chambers, a refuse compacting ram arranged to move reciprocally within the fore chamber of the compacting cylinder, a guide cylinder having an inner diameter greater than the outer diameter of the rear chamber of the compacting cylinder and surrounding at least a part of the rear chamber, a movable sleeve slidably inserted between the guide cylinder and the rear chamber, and means for moving the movable sleeve reciprocally in the axial direction.

Other objects and features of this invention will be described in detail hereinafter with reference to the accompanying drawings.

In the drawings:

FIG. 1 is a side elevational view in partial section representing a typical refuse compactor according to the prior art,

FIG. 2 is a side elevational view in partial section representing a refuse compactor provided with an embodiment of the refuse cutting device according to this invention, and

FIG. 3 is a side elevational view in partial section similar to FIG. 2, illustrating another embodiment of this invention.

Throughout the drawings, like reference numerals are used to denote corresponding structural components.

Referring first to FIG. 1, there is shown a typical refuse compactor according to the prior art, comprising a refuse compacting cylinder 10 installed in a horizontal position and a compacting ram 20. The compacting cylinder 10 consists of three essential portions, that is, a fore chamber 11 having a refuse inlet 14 provided with a refuse hopper 15 at the top, a rear chamber 12 having a refuse outlet 16 and a diameter less than that of the fore chamber 11, and a middle chamber 13 having a tapered wall and connecting both the fore and rear chambers 11 and 12. The compacting ram 20 is composed of a hollow cylinder 21 having an end plate

22 and arranged to freely move within the fore chamber 11 in the axial direction. The cylinder 21 is provided with a hydraulic cylinder 23 fixed to the compacting cylinder 10 through a bracket 17 and having a piston 24 whose end is fixed to the end plate 22 by means of a nut 25 which is covered with a cylindrical cap member 26.

In operation, a long tubular bag 30 made of synthetic resin such as polyethylene is put on the periphery of the rear chamber 12 and tucked with a number of folds 31 as shown in the drawing. The hydraulic cylinder 22 is energized by a suitable hydraulic source (not shown) to move the ram 20 reciprocally within the fore chamber 11. When refuse is continuously fed into the hopper 15, it is successively pushed toward the left by the ram 20 and compacted by the heavy friction caused by the tapered wall of the middle chamber 13, and the compacted refuse is discharged continuously from the outlet 16 of the rear chamber 12 into the bag 30. As the discharged refuse has a shape of continuous rod, the bag 30 is gradually let out from the periphery of the rear chamber 12 and forms a long rod-shaped package of compacted refuse. In order to cut this long refuse package into suitable lengths for transportation, it is tied by a string at a suitable position and the string is tightened until the compacted refuse is separated at that position. As described briefly in the preface, this operation is executed generally by hand and requires substantial labour and time. Moreover, the compacted refuse may be scattered about the floor when the bag 30 is changed to new one, since the compactor is constantly operated.

Referring now to FIG. 2, there is shown a similar type of refuse compactor comprising a refuse compacting cylinder 10 and a compacting ram 20 which are quite similar to those of FIG. 1 and will not be described further. However, the compactor of FIG. 2 is provided with an embodiment of the refuse cutting device according to this invention, which comprises a guide cylinder 40, a movable sleeve 50 and an operating lever 60. The guide cylinder 40 is a hollow cylinder having an inner diameter greater than the outer diameter of the rear chamber 12 of the compacting cylinder 10 and is coaxially fixed to the cylinder 10 through brackets 41 and 42 so that a part of the rear chamber 12 is surrounded by the guide cylinder 40. The movable sleeve 50 is inserted in the gap between the outer surface of the rear chamber 12 and the inner surface of the guide cylinder 40 and arranged to freely move in the axial direction. The operating lever 60 is pivoted at one end 43 to the bracket 41 and a pin 61 fixed to the outer wall of the movable sleeve 50 engages a slot 62 formed in the lever 60. Thus, the pin 61 is moved to the position 61' and the rear end 51 of the sleeve 50 is moved to the phantom position 51' when the lever 60 is pulled in the direction of the arrow to the phantom position 60'.

In operation, a synthetic resin packing bag 30 is placed on the guide cylinder 40 as shown in the drawing and refuse is thrown into the hopper 15. By operating the compacting ram 20 as in the case of FIG. 1, the refuse is successively compacted within the compacting cylinder 10 and continuously discharged from the rear chamber 12. Just after leaving the outlet 16, the compacted refuse expands against the compactive force and increases its diameter to form a circumferential step on the periphery at the outlet position. If the operating lever 60 is pulled to the position 60' under the

above condition, the rear end 51 of the movable sleeve 50 catches the circumferential step and moves it to the position 51'. As a result of this movement, the compacted refuse is well cut and separated at the plane of the outlet 16. Therefore, by binding that position with a string, packing is easily executed. Because of the distance from the outlet 16 to the rear end 44 of the guide cylinder 40, the compacted refuse is not discharged from the guide cylinder 40 immediately after the cutting operation and there is enough time to substitute a new bag 30 before the refuse is scattered about the floor.

The above binding operation is so simple that it can be automated if necessary. If the packing bag 30 is made of a thermally shrinking resin, this operation is further facilitated by applying heat to the binding position. Moreover, as there is no fear of scattering the refuse about the floor and it is not always necessary to use a long tubular bag 30 if it is substituted frequently.

FIG. 3 shows another embodiment of the refuse cutting device of this invention which is suitable for executing the process automatically. Although the essential structure and operation of the device are the same as those of FIG. 2, the operating lever 60 of the movable sleeve 50 is coupled to a piston rod 64 of an air cylinder 63 which is fixed to the compacting cylinder 10 through a bracket 65, so that the sleeve 50 is moved pneumatically by the air cylinder 63.

As described above, the refuse processing operation becomes very simple and easy and is much improved not only economically but also sanitarily.

What is claimed is:

1. A cutting device for compacted refuse in a refuse compactor comprising a refuse compacting cylinder and a compacting ram arranged to move reciprocally within said cylinder, said cylinder including a fore chamber having a refuse inlet, a rear chamber having a refuse outlet and a diameter less than that of said fore chamber and a middle chamber having a tapered wall and connecting said fore and rear chambers, said device comprising a guide cylinder having an inner diameter greater than the outer diameter of said rear chamber of the compacting cylinder and fixed coaxially with said compacting cylinder, a movable sleeve inserted in the gap between the inner surface of said guide cylinder and the outer surface of said rear chamber of the compacting cylinder, and means for moving said sleeve reciprocally in the axial direction.

2. A cutting device for compacted refuse according to claim 1, wherein at least a part of said rear chamber of the compacting cylinder is surrounded by at least a part of said guide cylinder and the discharge end of said guide cylinder is spaced from the outlet of said rear chamber.

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