



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.12.2000 Bulletin 2000/49

(51) Int Cl.7: **B30B 11/10, B30B 9/30**

(21) Application number: **99204050.1**

(22) Date of filing: **30.11.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Gonella, Carlo**
15078 Roccagrimalda (IT)

(74) Representative: **Spandonari, Carlo, Dr. Ing.**
Spandonari & Modiano s.r.l.
corso Duca degli Abruzzi 16
10129 Torino (IT)

(30) Priority: **01.06.1999 IT TO990460**

(71) Applicant: **VM Press S.r.l.**
15076 Ovada (AI) (IT)

(54) **Material feeder for processing machines for solid city waste**

(57) A hopper (32) has a flat bottom (42) ending in a bight (44) aligned with a lateral outlet (34). A slide (52) provided with a pusher scoop (56) is slidable along the

flat bottom transversely to the semicircular bight and is driven by hydraulic actuators (54). A feeding piston (46) is movable along the semicircular bight toward said outlet, the piston being driven by a hydraulic actuator (48).

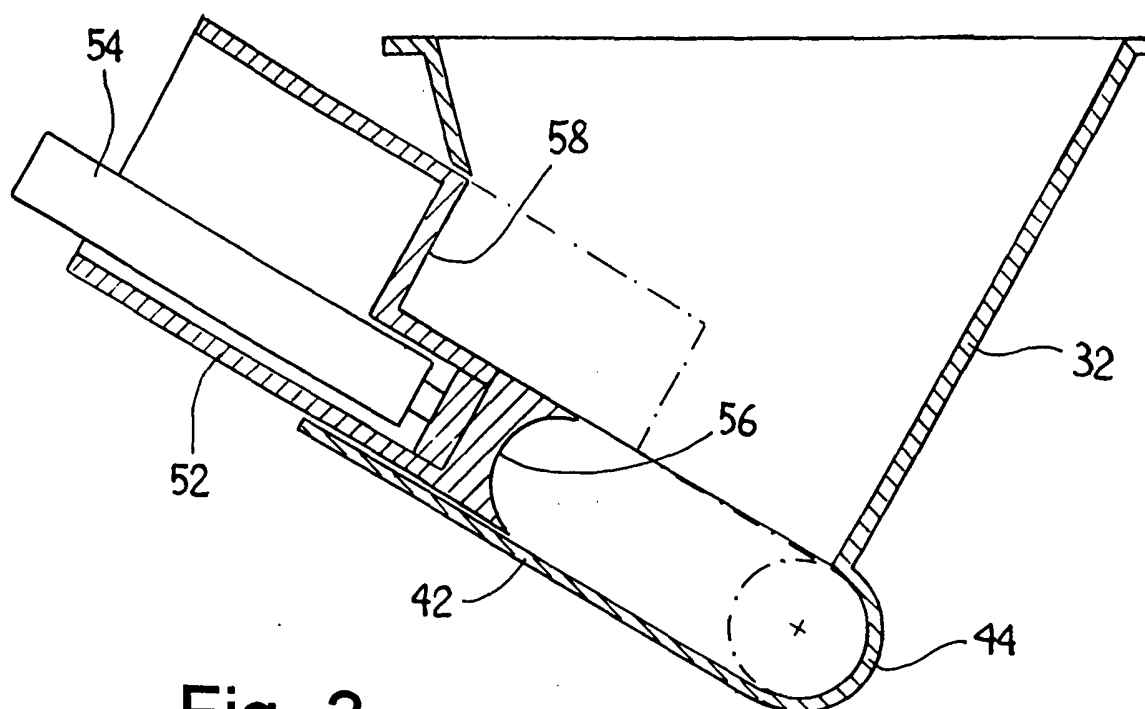


Fig. 3

Description

[0001] This invention is concerned with a material feeder for processing machines for mixed wastes, more particularly for solid city waste, also known as SCW.

[0002] As is well known, SCW is a material having highly variable properties, in respect of its nature (organic or inert), of its consistence and of its size. In any case, SCW always has a high humidity. SCW is usually disposed of in dumps or in incinerators, after reducing its humidity content below 20%, and usually after several sorting steps, e.g. for metal separation and/or grading, and others. Today, these operations are generally carried out in high-cost, high-bulk installations, and with processing times extending over several days.

[0003] In order to improve the efficacy and efficiency of SCW processing, IT-A-1256197, filed on 18-12-1992, with title "Machine for processing humid material, particularly for recycling solid city waste", provides for pressing or squeezing, under high pressure, individual portions of material in a perforated cylinder, so that a considerable proportion of its humid content is squeezed out of its perforations, while the bulk of the dry material is strongly reduced. The material is then expelled from the cylinder. The machine of IT-A-1256197 comprises a number of perforated cylinders, which are all supported on a drum. The drum is rotated step-by-step, so that each cylinder is first brought in alignment with a material feeding auger, then to an extrusion station where the material is squeezed, and finally to an expulsion station.

[0004] The machine of IT-A-1256197 performs an efficient separation, compaction and drying of city waste, but the feeding of material by means of an auger has turned out to be inadequate, because the material, being humid and of a changeable nature, as is typical in city waste, becomes clogged and causes locking of the auger, or builds bridges above the auger, thereby requiring frequent action by the staff in order to restore normal feeding.

[0005] The main object of the invention is therefore to provide a material feeder for processing machines for solid city waste, which overcomes the drawbacks of the auger feeder.

[0006] The invention achieves the above and other objects and advantages, such as will appear from the following disclosure, with a material feeder for processing machines for solid city waste having the features recited in claim 1.

[0007] The invention will be further described with reference to a preferred embodiment which is disclosed in the following disclosure and is shown, by way of non-limiting example, in the attached drawings, wherein:

Fig. 1 is a front view of a drum of a waste processing machine;

Fig. 2 is a view in longitudinal cross-section of a ma-

terial feeder according to the invention, suitable for cooperation with the machine of Fig. 1;

Fig. 3 is a view of the same feeder, in transverse cross-section made along line III-III of Fig. 2;

Fig. 4 is partial view, similar to Fig. 3, for a modification of the above embodiment of the invention.

[0008] With reference to Fig. 1, a waste processing machine according to IT-A-1 256 197 comprises a stationary support bed 10 which carries a drum comprising two parallel, disk-shaped walls 12, 14, joined by an internal framework 16, and rotatable around a horizontal shaft 18. Drum 12-16 has three equidistant passages, in which respective perforated cylinders such as 20 are mounted. The drum is rotated step-by-step, so that each perforated cylinder 20 is brought into alignment with a feeding station 22, where it is loaded with material requiring drying and compaction. Subsequently, the perforated cylinder is brought in alignment with a pressing station 24, where a piston 26 squeezes the material and extrudes its humid part through the perforations of cylinder 20. Finally the perforated cylinder reaches a delivery station 28, where the material is expelled from the cylinder by another piston 30. A detailed disclosure of this machine is found in the above-mentioned prior patent.

[0009] Having now reference also to Figs. 2 and 3, the feeding station of the machine of Fig. 1 is provided with a feeder device according to the invention. The feeder device comprises a hopper 32 having a horizontal outlet 34 which is joined, by means of a flange 36, to an opening in a partition 38 of the stationary bed 10, so that each perforated cylinder 20 becomes aligned in turn with outlet 34.

[0010] Hopper 32 leads to a flat, inclined bottom surface 42, which ends into a semicircular bight 44. In the semicircular bight seat 44 a feeder presser is received, which comprises a feeder piston 46, driven by a hydraulic actuator 48. Piston 46 has a cylindrical skirt 50, slidably matching bight seat 44. Piston 46 is aligned with outlet 36, so that it can push the material into perforated cylinder 20.

[0011] Opposite bight 44, hopper 32 has an opening where a slide 52, driven by hydraulic actuators such as 54, is slidable at right angles to piston 46 along the inclined surface 42. Slide 52 has a forward, concave scoop 56, which, when approached to bight 44, defines a cylindrical area for slidable reception of feeding piston 46.

[0012] Preferably, on the upper side of slide 52 a second flat scoop 58 is provided, which is set back with respect to concave scoop 56.

[0013] The above-disclosed feeder should operate in step with drum 12-14 of the processing machine, so that one work cycle is performed at each step of the drum. At the beginning of the cycle, both piston 46 and slide

52 are withdrawn to the positions shown on Figs. 2 and 3. Initially, slide 52 is moved forward to the position shown in dashed lines on Fig. 3. The sharp-edged, concave scoop 56 crunches and shears the material lying on inclined bottom 42, crushing any large objects such as branches, sticks and frames made of wood, synthetic material or metal, containers made of plastic or metal sheet, and others, so that a portion of material, partly compacted, is eventually confined in a cylindrical area near bight 44. At the same time, flat scoop 58 subjects the adjacent material to a preliminary, less thorough compaction, due to the lower compression ratio.

[0014] Subsequently, when a perforated cylinder 20 comes to rest before the hopper outlet 34, piston 46 is operated, while concave scoop 56 is kept stationary in the lowered position adjacent to bight 44. Piston 46 therefore moves within the cylindrical chamber enclosed by the bight and the concave scoop, and pushes any material there enclosed into perforated cylinder 20, which stands in front.

[0015] Then, while the drum steps forward, both piston 46 and slide 52 are withdrawn, thus allowing the material above them to fall to the bottom of the hopper, in preparation for the next cycle.

[0016] A person skilled in the art will understand that the structure of the feeder is capable of applying considerable forces, such that it will crush even rigid objects such as sticks, boxes, pots, cans, and others, which are likely to be present, together with more common materials such as paper, envelopes, food waste, and garbage generally. While an auger may give rise to clogging, with the feeder of the invention any flexible object, such as a sheet of plastic material, which should, by example, creep between the inclined bottom and the slide, is positively torn by the action of the scoop. Moreover, the preliminary crunching made by the flat scoop, which is capable of strong forces, due to its strength and to the power of the hydraulic actuators, will break and crumble any bridge-like structures that may occasionally be built by random interlacing of rods, branches, and the like, which, if not broken, would prevent the normal flow of material to the bottom.

[0017] The embodiment of Fig. 4 is quite similar to the embodiment of Figs. 2 and 3, and is distinguished only for the provision of two blades of hard metal 60 and 62, the former being attached to the upper edge of concave scoop 56, the latter to the upper edge of bight 44. Moreover, bight 44 is deeper than in the first embodiment, so that concave scoop 56 can approach with partial penetration in the bight, as shown in dotted lines, so that blades 60 and 62 can cooperate with a shearing action, in order to cut the material more positively, though with less wear of the scoop.

[0018] Obviously, a person skilled in the art will readily make changes to the feeder as described above, without going beyond the scope of the invention. For instance, the shapes and proportions of the different members could be changed, the second, pre-compac-

tion scoop could be modified, and other kinds of actuator could be used instead of the hydraulic cylinders.

5 Claims

1. A material feeder for waste processing machines, particularly for processing solid city waste, characterized in that it comprises a hopper having a flat bottom ending in a bight aligned with a lateral outlet, a slide provided with a pusher scoop, which is slidable along the flat bottom transversely to the bight and driven by first driving means, and a piston movable along the bight toward said outlet, the piston being driven by second driving means.
2. The feeder of claim 1, characterized in that said flat bottom is inclined.
3. The feeder of claim 1 or 2, characterized in that said bight is semicircular.
4. The feeder of claim 1, 2 or 3, characterized in that the scoop of the slide is concave.
5. The feeder of claim 4, characterized in that the upper edge of the scoop is provided with a blade of hard metal.
6. The feeder of claim 5, characterized in that the upper edge of the bight is provided with a blade of hard metal for cooperation with the blade of the scoop.

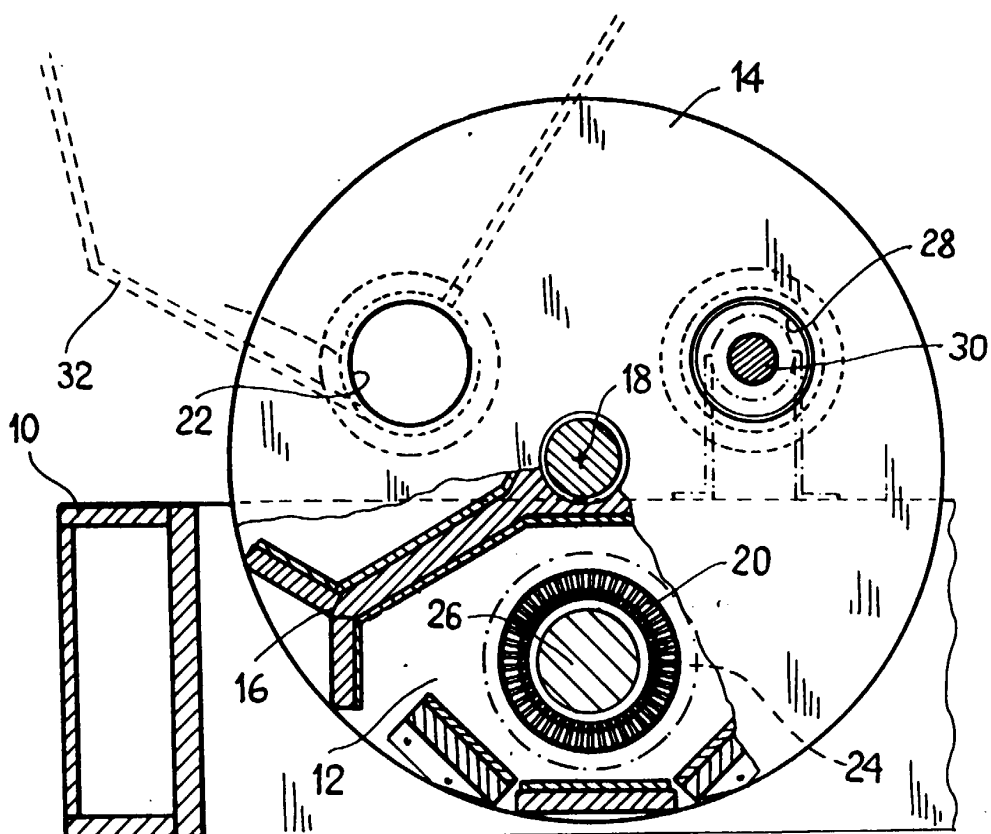


Fig. 1

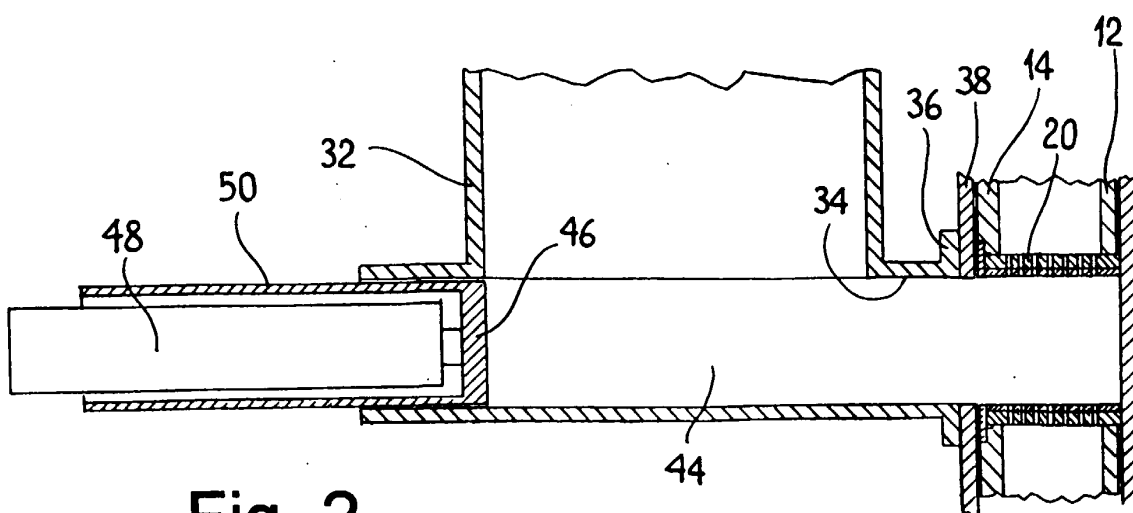


Fig. 2

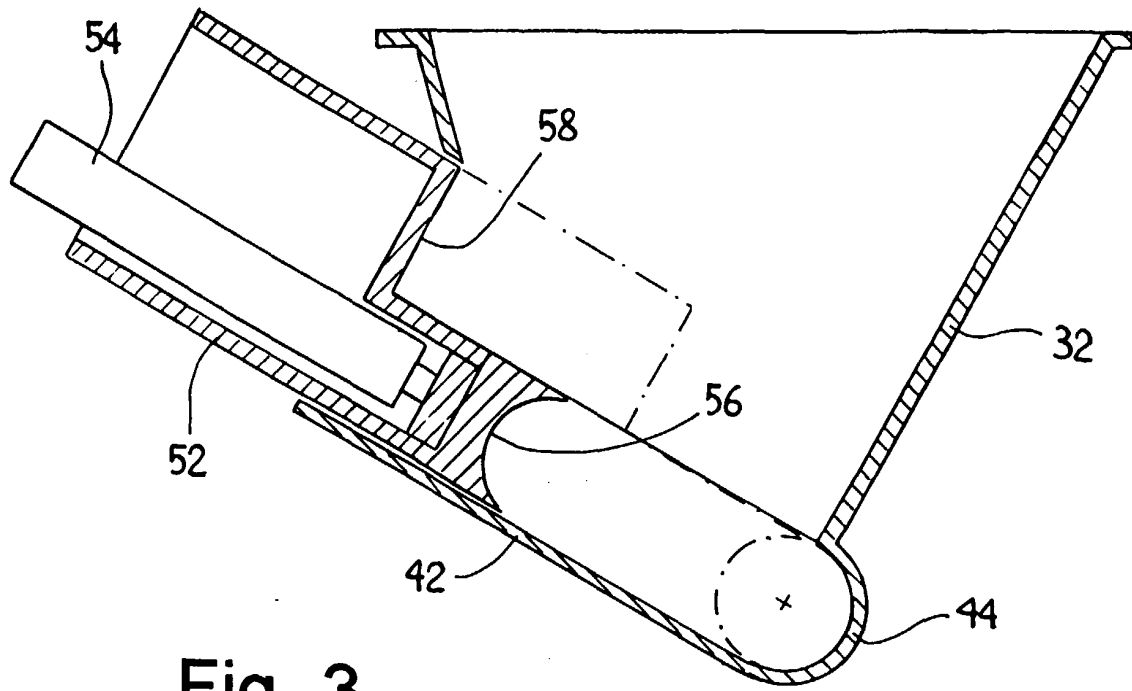


Fig. 3

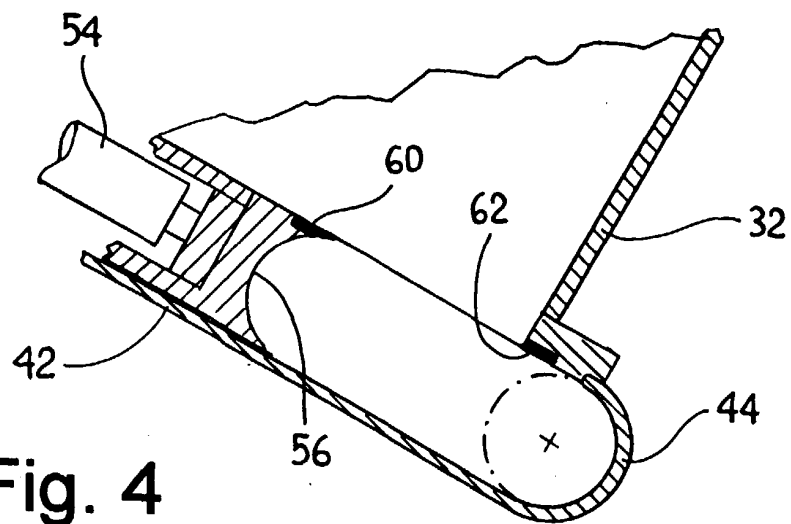


Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 20 4050

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 888 873 A (FM RACINE HYDRAULIK AG) 7 January 1999 (1999-01-07)	1,3,4	B30B11/10 B30B9/30
Y	* figures *	5,6	
Y	DE 41 05 138 A (GROENE ANDRE) 27 August 1992 (1992-08-27) * claim 1; figures 1,5 *	5,6	
X	FR 2 590 841 A (CHARTRES ETU REALISA OLEO HYDR) 5 June 1987 (1987-06-05) * abstract; figure 2 *	1-4	
X	DE 195 26 342 A (NENDEL KLAUS PROF DR ING) 23 January 1997 (1997-01-23) * figures 1,2 *	1,3,4	
X	FR 2 572 018 A (COMDEC) 25 April 1986 (1986-04-25) * abstract; figures *	1,2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B30B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 August 2000	Examiner Belibel, C
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
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 20 4050

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-08-2000

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0888873	A	07-01-1999	NONE	
DE 4105138	A	27-08-1992	NONE	
FR 2590841	A	05-06-1987	NONE	
DE 19526342	A	23-01-1997	NONE	
FR 2572018	A	25-04-1986	NONE	