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(54) **Press for treating solid city waste**

(57) A drum (12) carries a number of floating, perforated matrices or cylinders (24) with open bases, and is rotatable by steps in order to align each matrix in turn with a waste feeder (28), an extruder (30) and an unloader (32). A stationary wall (20), arranged on the opposite side of said feeder, has an aperture (34) that is

aligned with the feeder (28) and is plugged by a plugging device (36, 38, 40, 42) which can be opened to allow access to the inside of the matrix (24) currently aligned with the feeder. The plate can be fastened to the matrix by bolts in order to extract the latter through the aperture.

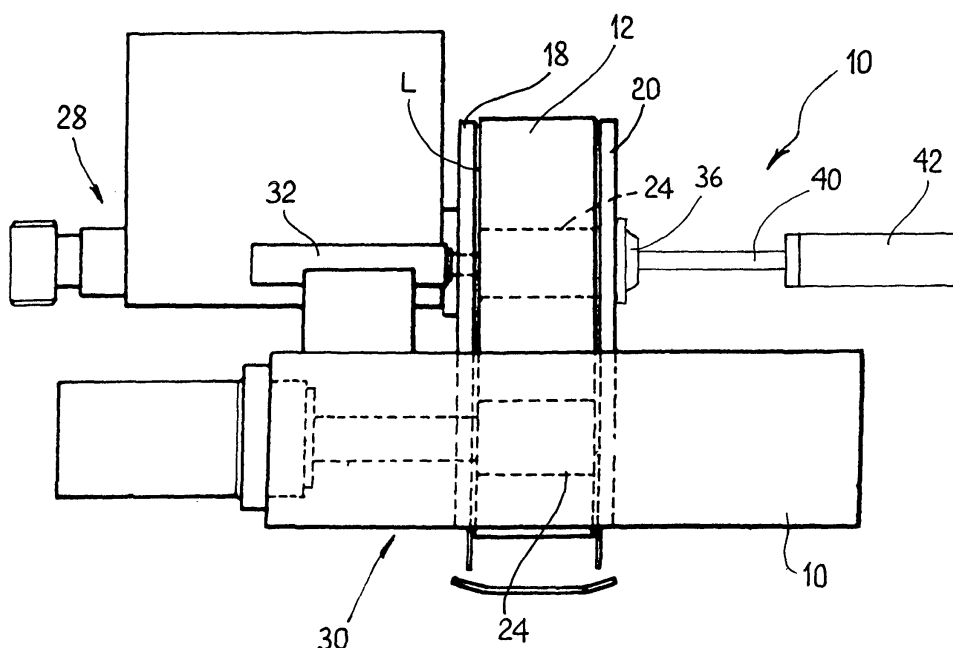


Fig. 1

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Description

[0001] This invention is concerned with an extruding press for treating solid city waste.

[0002] As well recognized, solid city waste is a material whose specifications are widely variable, both in its nature (organic or inert) and in its consistence, size and composition, and in any case it has a high degree of humidity. This material is usually disposed of in a dump or incinerator, after being sorted mainly in order to remove metals and large-size pieces, and after reducing humidity to below 20%.

[0003] In order to improve the efficiency and yield of such preliminary treatments, it is known to press or squeeze under high pressures the solid city waste in a perforated die or cylinder, so that the main proportion of its humid contents are wrung out through the holes in the cylinder, and so that the bulk of the dry residual material that is unloaded from the cylinder is substantially reduced.

[0004] A press that is suitable for advantageously performing such preliminary treatment is disclosed in IT-A-1 255 197, entitled "Macchina per il trattamento di materiale a contenuto umido, particolarmente per il riciclaggio di rifiuti solidi urbani". The above press, which in the following disclosure is referred to as the known press, substantially comprises a plurality of perforated cylinders carried in a rotating drum that is indexed to align each cylinder firstly with a waste material feeder, secondly with an extrusion station where the waste material is squeezed, and finally with a delivery station where the dry residue is discharged. The drum turns between two stationary walls, the gap between the drum and each wall being minimal, barely sufficient to avoid a sliding contact between them. One of the walls has three apertures located at the feeding station, extrusion station and delivery station, respectively, the perforated cylinders aligning in turn with each of them. The opposite wall is solid in front of the feeder, so that it will plug the cylinder base which is aligned with the feeder and therefore contain the material being loaded. Accordingly, said wall only has two apertures, located at the extrusion station and at the delivery station, respectively, and sealing means are provided for plugging the aperture at the extrusion station.

[0005] The above known press performs satisfactorily as far as efficiency and yield of the material treatment are concerned, but still has some structural and operational drawbacks. More particularly, the solid wall which permanently plugs the cylinder placed in front of the feeder can be a serious hindrance to restoring the operation of the press in case that unbreakable lumps or pieces of hard, particularly metallic material accidentally jam the press by catching in the gap between the cylinder and the wall. It should be noted that in these circumstances, in order to remove the jamming material, the inside of the cylinder can only be reached from the feeder side after awkward disassembly and removal of the

feeder itself.

[0006] The main object of the invention is therefore to avoid the above serious drawback, by improving the known machine so as to allow the material to be removed quickly and easily.

[0007] Moreover, another drawback of the machine according to IT-A-1 255 197 is the difficulty of removing and replacing the perforated cylinders. The replacement of the cylinders is required with some frequency due to several reasons, ranging from the need to renew the cylinders, which are liable to a rapid wear due to the strong squeezing pressures applied to the material being treated (about 1000 bar), to the need to change the gauges of the extrusion hole depending on (possibly seasonal) changes of the characteristics of the material being treated, and finally to a requirement for further treatment of the material downstream of the extrusion press. However, in the known machine, the removal of the perforated cylinders, which are supported floating in their respective seats in the drum, requires that the entire drum unit is lifted out of the frame, in order to allow the cylinders to be withdrawn laterally.

[0008] A further object of the invention is therefore to improve the known press so that the perforated cylinders can be easily withdrawn from the drum and replaced, without having to remove the drum from the machine.

[0009] The invention achieves the above and other objects and advantages, such as will appear from the following disclosure, with an extrusion press for treating solid city waste, having the features recited in the attached claims.

[0010] The features, aims and advantages of the improvements of the invention, made to the known extrusion press, will appear more clearly from the following detailed disclosure, with reference to the attached drawings, given by way of nonlimiting example, and wherein:

Fig. 1 is a side view in elevation of a press for the treatment of solid city waste according to the invention;

Fig. 2 is a view in axial cross-section, to an enlarged scale, of a detail of the press for the treatment of solid city waste at the loading station, according to a preferred embodiment of the invention; and

Fig. 3 is a view in cross-section similar to Fig. 2, showing the extraction of a perforate cylinder.

[0011] Fig. 1 shows an extrusion press for city waste according to IT-A-1255197, comprising a frame 10, preferably built as a sturdy portal structure and supporting a drum 12 for rotation around an horizontal axis (not shown). With reference to Fig. 2, drum 12 comprises a pair of spaced, parallel disks 14 and 16, which are connected by cross members not shown. The drum rotates between two walls 18 and 20, which are integral with

frame 10, and is spaced from each wall by a gap L of minimal width, such that it will allow the drum to turn freely between the walls.

[0012] Drum 12 has three seats such as 22, in which respective perforated cylinders or matrices such as 24 are floatingly received. The three seats 22 are arranged at equal angles around the drum axis, and drum 12 in its rotation will bring each of the three seats, together with its associated matrix, into successive alignment with: an aperture 26 on stationary wall 18, corresponding to a waste feeder 28; a similar aperture on stationary wall 18, corresponding to a waste extrusion station 30; and a further aperture on stationary wall 18, corresponding to an unloading or delivery station of the material resulting from the extrusion.

[0013] According to the invention, stationary wall 20 is provided, in front of the loading station, with an aperture 34, of a larger diameter than the outside diameter of matrix 24, and aligned with the corresponding aperture 26 in the stationary wall 18. Aperture 34 is plugged by a plugging device comprising a flanged plate 36 having a projection 38 matching aperture 34 of wall 20, and abutting against the base of the matrix which is dwelling there. Plate 36 is carried on a rod 40 of a double-acting hydraulic cylinder 42, which normally maintains rod 40 extended. Therefore, whenever feeder 32 pushes waste into matrix 24 through aperture 26, the waste material abut against plate 36 plugging aperture 34. When the waste loading operation is completed, drum 12 is stepped to the following extrusion position (station 32), and matrix 24 sliding along aperture 26 of wall 18 acts as a shears to trim any elongated bodies which might happen to be in an intermediate position. For an easier shearing, the edge of aperture 26 is reinforced with a hard metal 46.

[0014] However, the rotation of drum 12 may occasionally be blocked by a solid, bulky object such as a metal beam 44, which has a greater resistance to shear than the shear action offered by the machine. In this case, in order to restore the operation of the press, cylinder 42 is actuated to move plate 36 apart from aperture 34 to the position shown in dotted lines, and the material (including clogging material 44) is pushed out through aperture 34. Plate 36 is then immediately pushed back in order to continue the normal operation.

[0015] Fig. 3 illustrates how the invention is used for the extraction of the matrix. Fig. 3 is similar to Fig. 2, except that the flange of plate 36 has a set of bores 48 which can be aligned with corresponding threaded bores 50 in matrix 24.

[0016] Bores 48 do not affect the normal operation of the press as disclosed with reference to Fig. 1, since they are outside the area of the plate involved in plugging the end of matrix 24. However, when it is necessary, plate 36 can be fastened to matrix 24 by means of bolts 52 passing through bores 48 and screwed into bores 50. Hydraulic cylinder 42 can then be actuated to withdraw rod 40 to extract the entire matrix 24 from its seat, with-

out having to disassemble drum 12 from the press.

[0017] It is understood that the details of implementation can be changed with respect to what has been disclosed and illustrated by way of nonlimiting example, within the scope of the invention.

Claims

1. A press for the treatment of solid city waste, comprising a drum (12) supporting a number of floating, perforated matrices or cylinders (24) with open bases, the drum being rotatable by steps in order to align each matrix in turn with a waste feeder (28), an extruder (30) and an unloader (32), **characterized in that** a stationary wall (20) is arranged on the opposite side of said feeder, the stationary wall being provided with an aperture (34) that is aligned with the feeder (28) and is plugged by a plugging device (36, 38, 40, 42) which can be opened to allow access to the inside of the matrix (24) currently aligned with the feeder.
2. The press of claim 1, **characterized in that** the plugging device (36, 38, 40, 42) comprises a plate (36, 38) carried at one end of a rod (40) of a hydraulic cylinder driver (42) arranged with its axis at right angles to said stationary wall (20) for moving the plate at right angles to the wall.
3. The press of claim 2, **characterized in that** said plate (36, 38) has an axial projection (38) which is received in the aperture (34) in said wall (20).
4. The press of claim 3, **characterized in that** said aperture (34) in stationary wall (20) has a diameter equal or greater than the diameters of said matrices (24).
5. The press of claim 4, **characterized in that** said plate (36, 38) has a peripheral flange having bores (48) alignable with corresponding threaded bores (50) in the matrix (24) for engagement by bolts (52) to fasten the matrix to the plate.

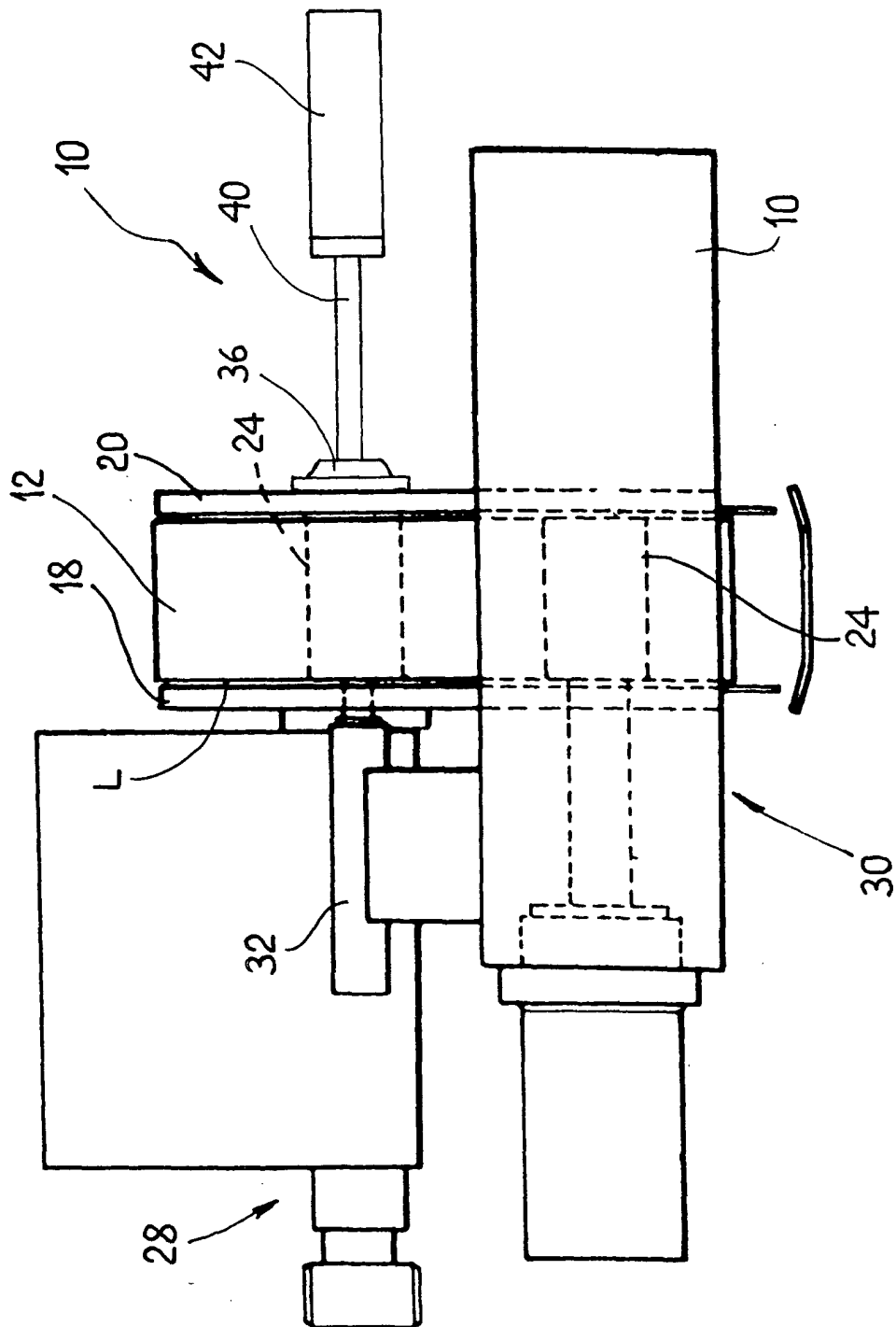


Fig. 1

