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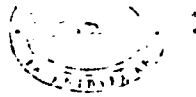
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S-203 14 Malmö 4(SE)(64) **A bale press and method for compressing waste material into bales.**

(57) A hydraulic bale press and a method for compressing bulky goods into bales. The bale press comprises an inlet section (2), a prepress chamber (3) and a main press chamber (4). The prepress chamber (3) comprises a prepress (7) having a prepress unit (8) arranged on a carriage (11) and pivotable around an axis (9). The carriage is reciprocable between a retracted position leaving the prepress chamber (3) essentially free, and an extended position in which a first precompression takes place. A second precompression is made by pivoting the prepress unit (8) around the axis (9) to the position shown in broken lines, thereby compressing the goods down into the main press chamber. During the two steps of the precompression, goods are continuously infed. After performing one or several precompression operations, a main compression is made by means of a main compression plunger (16), thereby feeding the material into a baling channel (18), where the bale is formed and treated in a conventional way (Figure 2).

EP 0 080 719 A2

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BALE PRESS AND METHOD FOR COMPRESSING WASTE MATERIAL INTO BALES

The present invention relates to a hydraulic bale press and a method for compressing waste material into bales, e.g. return paper, cardboard boxes or similar bulky goods.

A previously known bale press comprises a prepress and a main press.

5 An inlet opening opens into a prepress chamber. When this chamber is filled, a precompressing of the goods takes place into a main press chamber. The filling and precompressing can be repeated until sufficient material has been precompressed into the main press chamber. At this stage, the prepress stops in its bottom position and the main press is activated for compressing
10 the material into a bale, which is expelled through a channel, whereupon a new filling, precompressing and maincompressing takes place until a pre-determined bale length has been achieved, whereupon baling takes place. The bales are successively fed out from the channel.

Bale presses without any prepress do also exist.

15 At some applications it is desirable to have a wider inlet opening in order to be able to accomodate larger emty boxes and similar. If the above-mentioned bale press was constructed having a wider inlet opening, at least the prepress had to be proportionally enlarged and the total bale press should be too bulky for many applications. The other way around, the present
20 bale press is already too big for certain applications, and thus there is a need for a small but efficient bale press.

The object of the present invention is to provide a bale press of the above-mentioned type where it is possible to use a wider inlet opening or alternatively the machine size can be diminished.

25 Thus, according to the invention, the precompressing takes place in two steps, a first precompressing in the horizontal direction and a subsequent precompressing down into the main press chamber. After the first precompressing, further material can be loaded before the second precom-

pressing takes place down into the main chamber.

Thus, the present invention provides a bale press for compressing bulky goods and compressing the goods into bales. The bale press comprises an inlet section, a prepress chamber and a main press chamber. A main press
5 plunger is adapted to compress the goods into a bale. The prepress chamber comprises a prepress having a prepress unit mounted on a carriage and pivotable around an axis positioned on the carriage. The carriage is reciprocable between a retracted position leaving the prepress chamber essentially free and an extended position substantially decreasing the volume
10 of the prepress chamber.

The prepress unit has the shape of a fourth of a cylinder having a forward, essentially vertical wall, which performs the first precompressing during the movement of the carriage to the extended position. Thereafter the prepress unit is pivoted around its axis so that the forward wall sweeps
15 over an arc downwards to a lower, essentially horizontal position, thus in order to precompress the goods from the prepress chamber into the main press chamber in a second step.

The movements of the carriage is preferably horizontal and all movements are imparted by means of hydraulic cylinder devices.

20 The invention also provides a method for compression of bulky goods into bales. In accordance with the method, the precompression takes place in two distinctly separate steps, viz a first step including the horizontal movement of the carriage and a second step including the pivoting of the prepress unit.

25 Further objects and features of the invention will appear at the detailed description below of a preferred embodiment of the invention by reference to the drawings. Fig. 1 is a longitudinal side view with the side plate removed of the bale press in the start position or load position, while Fig. 2 is a similar side view of the bale press of Fig. 1 after the
30 horizontal compress operation.

The bale press according to the invention is shown in a longitudinal side view in Fig. 1 with the side plate removed. The bale press comprises an inlet section 2, a prepress chamber 3 and a main press chamber 4. The inlet section 2 is intended to be loaded from above.

35 Beside the prepress chamber 3 there is a prepress 7, comprising a prepress unit 8 in the shape of a fourth of a cylinder having a forward wall 19, which at its lower perpendicular side is pivotably journaled on an axis 9 and is driven by a cylinder unit 10. The complete prepress unit 8 is arranged on a carriage 11, which is horizontally reciprocable along a guiding or rails

12 between a retracted position shown in Fig. 1 and an extended position shown in Fig. 2 by means of a cylinder unit 13. During the horizontal movement, the volume of the prepress chamber 3 is decreased and a precompression or comprimation takes place in a first step. Simultaneously with this
5 horizontal movement of the carriage, an upper plate 14 follows the movement of the carriage and prevents goods to fall down behind the carriage 11.

After the first compression, a second compression takes place in a second step, by pivoting the prepress unit 8 around the axis 9 to the position shown in broken lines in Fig. 2, thereby comprimating or precom-
10 pressing the material in the prepress chamber 3 down into the main press chamber 4 by the forward wall 19. During this pivoting movement, the plate 14 prevents the goods to fall down behind the back rim of the prepress unit 8.

Thereafter, the prepress unit 8 is repivoted and the carriage is re-
15 tracted to the position shown in Fig. 1, and a continued filling of goods takes place, followed by a precompression as stated above. When the main press chamber 4 is full, a main compression takes place by means of the plunger 16, which is driven by a cylinder unit 17 and the bale is pressed into a channel 18, of which only the entry is shown on the drawings. The
20 continued baling operation is in accordance with known technique and is thus not given in detail here.

Experiments have proven that the addition of said horizontal precompression step at certain troublesome materials gives a firm and stable completed bale, where previously problems have been encountered since the bale
25 was too softly crammed. This is specially true for big cardboard boxes having relatively loose walls:

The method described above is used when the compression of bulky goods takes place. When heavy goods is compressed, such as periodicals, this is done with the carriage in the position shown in Fig. 2 and the
30 plates 5 are unfolded. Moreover, a material distributor 6 is unfolded and activated, which rotates and distributes and partially disintegrates the goods. Thereafter, a precompression is made by pivoting the prepress unit 8 forwards and downwards, one or several times and finally a main compression is made.

35 The inlet opening can now be made about double as wide as previously which entails an increased capacity. During the precompression normally a continuous goods infed takes place, but it is also possible to stop the infed during the compression operation.

The increased efficiency can also be used for making the machine con-

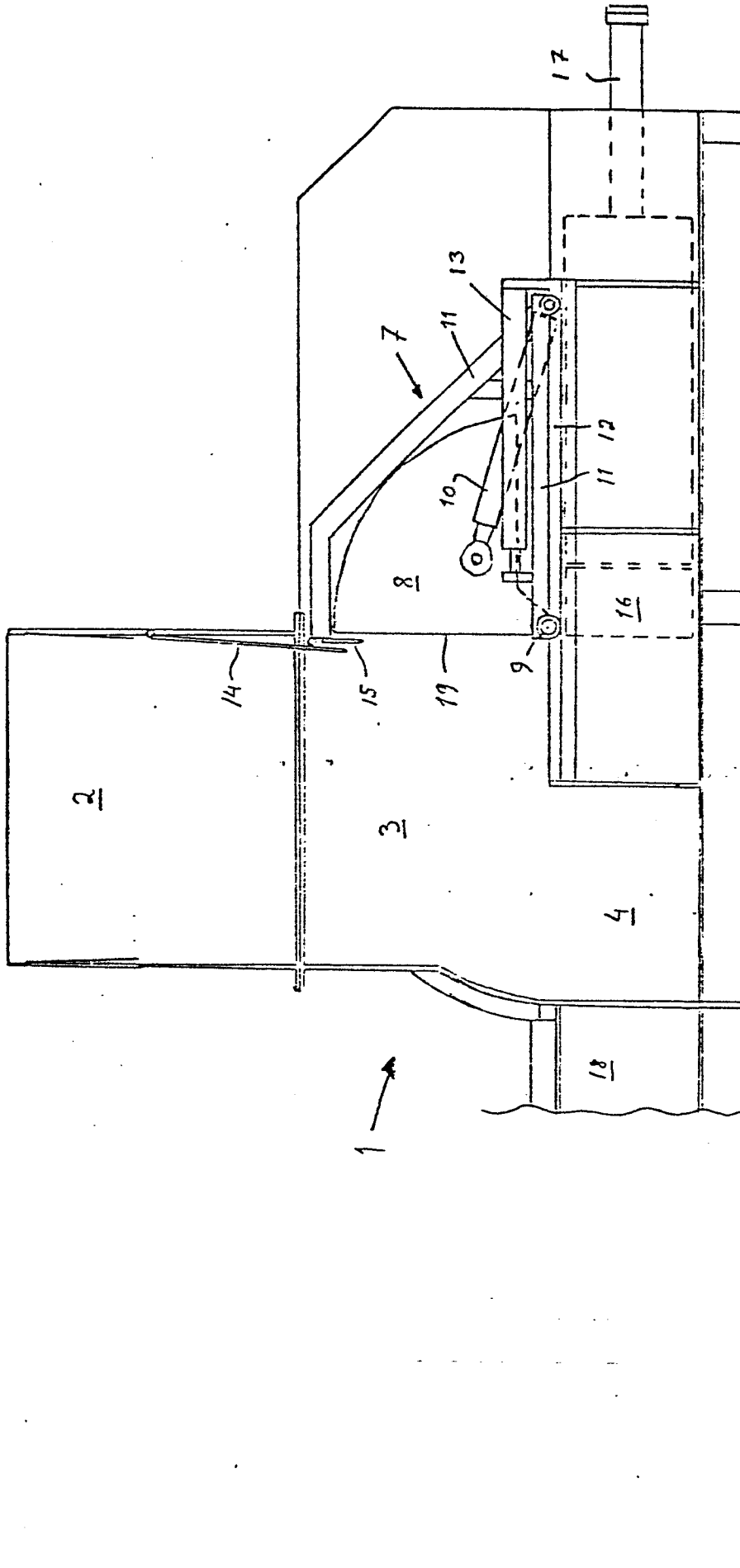
siderably smaller.

In the above a preferred embodiment of the invention has been described in order to elucidate the invention. However, the invention is not limited to the embodiment shown but can be modified in many respects within
5 the scope of the invention, as defined in the appended claims.

CLAIMS

1. A bale press for compressing bulky goods and compression thereof into bales, comprising an inlet section (2), a prepress chamber (3) and a main press chamber (4), whereby a main press plunger (16) is adapted to perform a main compression of the goods into a bale, characterized in that the prepress chamber comprises a prepress (7) having a prepress unit (8) with a forward wall (19) arranged on a carriage (11), the carriage being reciprocable between a retracted position essentially leaving the prepress chamber (3) free and an extended position in which the forward wall (19) substantially decreases the volume of the prepress chamber.
2. A bale press as claimed in claim 1, characterized in that the prepress unit (8) has the shape of a fourth of a cylinder and is pivotable around an axis (9) positioned on the carriage between a first position in which the forward wall (19) of the prepress unit is essentially vertical, to a second position in which the forward wall (19) of the prepress unit is essentially horizontal in order to precompress the goods in a second step from the prepress chamber (3) to the main press chamber.
3. A bale press as claimed in claim 1 or 2, characterized in that the movements of the bale press is imparted by means of hydraulic cylinder units (10, 13, 17).
4. A bale press as claimed in any of the previous claims, characterized in that the carriage is guided on horizontal rails (12).
- 5, Method of compressing bulky goods into bales in a bale press comprising an inlet section (2), a prepress chamber (3) and a main press chamber (4), including the step of compressing the goods in the main compression chamber into a bale, characterized by a first precompression by moving a carriage in the prepress chamber, the carriage including a prepress unit (8) having a forward wall (19), from a retracted position to an extended position in which the forward wall substantially decreases the volume of the prepress chamber.
6. Method as claimed in claim 5, characterized by a second precompression by pivoting the prepress unit (8), which has the shape of a fourth of a cylinder and is pivotable around an axis (9) positioned on the carriage, from a first position in which the forward wall (19) is essentially vertical, to a second position in which the forward wall is essentially horizontal thereby precompressing the goods in a second step from the prepress chamber to the main press chamber.

Fig 1.2



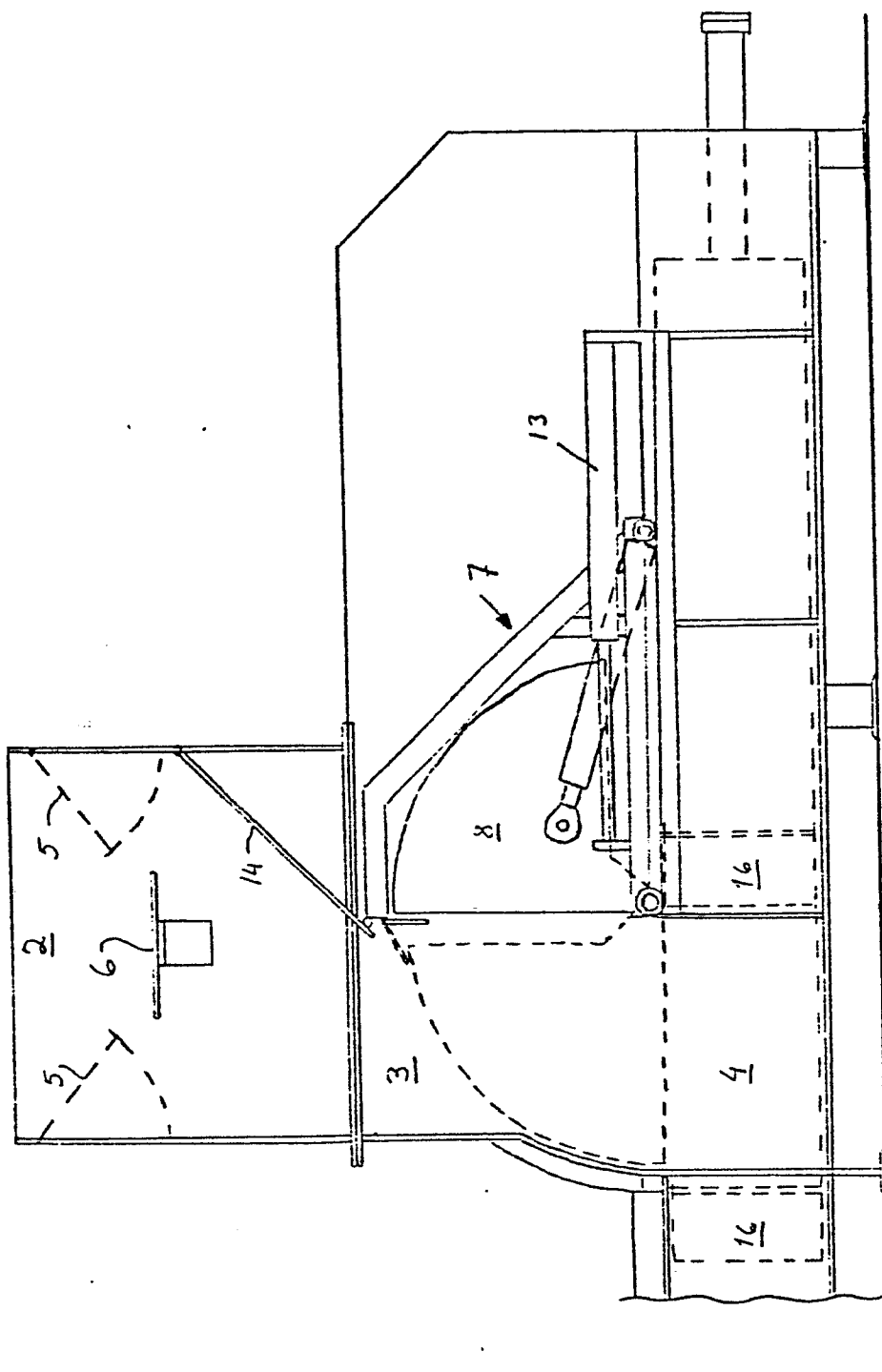


Fig 2