United States Patent

Aluotto

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[54] VERTICAL-HORIZONTAL BALING PRESS

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[52] **U.S. Cl.**.....**100/53,** 100/3, 100/188, 100/192, 100/232, 100/246, 100/256, 100/269, 100/278

[51] **Int. Cl.**.....**B65b 13/02,** B30b 7/04

[58] **Field of Search**.....100/42, 3, 53, 245, 256, 269, 100/232, 188, 192, 240, 246, 278, 215, 137, 138, 139, 141, 142, 143

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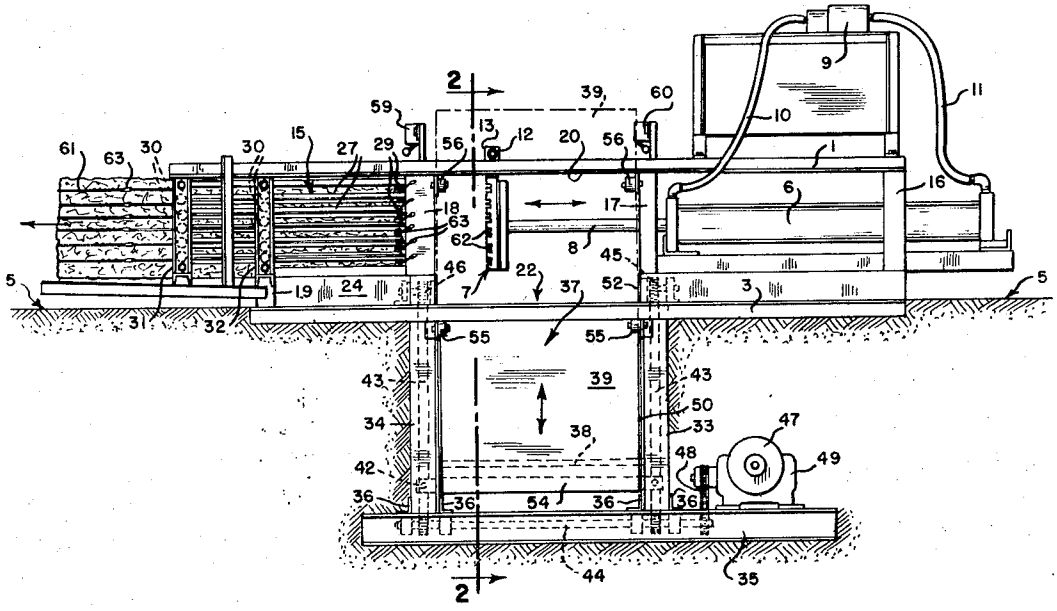
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[57] **ABSTRACT**

The baling press has a horizontal portion and a vertical portion and is adapted to bale waste paper and other loose and bulky materials. The horizontal portion embodies a conventional baling chamber and a plunger operated by a hydraulic cylinder. The vertical portion embraces a pit disposed between the baling chamber and the plunger when in retracted position, with a lifter of special construction within the pit and cooperating with the end walls of the pit.

5 Claims, 6 Drawing Figures



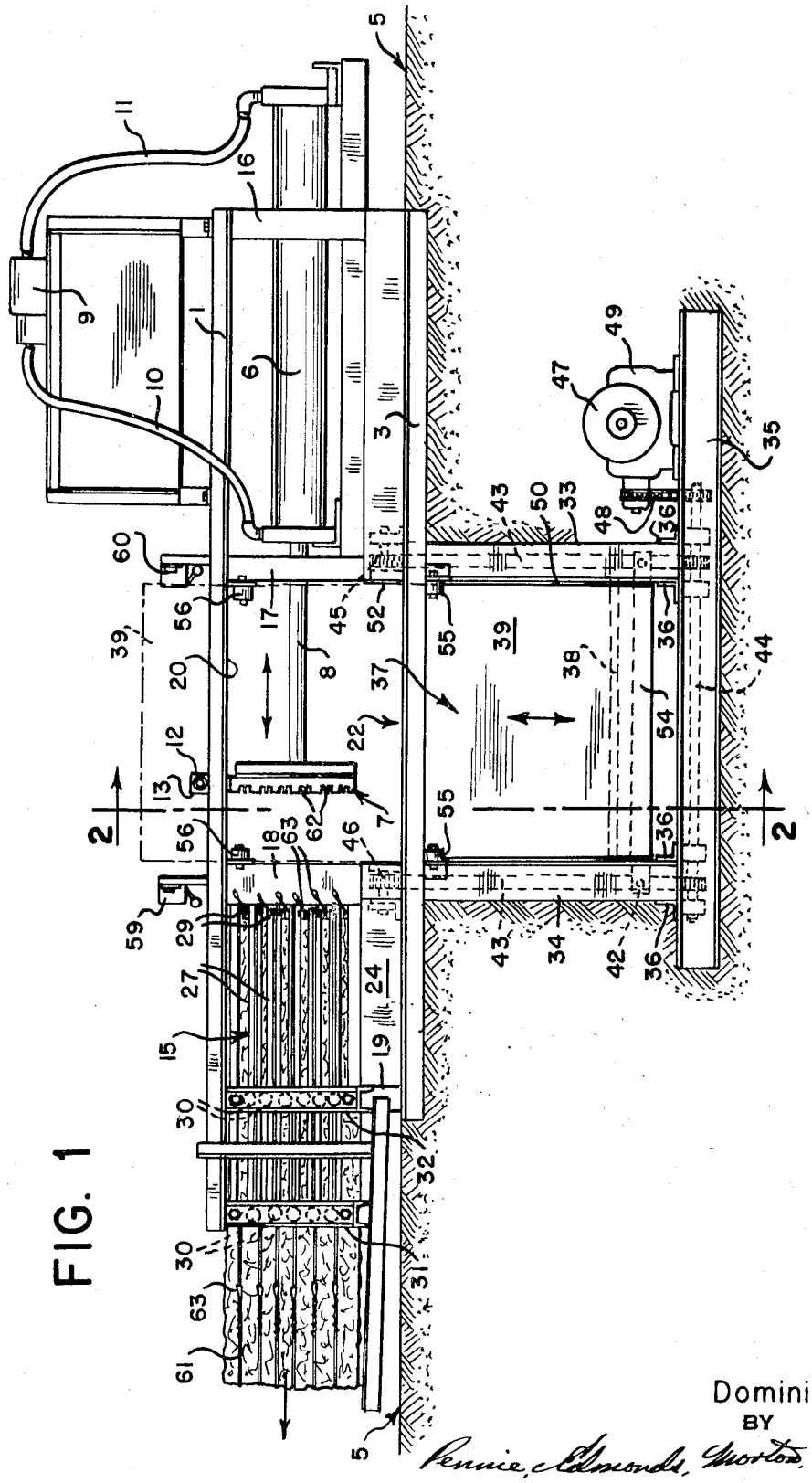


FIG. 1

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FIG. 2

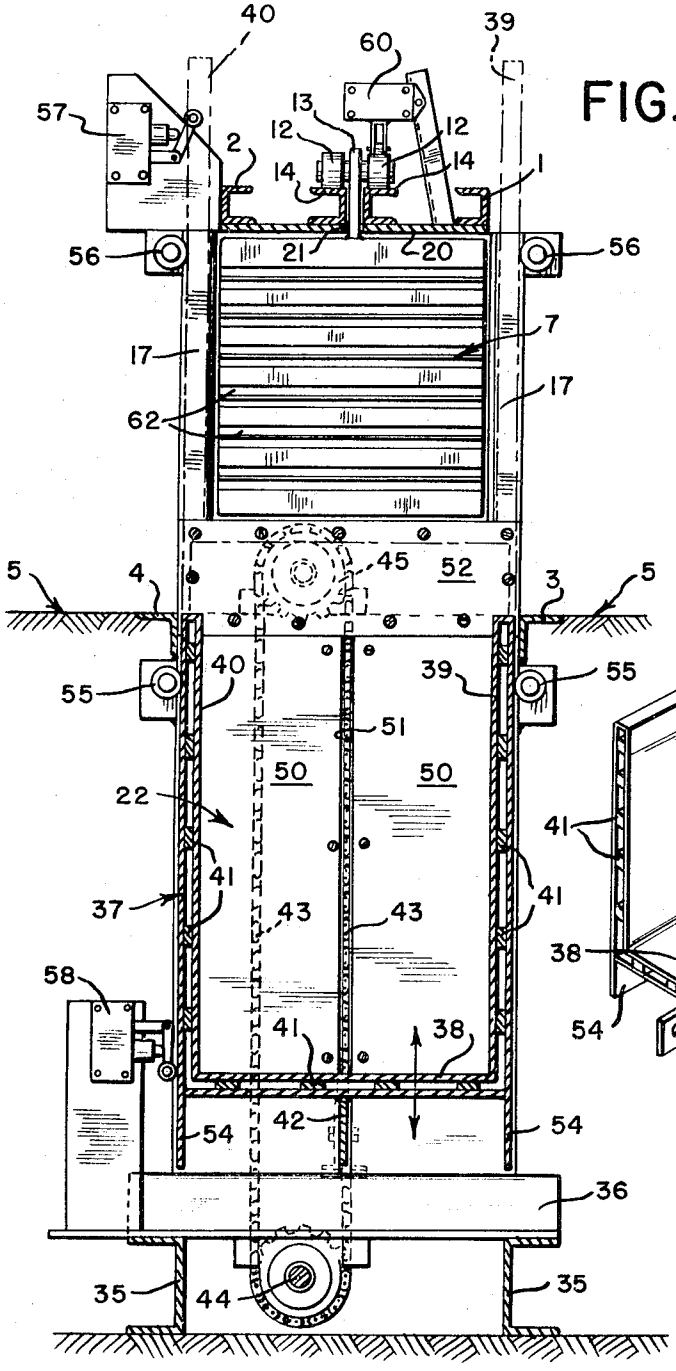
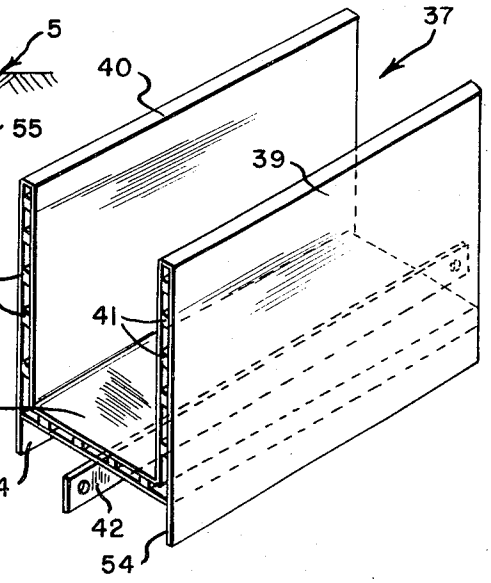


FIG. 3



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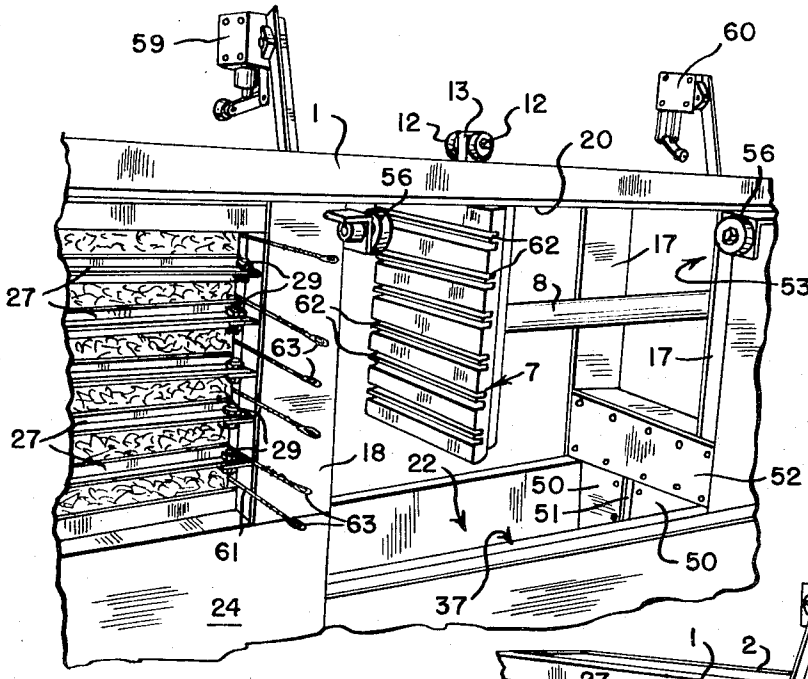


FIG. 4

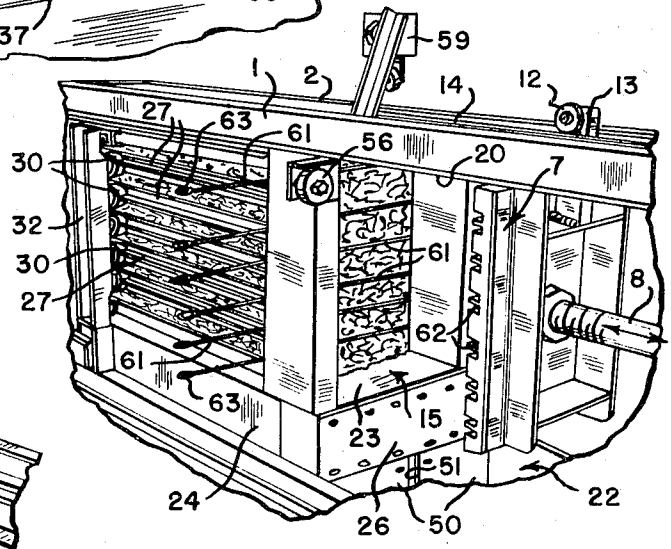


FIG. 5

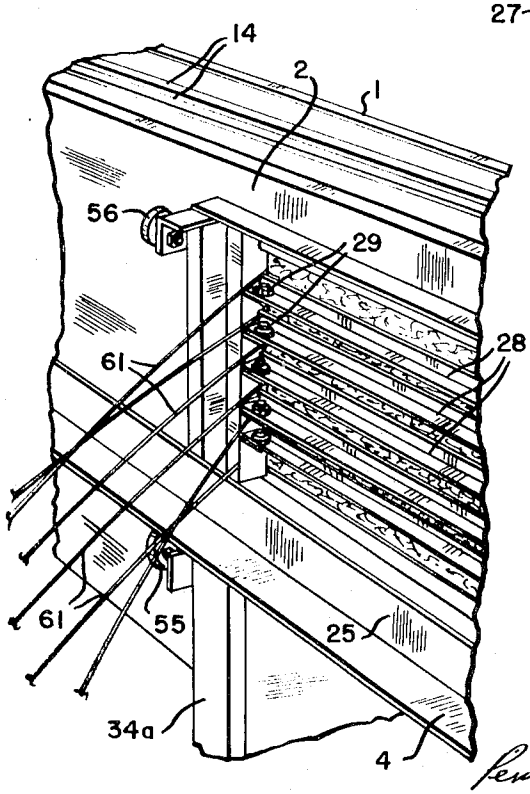


FIG. 6

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VERTICAL-HORIZONTAL BALING PRESS

SUMMARY OF THE INVENTION

The baling press is intended to bale scrap or waste materials such as wastepaper, corrugated paper, cardboard, cartons, newsprint, magazine trim, rags and other waste materials.

The press has a horizontal frame structure with a baling chamber section at its left end and a hydraulic cylinder at its right end and spaced from the baling chamber. A roof structure extends lengthwise of the framework, particularly at the central section beneath which there is a loading pit, the roof structure advantageously extending continuously from end to end of the baling press.

The pit section also includes a steel supporting framework and it has a right-hand wall which is in approximate vertical alignment with the plunger on the piston of the hydraulic cylinder when the plunger thru the piston of the hydraulic cylinder when the is in its retracted position. The opposite end wall of the pit section is in vertical alignment with the entrance to the baling chamber.

The lifter, which as indicated previously is of special construction, has a bottom wall and opposed sidewalls attached to the side edges of the bottom wall thus forming a structure which is U-shaped in cross section. With the end walls of the pit the lifter forms a chamber within which the material to be baled is partially compressed by the coaction of the lifter bottom and side walls, the pit end walls and the roof structure. The lifter is raised until its bottom is level with the bottom of the baling chamber. This partially compressed material is then further compressed by the operation of the plunger which moves the material lengthwise of the elevated lifter and into the baling chamber. After a number of repetitions of the combined vertical and horizontal compressions just described the baling chamber will be filled, and the conventional wires are placed about the bale. These wires are threaded through spaced horizontal parallel grooves provided in the vertical face of the plunger and then carried around the bale.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side or elevational view of the baling press with the ground or other supporting material shown in section.

FIG. 2 is a vertical section taken on line 2—2 of FIG. 1 looking in the direction of the arrows.

FIG. 3 is a perspective view of the lifter.

FIG. 4 is a fragmentary perspective or isometric view of the central portion of the baler looking from the left.

FIG. 5 is a similar view from the right and,

FIG. 6 is a view somewhat similar to FIG. 5 from the opposite side of the baler.

DETAILED DESCRIPTION

Referring to FIGS. 1 and 2 the baling press comprises a frame structure having upper horizontal channel members 1 and 2 at the front and rear of the baler respectively. Parallel to these members are front and rear angle members 3 and 4 at the level of the loading floor 5. Supported within the framework at its right end portion or section there is a hydraulic cylinder 6 having a plunger 7 at the left end of piston rod 8. Cylinder 6 is operated by means of a fluid pump 9 which is connected through control valves (not shown) to the opposite ends of the cylinder by hose members 10 and 11. The plunger 7 is supported not only by piston 8 but also by a pair of rollers 12 which are rotatably mounted on a cross rod at the upper end of a short bar 13 (FIG. 2) which is welded centrally at the upper side of the plunger. These rollers 12 travel along a pair of rails 14 in the form of channel bars which are supported on the framework midway between the front and rear frame channels 1 and 2. At the left end of the framework there is a baling chamber 15 which will be referred to more in detail below.

The upper front and rear top frame members 1 and 2 are supported by pairs of front and rear vertical steel posts 16, 17, 18 and 19. A roof member shown as a flat steel plate 20 extends throughout the length of the frame structure from one end to the other of the top channel members 1 and 2. It is provided with a central lengthwise slot 21 (FIG. 2) which allows for the travel of plunger 7 and through which the short bar 13 for the supporting rollers 12 projects.

The two vertical steel posts 17 are located adjacent the right end of the pit which may be designated by numeral 22. The two vertical posts 18 are at the left end of pit 22 and form the entrance to baling chamber 15. The roof of baling chamber 15 is formed by plate 20, and the bottom by a somewhat similar but shorter plate 23 which may be seen in FIG. 5. Plate 23 is supported at a distance above the top of bottom frame members 3 and 4 and of loading floor 5 by means of vertical side plates 24 and 25 (FIG. 4, 5 and 6) and a front or end plate 26.

The sides of baling chamber 15 are of conventional construction being formed by a series of horizontal steel bars 27 on the front side (FIG. 1) and 28 on the rear side (FIG. 6). These are usually made in the form of I-beam sections as illustrated. At their right ends these bars 27 and 28 are pivoted by bolts 29 to short projections welded on the side surface of vertical posts 18. At their right ends the side bars 27 and 28 are individually supported by cuplike members 30 which in turn are supported by coil springs (not shown), one on the interior of each cup member, these springs being fixed on the front side to a vertical channel member 31. The bars 28 for the rear side of the baling chamber are similarly supported.

Thus as a charge of waste material is advanced into the baling chamber 15 by plunger 7 the sides of the mass of waste material are compressed by the springs just mentioned and also cause the side bars 27 and 28 to be forced outward to some extent, pivoting on the bolts 29 at their front ends. A second upright channel member 32 equipped with a similar set of cuplike members and coil springs may be added on each side of the baling chamber in order to produce greater lateral compression of the waste material.

In pit 22 there are four upright channel frame members, one at each corner. The two front channel members 33 and 34 are visible in FIG. 1 and the two rear channel members are directly behind them. One of these, 34*a*, may be seen in FIG. 6. Front channel members 33 and 34 are secured at the bottom to a horizontal lengthwise channel member 35, a second such member serving to support the two rear channel members. Front and rear channel members 35 are joined together into a framework by means of steel angle bars 36 shown in FIGS. 1 and 2.

The U-shaped lifter 37 shown in FIG. 3 is arranged for vertical movement in pit 22. Lifter 37 has a bottom 38 and front and rear sidewalls 39 and 40. To provide the strength necessary to compress the waste material these walls may be made in a two layer or double construction as shown in FIGS. 2 and 3 where the bottom 38 and each side wall 39 and 40 is constructed of two layers of sheet metal separated and also joined together by a plurality of spaced steel bars 41 which extend lengthwise of the lifter from the left side thereof to the right. These bars are shown as rectangular bars but if desired bars of other cross section may be used.

In order to operate lifter 37 upwardly and downwardly in pit 22 a lengthwise supporting bar 42 is welded at its upper edge beneath bottom 38 and the ends of such bar project to the left and right respectively and are appropriately connected to endless chains 43 as indicated by dotted lines in FIG. 1. The lower end portions of chains 43 engage sprockets which are fixed to a shaft 44. The upper ends of the chains pass over individual sprockets 45 and 46 which rotate freely on short shafts supported on the lower angle members 3 and 4 of the apparatus framework. An electric motor 47 drives shaft 44 and is connected thereto by means of an endless chain 48 and an appropriate speed-reducing unit 49.

In order to form a closed compression chamber within the lifter 37 pit 22 is provided with end walls. Each of these walls at the right and left of the pit comprises a pair of similar steel plates 50 (FIG. 2) which are appropriately fixed in position on the framework of the pit structure and are spaced apart cen-

trally so as to leave a channel **51** for the passage of the end extensions of supporting member **42** for lifter **37**. The construction just described is shown in FIG. **2** for the end wall at the right end of pit **22**. The wall at the left end is similarly constructed. These two end walls are each provided with an extension plate **52** so as to raise the top edges of the walls to the level of the lower edge of plunger **7** on one side and to the bottom of the entrance to baling chamber **15** on the opposite side.

When lifter **37** is in its lowermost or bottom position the tops of its side walls **39** and **40** are level with the loading floor **5** (FIG. **3**) so that it is an easy matter to introduce the waste material into the pit and the U-shaped lifter. When the lifter is somewhat less than full and the plunger **7** has been withdrawn to the right where it enters into a receiving cavity **53** shown in FIG. **4**, motor **47** is operated to raise lifter **37**. This raises the waste material and as the top edges of the sides **39** and **40** rise above the roof plate **20**, as indicated by the dotted lines in FIG. **2**, the material is compressed, being confined between the sidewalls of the lifter the end walls **50** of the pit and the extension **52** and surface of plunger **7**. The material may spill over at the left of the lifter somewhat into the entrance of baling chamber **15**. This compression continues until the bottom **38** of the lifter reaches the level of the entrance to the baling chamber and the bottom of plunger **7** which is the limit of the upward movement of the lifter, shown by the dot and dash lines in FIGS. **1** and **2**.

Thereupon plunger **7** is operated by hydraulic cylinder **6** and moves the partially compressed material into the end portion of baling chamber **15**. Skirt portions **54** which are extensions at the bottom of the sidewalls **39** and **40** of lifter **37** are provided as a safety feature to prevent an operator from placing his toes beneath the bottom of lifter **37**.

The lifter is guided in its vertical up and down movement by means of two pairs of rollers **55** and **56** which are suitably mounted on the framework of the apparatus and engage the sidewalls of the lifter. The lifter **37** is provided with suitable electronic control for its operating motor **47** which includes a manually operated starting button (not shown), and switches **57** and **58** which automatically stop the lifter at its top and bottom positions respectively. Similar control is provided for operating the valve which controls the flow of fluid pressure to and from the hydraulic cylinder **6**. This control includes limit switches **59** and **60** which stop the movement of plunger **7** in its movement towards the left and right respectively.

It will be understood that each amount of waste material received in pit **22** is compressed in two stages, an initial partial compression such as effected by the lifter **37**, and the complete compression such as produced by plunger **7**. It will also be understood that the successive operations of the lifter and plunger are repeated to place sections of compressed waste material in the baling chamber until the baling chamber is filled.

When the baling chamber has been filled as indicated in FIG. **5** plunger **7** is left in position until baling wires **61** are applied. This is done by threading the open ends of the wires through crosswise channels **62** which are provided in plunger **7**. With the loop ends of the wires left projecting as shown in FIG. **5** the free ends are carried around the back side of the bale between certain of the bars **28** after which they are swung around the opposite end of the bale and brought back to the loops **63** to which they are secured.

I claim:

1. In a baling press, a horizontal frame structure embracing,

a. a hydraulic cylinder and plunger section,

b. a baling chamber section, and

c. a pit section disposed between said hydraulic cylinder and baling chamber sections,

d. said frame supporting a roof structure extending continuously from the plunger of the hydraulic cylinder section when in retracted position throughout the pit section and to the baling chamber section,

e. said pit section having stationary vertical end walls adjacent respectively the said retracted plunger and the front of said baling chamber section, each of said end walls extending from the bottom of said pit to the level of the bottom of said plunger and to the bottom of said baling chamber respectively, and

f. a lifter which is vertically reciprocable within said pit, said lifter having bottom and sidewalls forming with said stationary end walls a loading and compressing area,

g. means for raising and lowering said lifter, the raising movement thereof causing compression against said walls and roof structure of waste material placed within the pit, the bottom of the lifter being raised to the level of the bottom of said baling chamber and of said plunger and

h. means for actuating said hydraulic cylinder to cause the plunger thereof to move between said roof structure and the bottom of the raised lifter and between the two sidewalls of the lifter to advance and further compress said material and move the same into said baling chamber.

2. A baling press according to claim **1** wherein the roof structure is a continuous flat plate.

3. A baling press according to claim **2** in which the roof structure extends throughout the pit and baling chamber sections.

4. A baling press according to claim **1** in which a loading floor for the pit section is arranged at an elevation below the level of the bottom of the baling chamber and said plunger, the lifter being provided at least on one side, with a skirt portion which extends to the level of the loading floor when the lifter is in its uppermost position.

5. A baling press according to claim **1** in which the plunger is provided with a plurality of horizontal grooves in its forward face so that baling wires may be applied across the rear face of a bale before it is released by the plunger.

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