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Newcom et al.

[11] **3,851,577**

[45] **Dec. 3, 1974**

[54] **VERTICAL BALER**

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[73] Assignee: **Munro-Newcom, Inc.,** Southampton, Pa.

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[52] **U.S. Cl.** ..... **100/218,** 100/3, 100/53, 100/100, 100/255, 100/269 R, 100/295

[51] **Int. Cl.** **B30b 15/32**

[58] **Field of Search** ..... 100/3, 269 R, 255, 53, 100/229 A, 245, 218, 100, 52, 295

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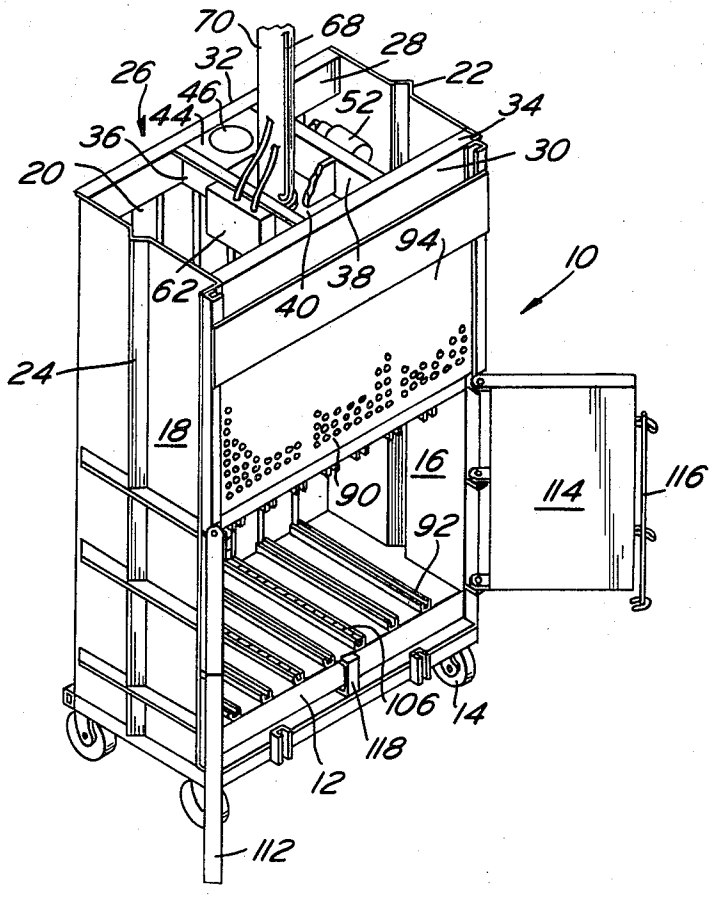
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Primary Examiner—Billy J. Wilhite

[57] **ABSTRACT**

A vertical baler for baling scraps such as cardboard boxes is disclosed. All of the hydraulic system is an integral structural part of the roof. For purposes of shipment, the cylinder may be lowered into the housing using its own hydraulic system without connecting or disconnecting any conduits.

7 Claims, 6 Drawing Figures



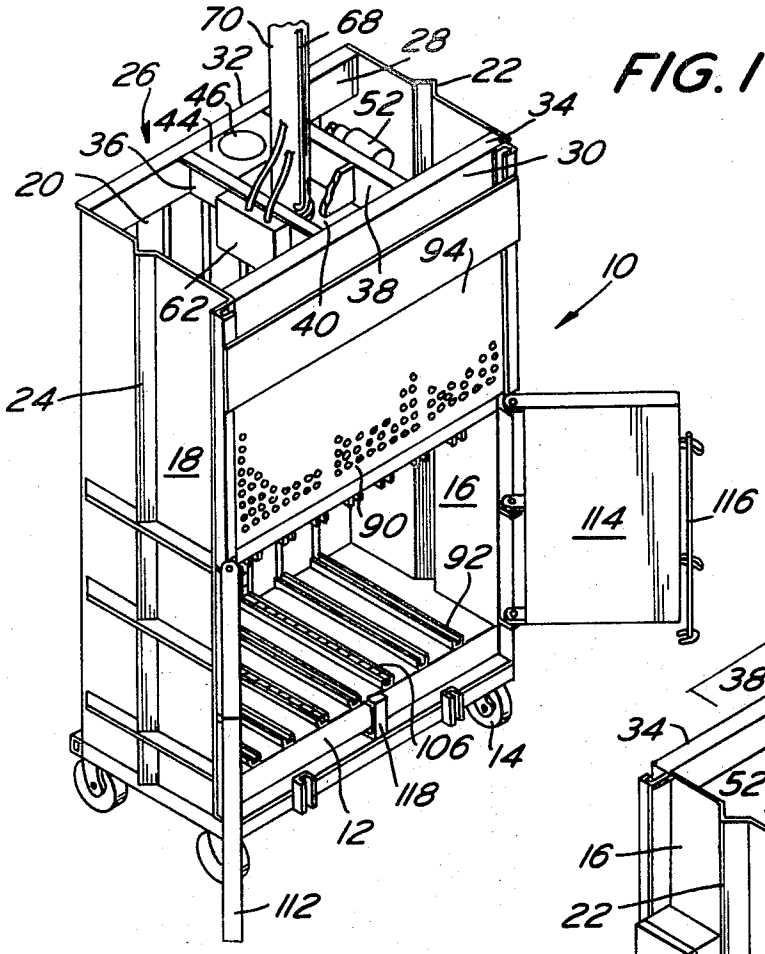

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FIG. 1

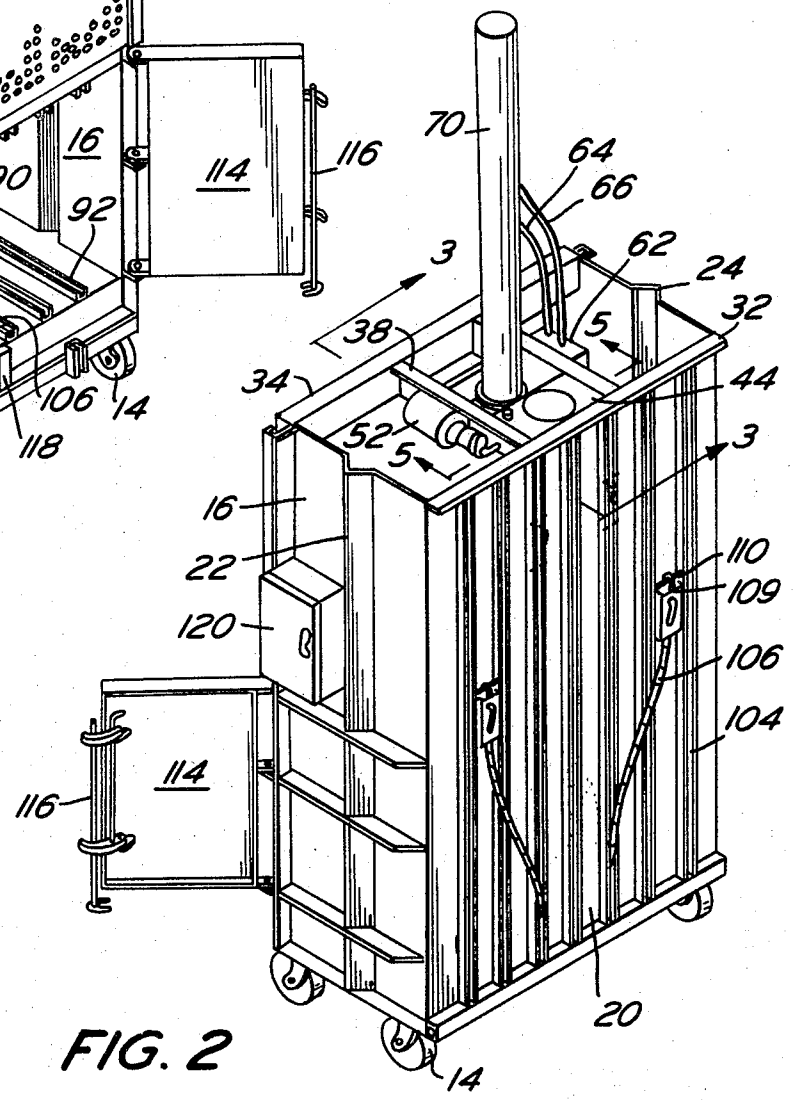

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FIG. 2

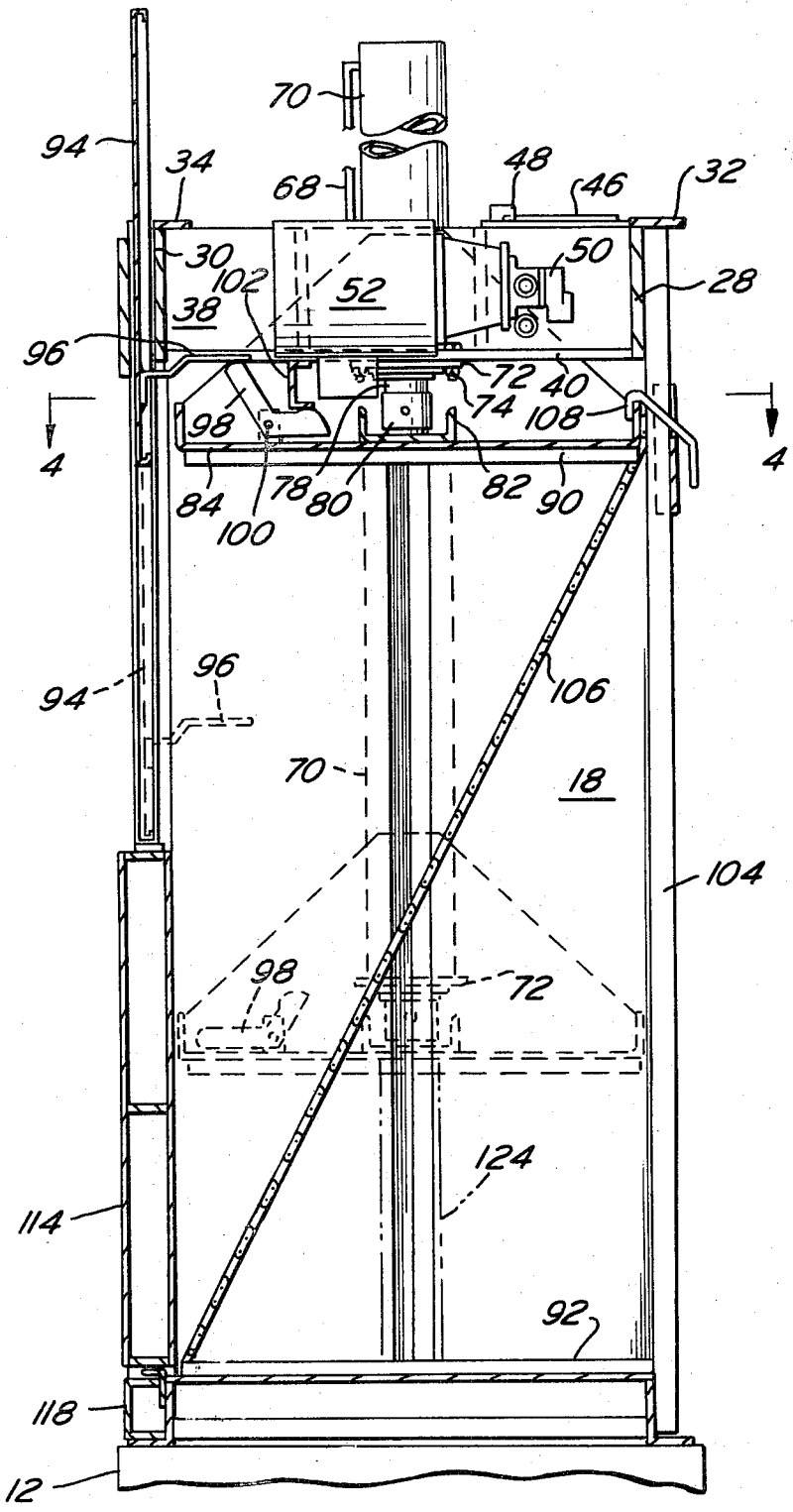

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FIG. 3

FIG. 4

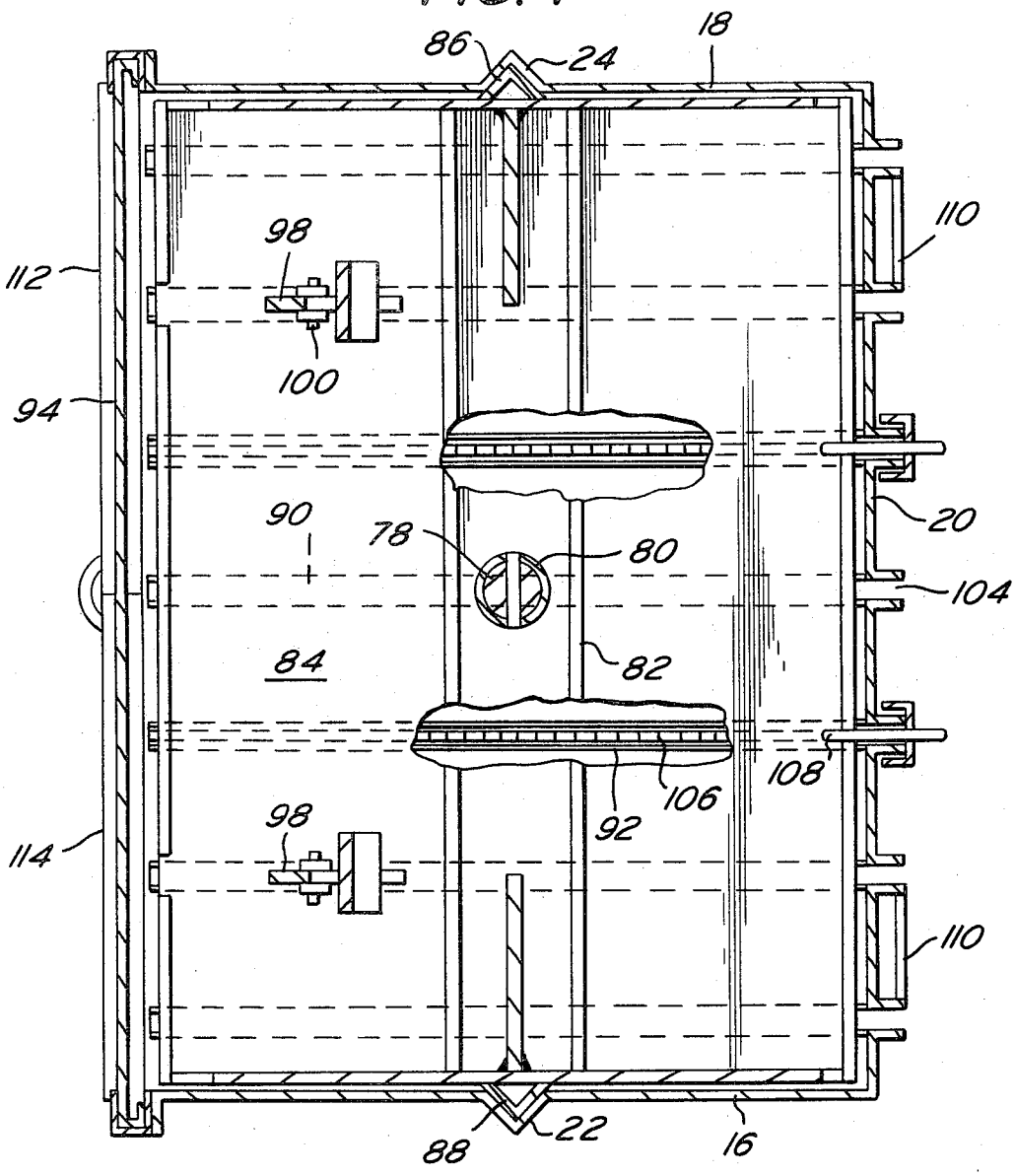

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FIG. 5

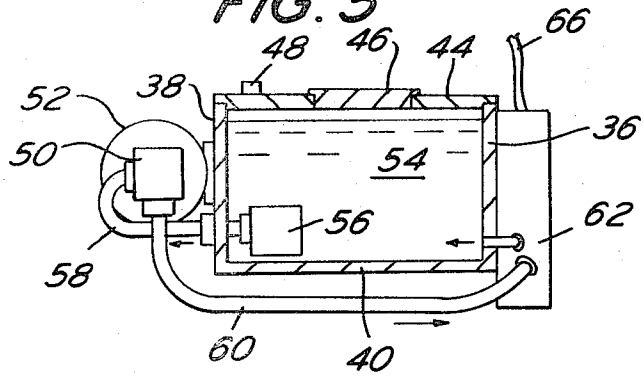
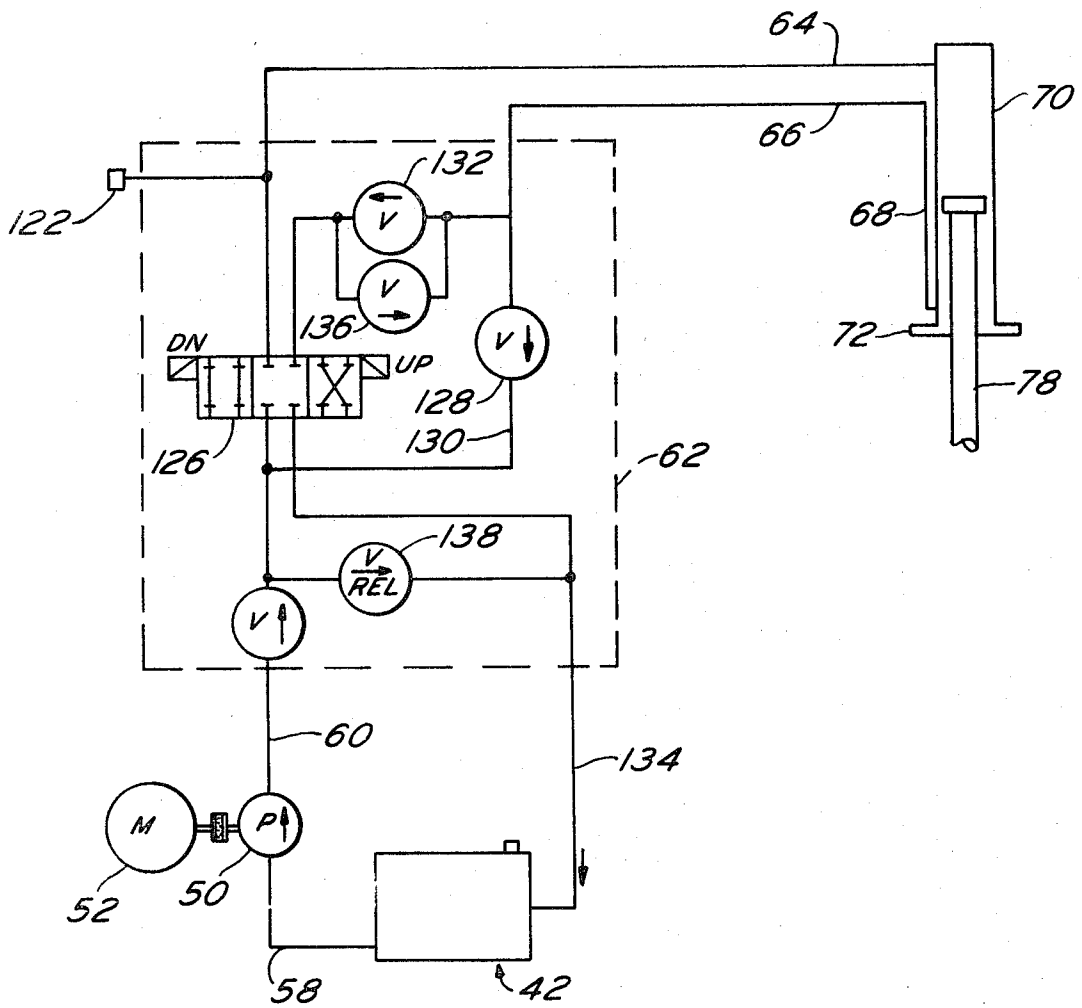

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FIG. 6


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VERTICAL BALER

The vertical baler of the present invention is adapted to be used in connection with the baling of scrap materials such as cardboard boxes, paper, and the like. The baler of the present invention is structurally interrelated in a manner so as to occupy a minimum amount of floor space and require minimum work for purposes of installation. Thus, the vertical baler of the present invention could be a mobile unit. Access to the baling chamber is attained by means of a pair of pivotable doors on the front face of the baler.

In order to maximize the size of the bale which can be produced while at the same time minimize the floor space required for the baler, all of the hydraulic system is a structural integral part of the roof of the baler. Thus, the roof of the baler includes a trough which supports the oil reservoir, the cylinder, the pump and motor, the valve manifold, etc. During operation, the cylinder projects upwardly from the roof. The cylinder is mounted in the unique manner whereby it may be caused to descend into the baler by use of its own hydraulic power without connecting or disconnecting any conduits.

The baler of the present invention is of a simplified construction whereby it may be operated by personnel who do not require any extensive training. With the safety gate up, the operator merely introduces waste material into the baling chamber. Periodically, the platen is caused to descend and compress the waste material. When the platen reaches the end of its stroke, a pressure switch causes the platen to return to its up position. After a sufficient amount of material has been compressed in the baling chamber, the material may be baled and ejected in a manner which is simple, easy, and reliable.

It is an object of the present invention to provide a novel vertical baler.

It is another object of the present invention to provide a baler which can produce a maximum size bale using a minimum amount of floor space by locating all hydraulics as an integral structural part of the roof.

It is another object of the present invention to provide a vertical baler having a low profile for purposes of shipment by providing a cylinder which may descend into the baler housing by means of its own hydraulic power without disconnecting or connecting any conduits.

Other objects will appear hereinafter.

For the purpose of illustrating the invention, there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIG. **1** is a front perspective view of the baler of the present invention with the doors to the baling chamber in an open disposition.

FIG. **2** is a rear perspective view of the baler in accordance with the present invention.

FIG. **3** is a sectional view taken along the line **3—3** in FIG. **2.**

FIG. **4** is a sectional view taken along the line **4—4** in FIG. **3.**

FIG. **5** is a sectional view taken along the line **5—5** in FIG. **2.**

FIG. **6** is a schematic hydraulic circuit.

Referring to the drawing in detail, wherein like numerals indicate like elements, there is shown in FIG. **1** a vertical baler designated generally as **10.** If desired, the baler **10** may be rendered mobile by mounting the base **12** on wheels **14.**

The baler **10** includes a housing defined by side walls **16** and **18** and a rear wall **20,** each of which are secured to the base **12.** The base **12** defines the bottom of the housing and cooperates with the walls of the housing to define a baling chamber. Side wall **16** is provided with a vertically disposed, centrally arranged V-channel **22** which is coextensive with the interior of the housing. Side wall **18** is provided with a similar but oppositely disposed channel **24.** The purpose of channels **22** and **24** will be made clear hereinafter. Each of the side walls **16** and **18** are provided with reinforcement members as shown more clearly in FIGS. **1** and **2.**

The housing of the baler **10** is provided with a roof unit **26** which may be prefabricated as a subassembly and includes all of the hydraulics as a structural integral part thereof. The roof unit **26** includes a rear structural channel member **28** and a front structural channel member **30.** Member **28** has a flange **32** which overlies the upper end of the rear wall **20** and is secured thereto. Member **30** has a horizontally disposed flange **34** which overlies the upper front edges of the side walls **16** and **18** and is secured thereto. The members **28** and **30** are secured to the side walls and the rear wall to rigidify the entire housing.

Members **28** and **30** of the roof unit **26** support therebetween a trough having a vertical side wall **36,** a vertical side wall **38,** and a bottom wall **40.** See FIGS. **1, 2** and **5.** The trough runs from front to rear and is made from plate steel which is sufficiently rigid so as to support thereon all of the hydraulics. For example, plate steel having a thickness of approximately three-fourths inch would be satisfactory.

The trough includes an oil reservoir **42** having a top wall **44.** The top wall **44** is provided with a removable cover **46** and a breather cap **48.**

As shown more clearly in FIGS. **3** and **5,** a pump **50** and its associated motor **52** are supported by the wall **38** of the trough. Pump **50** withdraws oil **54** from the reservoir **42** through a strainer **56** and conduit **58,** and transmits the same by way of conduit **60** to a valving manifold **62.** As shown in FIG. **5,** conduit **60** passes beneath the bottom wall **40** of the trough.

The valve manifold **62** includes the various hydraulic controls such as a sequential valve, directional valve, pressure switch, etc. Manifold **62** directs the oil **54** under pressure to one of the flexible conduits **64** and **66.** Conduit **64** communicates directly with the top of the cylinder **70** above the piston therein. Conduit **66** connects to the upper end of extension conduit **68.** Extension conduit **68** is on the front of the cylinder **70** and communicates with the bottom of cylinder **70** below the piston therein.

As shown more clearly in FIG. **3,** the cylinder **70** at its lower end is provided with a flange **72.** Cylinder **70** extends through the bottom wall **40** of the trough with its flange **72** bolted to the bottom wall **40** on the lower surface thereof by means of a set of bolts **74.** Thus, instead of merely resting on top of the bottom wall **40,** the cylinder **70** is supported by the lowermost surface of the wall **40.**

The piston rod **78** is connected by a pin at its lower end to a coupling **80.** The coupling **80** is secured to a

channel 82 on the upper surface of a platen 84. The platen 84 defines the upper end of the baling chamber and is adapted to be moved toward and away from the base 12 by means of the piston rod 78.

The platen 84 is provided with a V-guide 86 on one side adjacent wall 18 of the housing. The V-guide 86 is received in the V-channel 24 for assisting in guiding the platen 84 in its vertical movement. The opposite side of the platen 84 is provided with a similar V-guide 88 which is received in the V-channel 22 on the side wall 16. Cooperation between the guides 86, 88 and the mating channels 24, 22 results in the platen 84 being limited to vertical reciprocatory movement with minimum twist or tilt during compression of scrap material in the baling chamber.

The baler 10 includes a vertically reciprocable safety gate 94 which may be of wire mesh construction or perforated metal. The safety gate 94 is reciprocated vertically to provide an access opening to facilitate introduction of scrap material into the baling chamber at an elevation below the elevation of the platen 84. In FIG. 3, the sold line position of safety gate 94 is its elevated position. In FIG. 1, the safety gate 94 is in its lowermost position. A safety gate of this nature, per se, is well known to those skilled in the art and further details with respect to the same are not deemed necessary.

The platen 84 is provided on its lower surface with spaced parallel channel members 90. The channel members 90 open downwardly. Spaced parallel channel members 92 are secured to the base 12 in the baling chamber. Channel members 92 open upwardly. Each channel member 92 is aligned with and opposite to one of the channel members 90. The purpose of the channel members 90 and 92 will be referred to in greater detail hereinafter.

The safety gate 94 is provided with a pair of rigid arms 96 which extend inwardly towards the rear wall 20. A gate lift member 98 is supported by the upper surface of the platen 84 in line with each of the arms 96. See FIGS. 3 and 4. Each gate lift member 98 is generally L-shaped and pivoted to brackets on the upper surface of platen 84 by means of a pin 100. One leg of the gate lift member 98 is provided with a cam surface adapted to cooperate with one of the fixed limit stops 102 on the bottom surface of the bottom wall 40 of the trough. Thus, when the platen 84 is raised to the solid line position in FIG. 3, the gate lift members 98 contact the arms 96 and raise the safety gate 94 to the position shown in FIG. 3.

The rear wall 20 of the housing is provided with a plurality of vertical slots 104. See FIGS. 2 and 4. Each slot 104 is aligned with a set of the channel members 90, 92.

A pair of flexible members 106, such as chains, are secured at one end to the base 12 and lie within a pair of the channel members 92. See FIG. 1. The flexible members 106 extend through the aligned slots 104 in the rear wall 20 and terminate in a support plate 109 having a handle and a hook 108. Each hook 108 is adapted to be supported in an inoperative position by a bar 110. See FIG. 2 which shows such inoperative position. As shown more clearly in FIG. 4, a pair of bars 110 are supported by the rear wall 20.

When it is desired to eject a bale, the hooks 108 are attached to a rear edge of the platen 84 by extending the same through one of the slots 104. See the position of these elements in FIG. 3. Such attachment of the hooks is done while the platen 84 is a lowermost position. As the platen 84 rises to the solid line position shown in FIG. 3, the flexible members 106 eject the bale outwardly through the opening resulting from the open disposition of the doors 112 and 114.

The doors 112 and 114 are each pivotably supported by the housing and cooperate to form a front wall for the baling chamber. A suitable lock 116 is provided on one of the doors for cooperation with the other door and the base 12. Thus, the lock 116 also engages the bracket 118 on the base 12 to hold the doors in a closed disposition. The lock 116 may be any one of a wide variety of commercially available locks and therefore need not be described in further detail. A control box 120 may be supported in any convenient location such as on side wall 16. See FIG. 2. The control box 120 includes the various switches for operating the motor, solenoids on valves, etc.

It is believed that the schematic hydraulic diagram shown in FIG. 6 will be apparent from the above whereby further description is not deemed necessary. The operation of a baler is well known to those skilled in the art, whereby a detailed description of operations is not deemed necessary. Hence, the abbreviated description set forth hereinafter should be adequate.

When receiving scrap materials to be baled, the components assume the solid line position shown in FIG. 3. Scrap materials are introduced into the baling chamber through the opening between the lower edge of the safety gate 94 and the upper edge of the doors 112, 114. When it is desired to compress the materials, the appropriate button is actuated to introduce oil 54 from reservoir 42 into the upper end of cylinder 70 by way of the manifold 62 and conduit 64. The safety gate 94 and the platen 84 descend. The safety gate 94 bottoms out on the upper edge of the doors 112, 114 while the platen 84 continues to descend and compress the material therebelow in the baling chamber.

When the pressure applied reaches a maximum such as 1600 psi, this is detected by switch 122 which reverses the direction of movement of the platen 84. When a sufficiently large enough amount of material has been compressed into a bale, the platen 84 is caused to descend and apply maximum pressure to the bale. The doors 112 and 114 are unlocked and moved to an open disposition as shown in FIG. 1. Thereafter, wire, twine or the like is inserted through one of the channel members 92, through a slot 104 in the rear wall 20, back through one of the channel members 90, and then the free ends are joined together. Two or more such bindings may be made to confine the bale. Thereafter, the hooks 108 are moved from the position shown in FIG. 2 to a position wherein they are engaged on the rear edge of the platen 84. Thereafter, the platen 84 is caused to move upwardly to the position shown in solid lines in FIG. 3 whereby the flexible members 106 will eject the bale through the opening in the front of the baler and onto the floor, onto a pallet, or other support.

A feature of the vertical baler 10 of the present invention is the ability of the overall height to be substantially reduced for purposes of shipment. In this regard, the cylinder 70 may be caused to descend down into the housing and thereby shorten the overall height of the baler 10 by the length of the exposed portion of the cylinder 70.

In order to cause the cylinder **70** to descend into the housing, the following steps should be followed. The platen **84** should be caused to move downwardly to the phantom position shown in FIG. **3** wherein it is in engagement with wooden blocks **124.** Thereafter, the bolts **74** are removed so that the cylinder **70** is no longer supported by the bottom wall **40** of the trough. Thereafter, the appropriate switch is manipulated to introduce oil into the cylinder **70** by way of conduit **66** which normally tends to raise the platen. Instead, the introduction of oil into cylinder **70** will cause the cylinder **70** to descend downwardly to the phantom position shown in FIG. **3** under its own hydraulic power without connecting or disconnecting any conduits. During such descent of the cylinder **70,** the conduits **64** and **66** will flex. Since no connection or disconnection of conduits is necessary in order to effect a descent of the cylinder **70,** the operation is simpler, easier, faster, and is less likely to result in damage or mistake to fittings.

Referring to FIG. **6,** it will be noted that directional valve **126** will have been shifted to the right from the neutral position as illustrated when oil is being pumped from conduit **60** to conduit **64.** At the same time, any oil below the piston is recycled to conduit **64** by way of check valve **128** in conduit **130.** When the pressure in conduit **66** is about 1,100 psi, valve **132** will open and cause the remaining oil in conduit **66** to return to the reservoir **42** by way of conduit **134.** When valve **126** is shifted to the left in FIG. **6,** conduit **60** communicates with conduit **66** by way of valve **126** and check valve **136.** If at any time the pressure in conduit **60** exceeds a predetermined maximum such as 1,700 psi, conduit **60** communicates with conduit **134** by way of the bypass relief valve **138.**

It will be noted that the hooks **108** are coupled to the platen **84** in a manner whereby they will automatically disengage if they contact an obstruction during downward movement. In order to facilitate the ease of ejection of a bale, the side walls **16** and **18** taper from front to back. That is, the distance across the front of walls **16** and **18** is greater than the width across rear wall **20.** If it is desired to compress the scrap material into a container such as a bag or box, it is preferable to eliminate members **90** and **92.**

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

We claim:

1. A baler comprising a housing having a base at the bottom thereof and defining the bottom of a baling chamber in the housing, a platen supported by the housing for movement in a vertical direction toward and away from the base, said base and platen on their juxtaposed faces having channels through which a flexible member may extend during application to confine a bale in said chamber, means at the upper end of said housing supporting a cylinder having its piston rod connected to said platen for causing movement of said platen, door means on said housing for providing access to said baling chamber, said housing having a rear wall provided with slots, each rear wall slot being aligned with a channel on said base, a plurality of flexible members each having one end secured to said base, each flexible member extending in one of the channels on the base and through the aligned slot in the rear wall, means defining an inoperative position on the rear wall of said housing for the ends of flexible members remote from the base, and means on the last mentioned ends of said flexible members for removably attaching the same to said platen whereby the flexible members may selectively effect ejection when the door means are open and the platen is moved to an uppermost position away from the base.

2. A baler comprising a housing having a base at one end and a trough at the other end, said trough being at the end of the housing remote from the base, a reservoir in said trough, a pump supported by the trough and connected to the reservoir, a cylinder supported by the trough, means connecting the outut of the pump to opposite ends of the cylinder, a piston rod in the cylinder connected to a platen, said platen being mounted for movement toward and away from the base to compress materials therebetween, door means on the housing for providing access to a baling chamber in the housing, each of said base and platen on their juxtaposed faces having channels through which a flexible wire or rope may extend during application to confine the bale, said housing including a rear wall having slots, each rear wall slot being aligned with a channel on said base, flexible members secured at one end to the base, each flexible member extending in one of the channels on the base and through the aligned slot in the rear wall, means defining an inoperative position for the ends of the flexible members remote from the base and on the rear wall of said housing, and means for removably attaching the last-mentioned ends of said flexible members to said platen whereby the flexible members will effect ejection when the door means is open and the platen is moved to an uppermost position.

3. A baler comprising a vertically disposed housing having a base at its bottom, a roof unit at the top of said housing, said roof unit including a trough, a reservoir in said trough, a pump supported by the trough and connected to the reservoir, a cylinder supported by a trough extending upwardly from the roof unit, means connecting the output of the pump to opposite ends of the cylinder, said last-mentioned means including a valving manifold and conduits, said valving manifold being supported by said trough, a piston rod in the cylinder, the lower end of said piston rod being connected to a platen therebelow within said housing, said platen being mounted for movement toward and away from the base to compress materials therebetween, door means on the housing for providing access to a baling chamber in the housing, means on the juxtaposed surfaces of said base and platen defining channels through which a flexible member may extend to bind a bale under compression in the baling chamber, said housing having a rear wall, said rear wall having vertically disposed slots, at least one flexible member having one end secured to the base and extending through one of said slots, means defining an inoperative position for the other end of the flexible member on the rear wall of said housing, and means on said other end of said flexible member for removably attaching the same to said platen.

4. A baler comprising a vertically disposed housing having a base at its bottom, a roof unit at the top of said housing, and defined by a trough, a reservoir in said trough, a pump supported by the trough and connected to the reservoir, a cylinder supported by said trough

and extending upwardly from the roof unit, means connecting the output of the pump to opposite ends of the cylinder, said last-mentioned means including a valving manifold and conduits, said valving manifold being supported by said trough, said cylinder extending through the space between side walls of the trough, said cylinder having a flange removably connected to a face of the trough within the housing so that the cylinder may enter the housing under hydraulic power from said pump, means including said conduits for recycling hydraulic fluid from one end of the cylinder to the opposite end of the cylinder, a piston rod in the cylinder, the lower end of said piston rod being connected to a platen therebelow within said housing, said platen being mounted for movement toward and away from the base to compress materials therebetween, door means on the housing for providing access to a baling chamber in the housing, and means on the juxtaposed surfaces of said base and platen defining channels through which a flexible member may extend to bind a bale under compression in the baling chamber.

5. A baler in accordance with claim **4** wherein side walls of said housing are provided with a V-channel, each channel cooperating with a V-guide on said platen to limit movement of the platen toward and away from the base with minimal twisting or tilting.

6. A baler in accordance with claim **4** wherein said manifold being supported by the trough on an opposite side from the pump, said conduits including a pair of flexible conduits extending from the manifold to the end of the cylinder remote from the trough, one of said flexible conduits communicating with said last-mentioned end of the cylinder, the other of said flexible conduits communicating with one end of an extension conduit attached to the outer periphery of the cylinder, said extension conduit communicating with the end of the cylinder adjacent said trough.

7. A baler in accordance with claim **4** wherein said housing includes a rear wall having slots, each rear wall slot being aligned with a channel on said base, flexible members secured at one end to the base, each flexible member extending in one of the channels on the base and through the aligned slot in the rear wall, means defining an inoperative position for the ends of the flexible members remote from the base and on the rear wall of said housing, and means for removably attaching the last-mentioned ends of said flexible members to said platen whereby the flexible members will effect ejection when the door means is open and the platen is moved to an uppermost position.

* * * * *