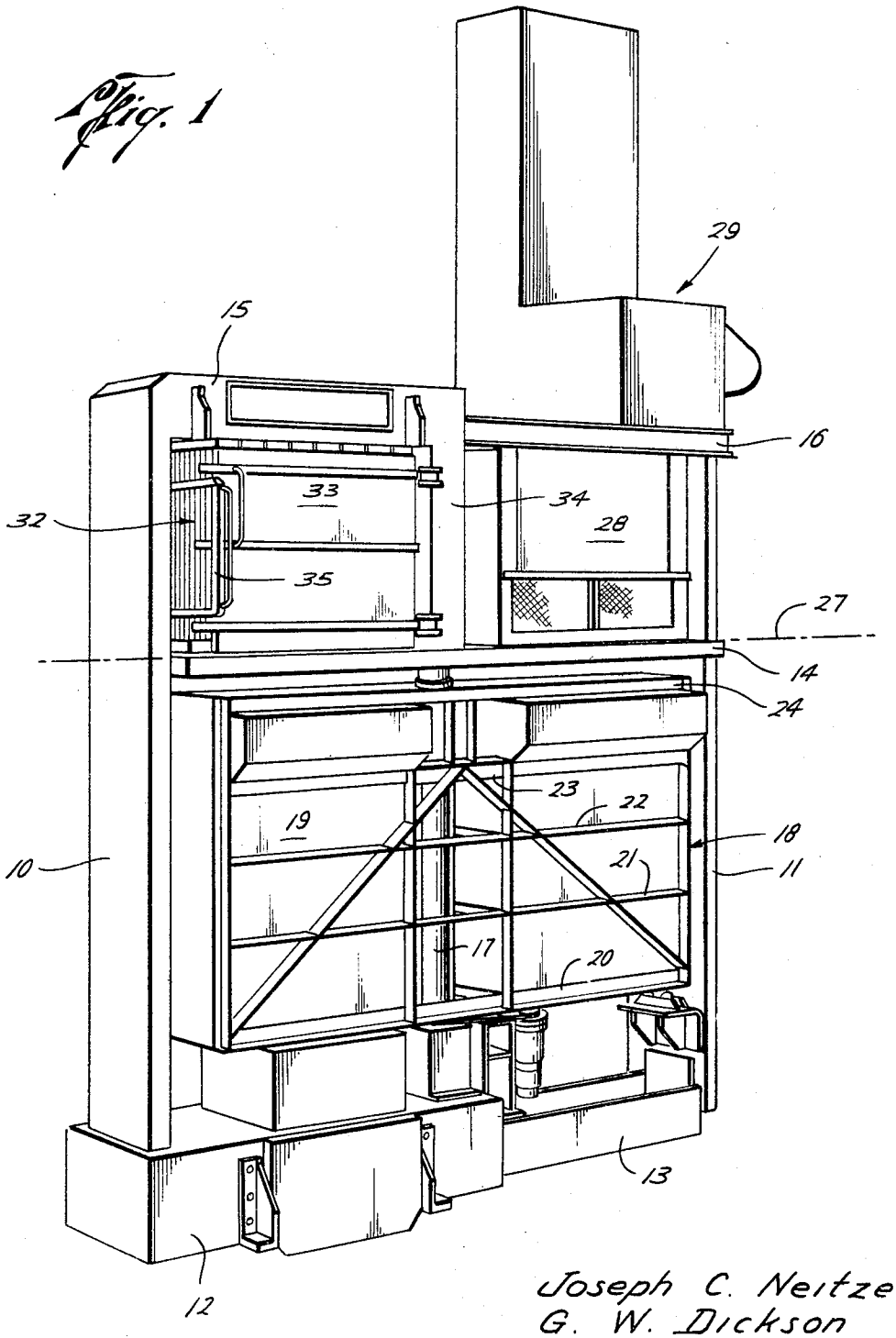
May 12, 1970 J. C. NEITZEL ET AL 3,511,019

FIBER PRESS CONTROL

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Fig. 1



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Filed Oct. 11, 1967 3 Sheets-Sheet 2

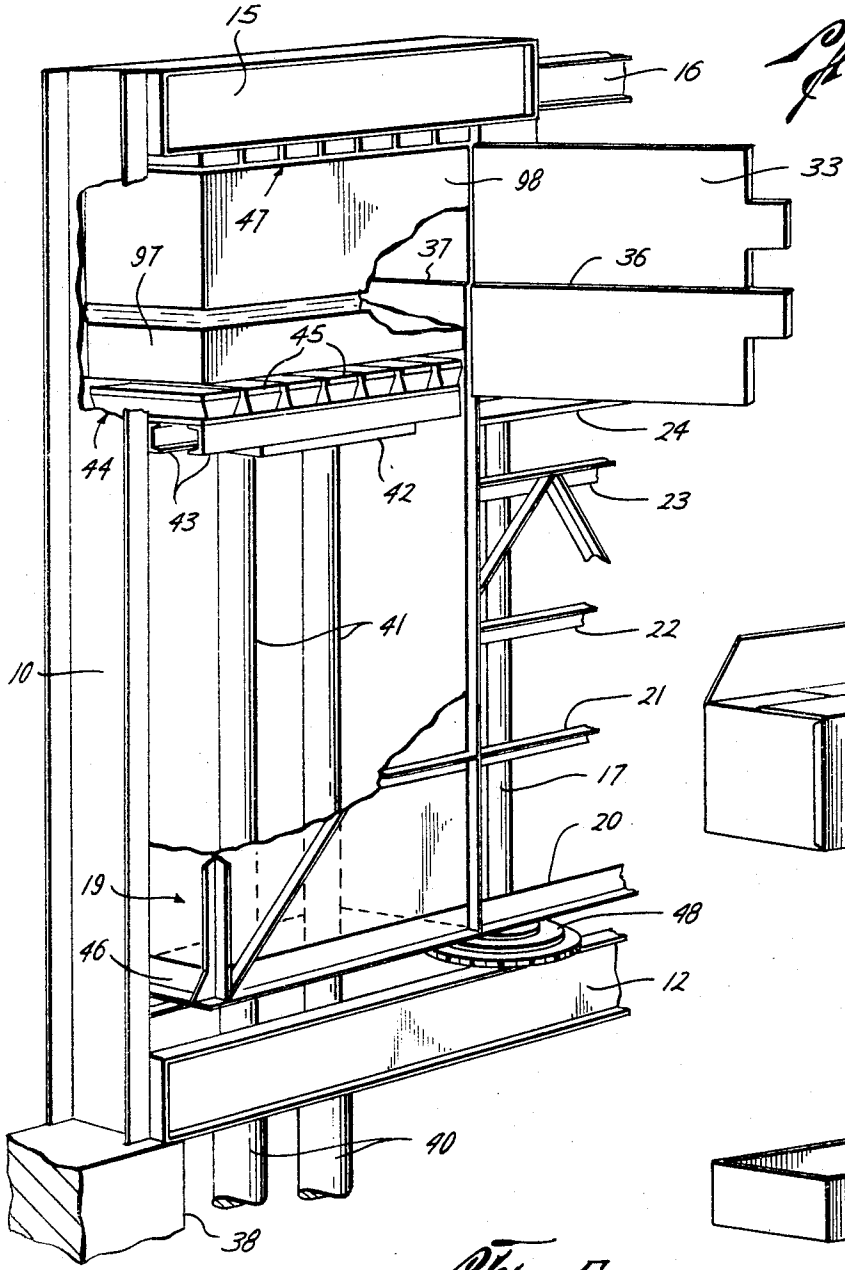


Fig. 2

Fig. 3

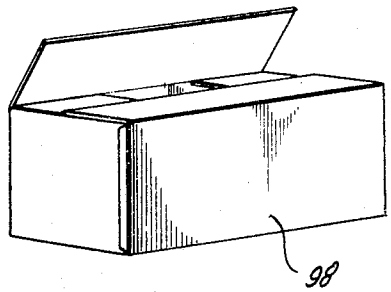


Fig. 4

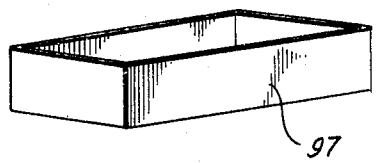
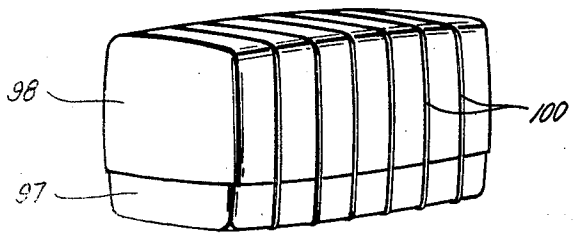


Fig. 5



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Fig. 6

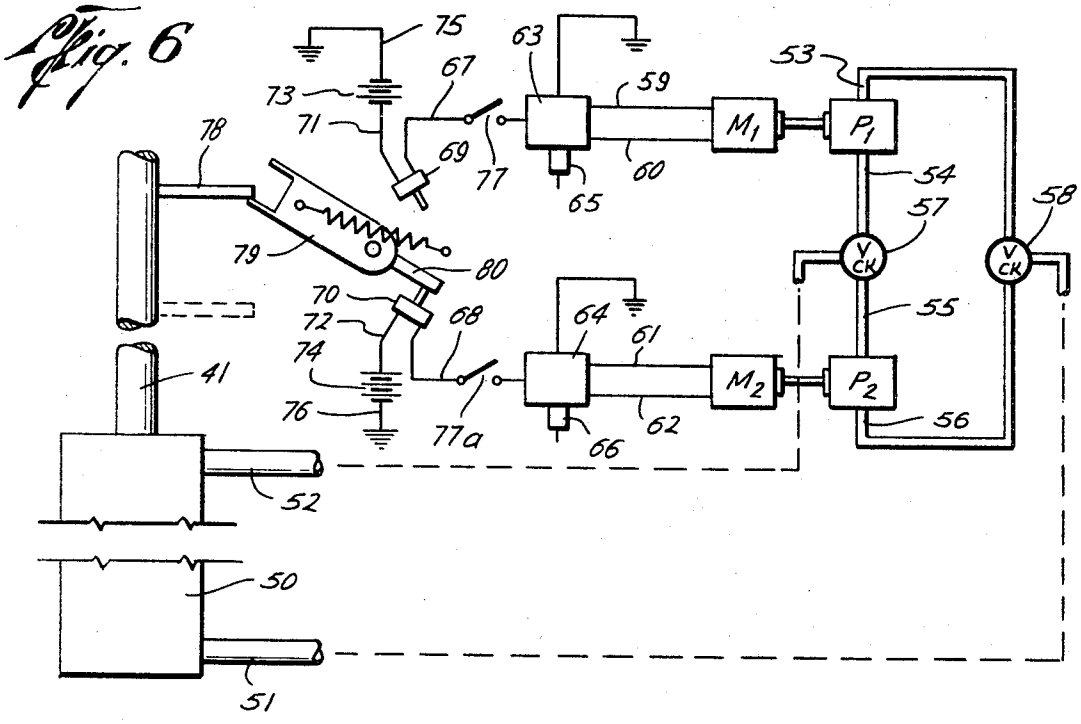
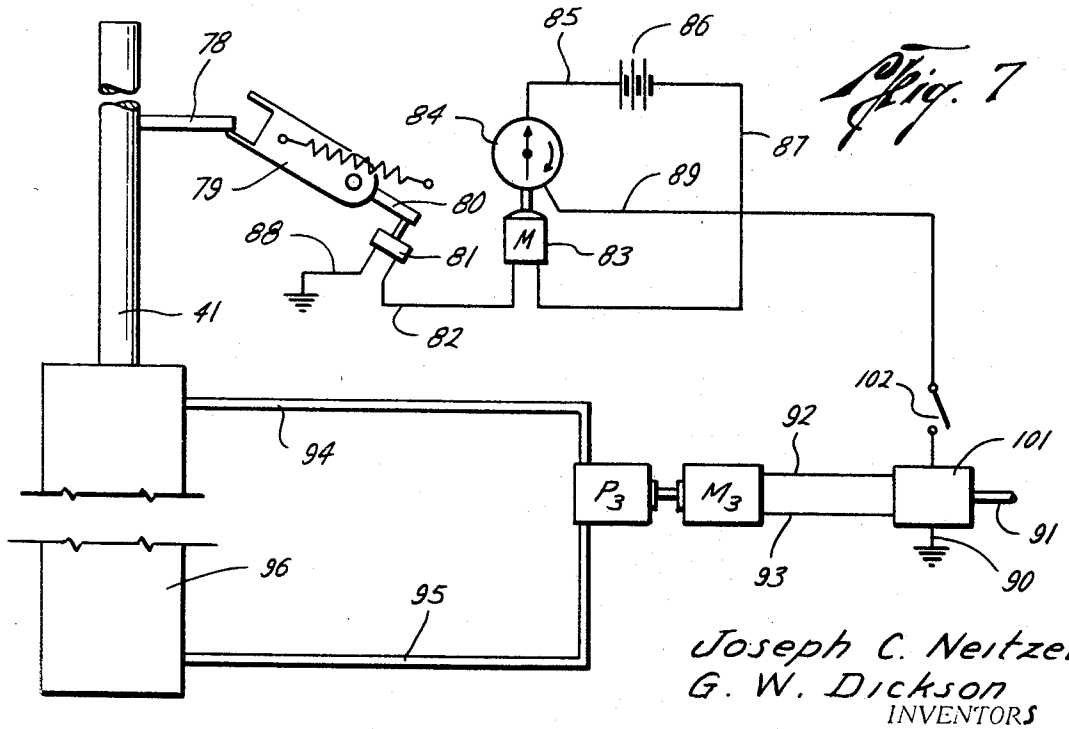


Fig. 7



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United States Patent Office 3,511,019
Patented May 12, 1970

3,511,019

FIBER PRESS CONTROL

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Filed Oct. 11, 1967, Ser. No. 674,419
Int. Cl. B65b *1/24, 1/28, 61/24*
U.S. Cl. 53—52 2 Claims

ABSTRACT OF THE DISCLOSURE

A fiber press is provided in which the pressed material is enclosed within substantially impervious, telescoping box parts. In order to prevent trapping of air within the box parts during high-speed operation of the press, the inward movement of the follow block is automatically delayed, e.g., either retarded or momentarily stopped, as the box parts approach their telescoping relationship to facilitate escape of the trapped air.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to fiber presses, particularly of the type for handling synthetic fibers, and consists particularly in novel means for preventing the trapping of air within telescoping box parts which cover the bale so as to reduce the load on the box board material as well as the press follow block.

Description of the prior art

Bales of fibrous material, particularly synthetic fibers, are now sometimes enclosed within protective, substantially impervious boxes of paperboard or the like. This has produced a problem in the high-speed operation of presses which compress the material, in that air trapped between the covering box parts places a heavy expansive force upon these parts so that extra heavy and expensive covering material must be used to resist these stresses. Furthermore, the build-up of air pressure within the telescoping box parts greatly increases the load on the moving platen (follow block). As far as is known, the prior art does not suggest practical solutions for these problems.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide practical means for relieving the air pressure which otherwise tends to build up within the telescoping box parts as utilized in the above-described fiber pressing operation.

Another object is to provide means for increasing the speed of operation of such a press at a given horsepower, while reducing the internal expansive stresses applied to the covering box parts and, therefore, permitting the use of lighter weight and less expensive material for these covering parts.

According to the herein-described invention, means are provided for delaying the travel of the movable pressure platen (follow block) into the press box, just prior to interfitting of the bale-covering box parts. In one form of the invention, the rate of travel of the pressure platen is reduced so as to expedite the escape of air from between the parts. In another form of the invention, the follow block is momentarily stopped at the mentioned position thereof, for the same purpose.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings which illustrate the invention,

FIG. 1 is a perspective front view of a form of press utilizing the present invention.

FIG. 2 is a partial perspective of the front of the press, certain parts being broken away and the press front door being opened to illustrate internal parts and the bale being formed.

FIGS. 3 and 4 are perspective views of the bale-covering box parts.

FIG. 5 is a view of a finished bale.

FIGS. 6 and 7 are schematic diagrams of two forms of pressure platen operating and control mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The press shown in FIGS. 1 and 2 is of the stationary box type having rotating boxes beneath the floor level. A massive frame surrounds the boxes including upright side channels **10** and **11**, base structures **12** and **13**, floor level horizontal bracing **14**, and top sill structures **15** and **16**. Pivotally mounted on a center post **17** in the lower part of the framing are identical boxes, generally designated **18** and **19**, rigidly braced and secured together by cross bars **20–24** inclusive. A relatively light box part, generally designated **28**, is mounted at the right side of the framing, above the flooring **27**, for directing fibrous material from a tramper structure, generally designated **29**, downwardly into the box **18** or **19** which, at the moment, is directly therebeneath. Box **28**, of course, is open at the top and bottom. Tramper **29** is of conventional commercial design and need not be further described, except to point out that the tramper consists of a vertically reciprocating foot which periodically pushes fibrous material, fed thereto as from an air separating condenser, downwardly through box **28** into a press box therebeneath.

At the left side of the framing structure, above the flooring, there is provided a heavy press box, generally designated **32**. This box has a front door **33** which is hingedly mounted on an intermediate heavy vertical beam **34** and which may be locked in its closed position by clamping mechanism, generally designated **35**. As shown in FIG. 2, door **33** has an intermediate horizontal ledge **36** on its inner face which is horizontally aligned with similar ledges as at **37** on the end walls, and also the rear door.

Depending from heavy base structure **12** into a well **38** are a pair of hydraulic cylinders **40** in which reciprocate pistons (not shown) from which piston rods **41** extend upwardly and carry at their tops a pressure plate **42** which underlies the beams **43** of the pressure platen or follow block, generally designated **44**. Bale engaging bars **45**, usually of wood, traverse beams **43**. Follow block structure **44** in the lowered position of the ram, formed by cylinders **41**, etc., rests at the bottom of its box **19** on bottom framing parts **20** and **46**. At the top of press box **19** there is provided the stationary upper platen structure **47** which is rigidly secured and rests against upper sill structure **15**. Boxes **18** and **19** may be rotated through the intermediary of gearing **48** and other mechanism (not shown).

FIG. 6 is a schematic diagram of a control arrangement including a hydraulic motor **50** which is representative of the ram forming hydraulic cylinders **40** from which project piston or plunger rods **41**. Hydraulic fluid lines **51** and **52** extend from the upper and lower parts of motor **50** to connections **53** and **54** and **55** and **56** of pumps P_1 and P_2 through check valves **57** and **58**. Pumps P_1 and P_2 are, respectively, a high volume low pressure pump (P_1) and a low volume high pressure pump (P_2). These pumps and valving constitute an hydraulic staging system, as will be explained. The pumps are provided with operating motors M_1 and M_2 having control wiring **59** and **60** and **61** and **62**. This control wiring passes

through reversing switch mechanisms, generally designated **63** and **64**, having actuating plungers or levers **65** and **66** (conveniently linked together). The reversing switches are connected respectively through wires **67** and **68** to microswitches **69** and **70** which are in turn connected by wires **71** and **72** to power sources **73** and **74**. While batteries are shown, it will be understood that normally the power source will be the power lines connected to the plant. Ground or common return leads **75** and **76** also connect with the reversing switches. Start-stop switches for the ram motors are shown at **77** and **77***a*. Projecting from one of the plunger rods **41** is a detent member **78** which is disposed to actuate an over-center lever **79** having a microswitch actuator extension **80**.

FIG. 7 shows a modified control mechanism in which piston rod carried detent **78** is positioned to actuate over-center lever **79** with a microswitch actuating extension **80**, as in FIG. 6. However, only a single microswitch **81** is provided which is connected by a wire **82** to an operating motor **83** of a timer switch **84**. The timer switch terminals are connected by a wire **85** to a source of power **86** which is connected by a wire **87** to timer motor **83**. This circuit leads through wire **82** and microswitch **81** to a common return wire **88**.

The other lead **89** from timer switch **84** connects with reversing switch **101** to which is connected a ground or common return lead **90**. The reversing switch has an actuating lever **91** and connects by wires **92** and **93** to a motor M_3 which drives pump P_3 which is connected by hydraulic lines **94** and **95** to hydraulic motor **96** which, as in FIG. 6 symbolizes the hydraulic cylinders **40** of the hydraulic ram.

FIG. 2 also shows an upwardly-opening box part **97** (also shown in FIG. 4) resting on bottom platen **44**, and a downwardly-opening top box part **98** (also in FIG. 3) resting against top platen **47** and supported upon the horizontal ledge in the inner faces of the doors and end walls at the top of press box **19**.

In operation of the press equipped with the control mechanism of FIG. 6, after the box part **18** beneath the tramper **29** (FIG. 1) is filled with the proper amount of fiber, the boxes are reversed to bring box **18** above base structure **12** and the ram. Reversing switch plunger or lever **65** and switch **77** are then actuated to cause operation of pump P_1 in the direction for driving plunger rods **41** and the now superimposed follow block rapidly upwardly to compress the fiber in the box. When follow block **44** reaches the position shown in FIG. 2, with box parts **97** and **98** approaching but not yet telescoped together, detent **78**, which moves with the ram structure, engages and rotates over center lever **79** to the position shown in FIG. 6 for actuating normally-open microswitch **70** and opening switch **69**. Current is then transmitted through reversing switch **64** to motor M_2 for driving high pressure pump P_2. At the same time, microswitch **69** is permitted to open to cut off the supply of current to motor M_1 so that upward motion of bottom platen **44** is sharply retarded and continues at a reduced rate of speed. Preferably, the first major part of the press movement of the ram is at a high rate of speed under the influence of high volume pump P_1, while the last portion of this movement of the ram is at a much lower rate which permits the escape of air trapped between the box parts. This has the effect of reducing the internal pressure on the box walls, which permits the box parts to be made of lighter, less expensive materials, and also reduces the back pressure on the platen and ram structure.

After the pressed and covered bale is bound with baling straps, as at **100** in FIG. 5, the platen will be withdrawn somewhat, the doors opened, and the end walls withdrawn to permit removal of the finished bale. Thereafter, ram reversing switch levers **65** and **66** are actuated to initially lower platen **44** by means of pump P_2, until detent **78** again rotates over center lever **79** to open microswitch **70** and close microswitch **69** causing energization of high volume pump P_1 and final lowering of the platen structure at the corresponding high rate of speed. Of course, the rate of final lowering of the platen may be varied from the rate of initial lifting thereof, if desired.

In the use of the control apparatus of FIG. 7, the retarding of the press movement of the lower platen from the position shown in FIG. 2 is achieved by momentary stopping of the platen. At the lower platen position of FIG. 2, detent **78** engages and rotates over center lever **79** so as to close normally-open microswitch **81**. This causes energization of a timer motor **83** which starts the actuation of normally-closed timer switch **84**. When the timer leaves its normally-closed, energized position, power from source **86** is cut off from reversing switch **101** and motor M_3 so that pump P_3 is stopped. At the same time, upward movement of piston rods **41** is arrested. At the end of the predetermined timed interval, timer switch **84** reassumes its normal energized position and current is again passed from source **86** to motor M_3 to complete the upward movement of the press follow block. As will be understood, the extreme movement of the press platen is ended, either automatically or otherwise, through the intermediary of a switch, as at **102**, suitably placed in the circuit.

During the downward movement of the ram structure and press platen, lever **79** will be oppositely rotated to reopen switch **81** so that the press will continue downwardly at an unabated rate.

Accordingly, with the use of the above-described invention, air pressure within the interfitting box parts will be relieved as to achieve the advantages heretofore stated. The control circuitry is merely illustrative and may be modified, as may various features of the press, as will occur to those skilled in the art. For instance, the lowering of the press ram may be at a uniform rate and under the influence of gravity. The exclusive use of all modifications as come within the scope of the appended claims is contemplated.

We claim:

1. The combination in a fiber press having a press chamber; fixed and movable platens, respectively, at the top and bottom thereof; upwardly and downwardly opening, telescoping, interfitting box parts for resting, respectively, against said platens, said box parts comprising impervious sheets; means for charging said chamber between said box parts with the material to be pressed; a fluid operated ram and fluid pressuring apparatus connected thereto for moving said bottom platen upwardly into said chamber to press said material therein; control means being operatively connected to said fluid pressuring apparatus and including a control device movable with said bottom platen and cooperable with said ram at a predetermined position of said bottom platen and including means in said chamber and on said ram shaped to partially trap air therebetween after said ram passes said position during its inward movement and in which said control device functions to reduce the build-up of air pressure in said chamber and the resultant resistance to movement of said ram, for delaying the rate of travel of said bottom platen as said upwardly opening box part approaches said downwardly opening box part to facilitate the escape of the air partially trapped between said box parts as said box parts are caused to telescope.

2. The combination in a fiber press having a press chamber; fixed and movable platens, respectively, at the top and bottom thereof; upwardly and downwardly opening, telescoping, interfitting box parts for resting, respectively, against said platens, said box parts comprising impervious sheets; means for charging said chamber between said box parts with the material to be pressed; a fluid operated ram and fluid pressuring apparatus connected thereto for moving said bottom platen upwardly into said chamber to press said material therein; control means being operatively connected to said fluid pressuring apparatus and including a control device movable with said bottom platen and cooperable with said ram at

a predetermined position of said bottom platen and including means in said chamber and on said ram shaped to partially trap air therebetween after said ram passes said position during its inward movement and in which said control device functions to reduce the build-up of air pressure in said chamber and the resultant resistance to movement of said ram, for momentarily stopping the travel of said bottom platen as said upwardly opening box part approaches said downwardly opening box part to facilitate the escape of the air partially trapped between said box parts as said box parts are caused to telescope.

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