

Dec. 13, 1949

D. A. ROGERS ET AL

2,491,279

SAFETY OVERLOAD FITMAN FOR POWER PRESSES

Filed June 25, 1947

5 Sheets-Sheet 1

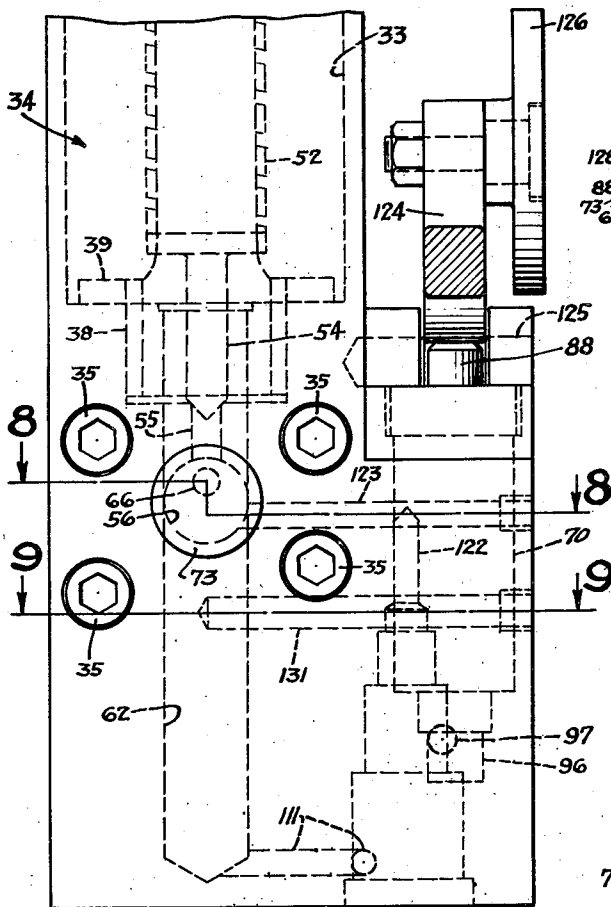


FIG. 6

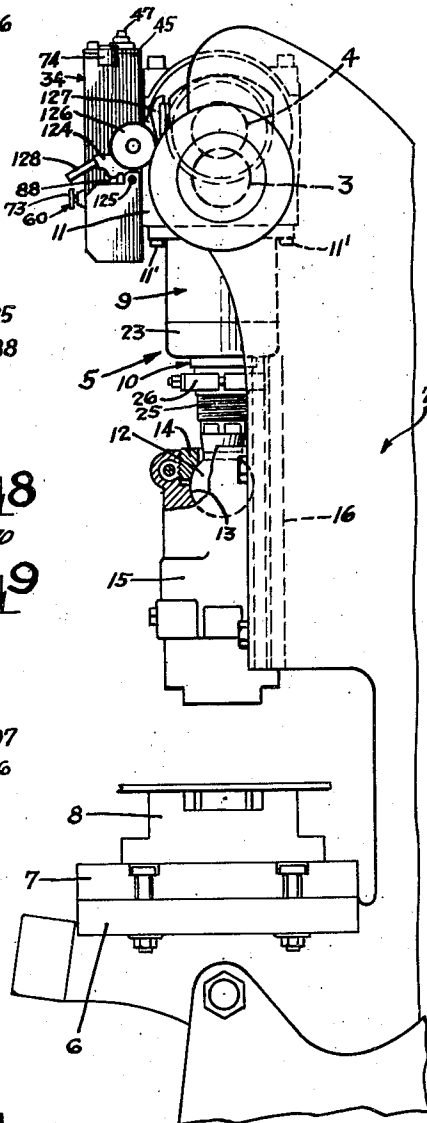


FIG. 1

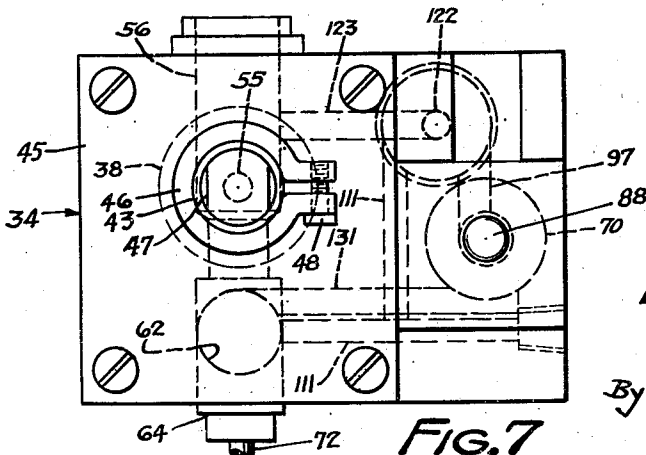


FIG. 7

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5 Sheets-Sheet 2

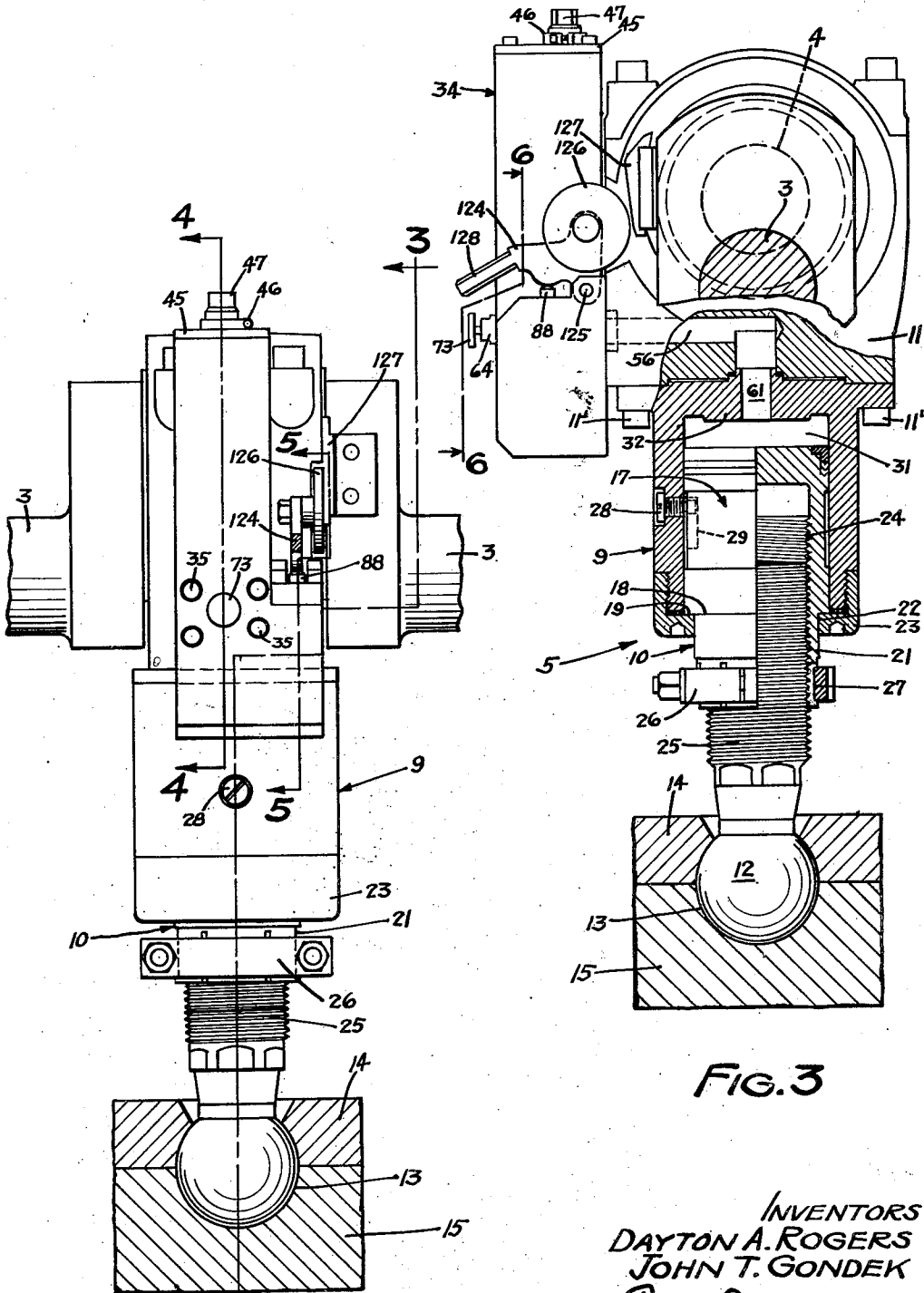


FIG. 3

FIG. 2

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5 Sheets-Sheet 3

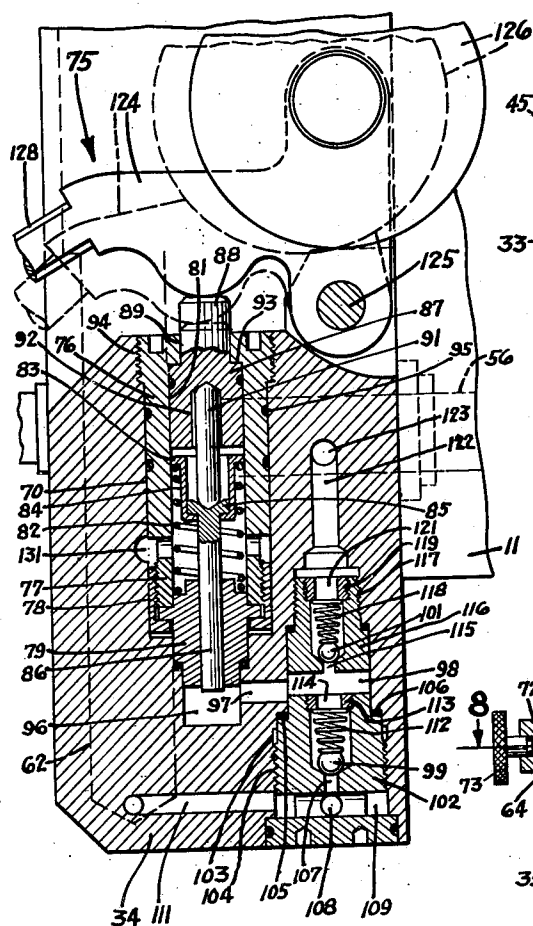


FIG. 5

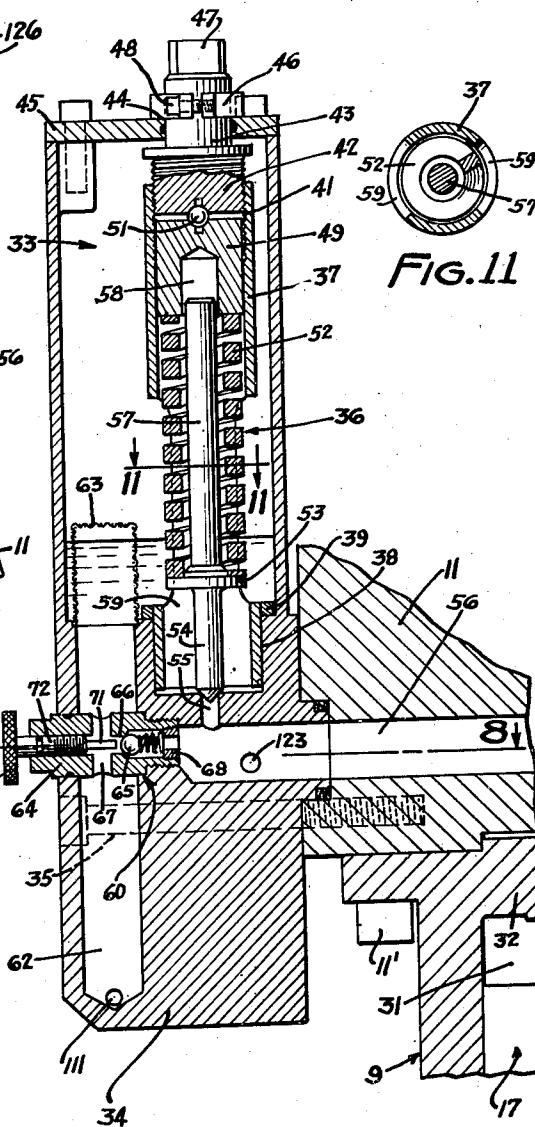


FIG. 4

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5 Sheets-Sheet 4

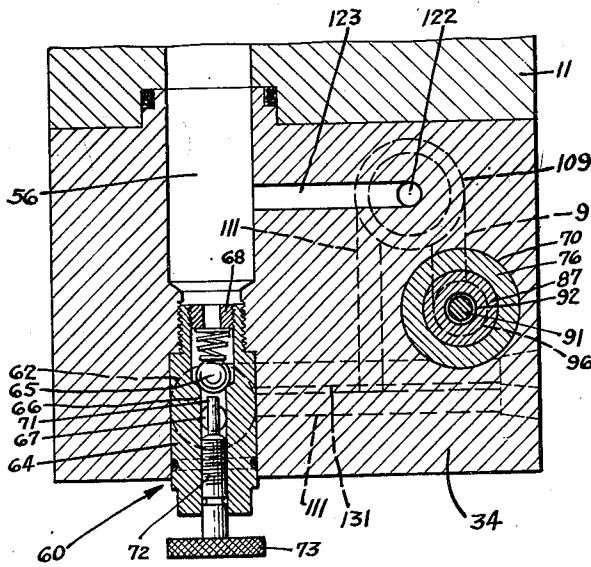


FIG. 8

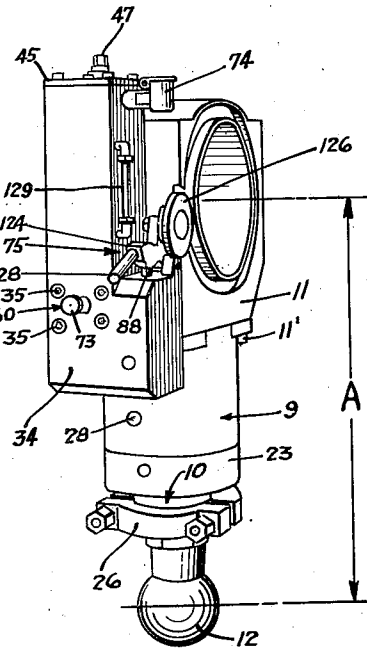


FIG. 10

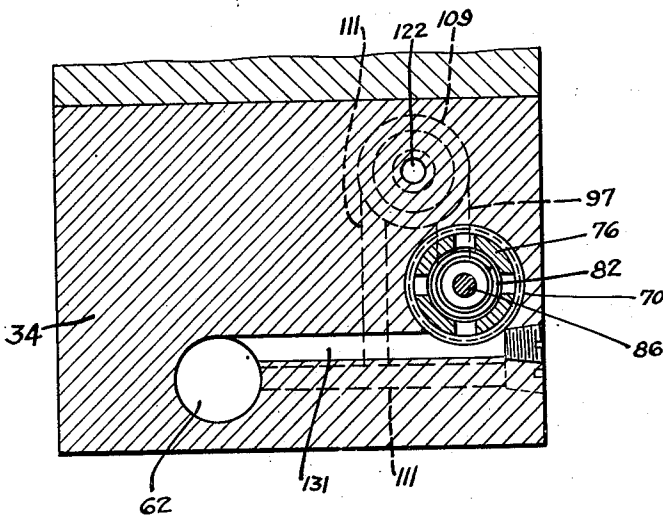


FIG. 9

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5 Sheets-Sheet 5

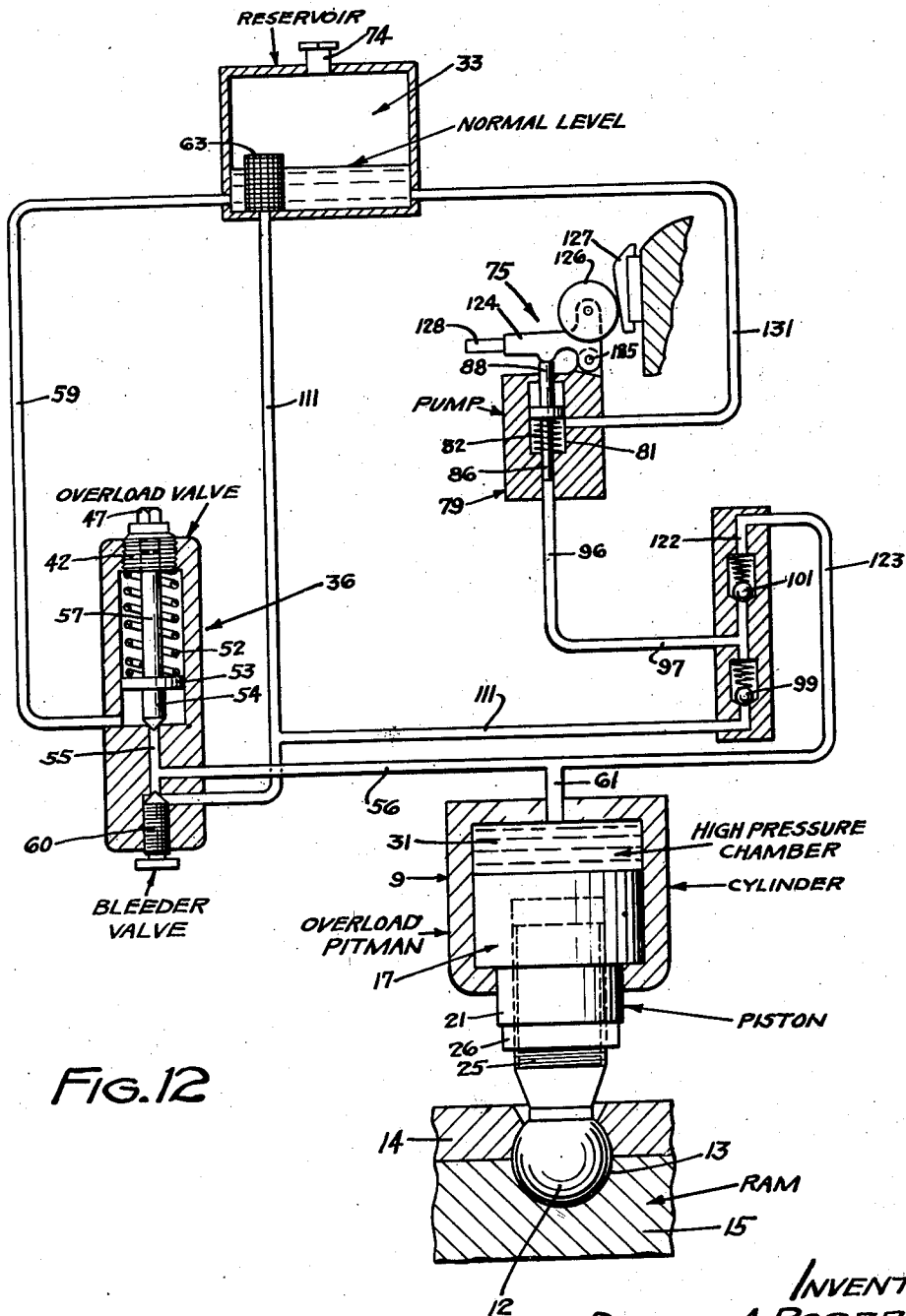


FIG. 12

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UNITED STATES PATENT OFFICE

2,491,279

SAFETY OVERLOAD PITMAN FOR POWER PRESSES

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Application June 25, 1947, Serial No. 756,966

8 Claims. (Cl. 74—583)

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This invention relates to new and useful improvements in power presses and more particularly to a novel pitman for such presses having means embodied therein for automatically permitting the overall length of the pitman to shorten in the event the press is momentarily subjected to an overload, thereby to prevent damage to the press, die members or work.

In the operation of power presses, particularly of the larger sizes wherein the work often requires a working pressure of from thirty or more tons, serious damage may sometimes result to the press, die members or the work in the event the press is momentarily subjected to an overload. If the overload is of such a nature that the press ram cannot force the die members into their proper co-acting relation, then in a conventional press, it is obvious that something must give way, because the inertia of the usual fly wheel of the press in conjunction with the power supplied thereto to operate the press may be sufficient to carry the crank through its working cycle, even though the working movement of the pitman may be momentarily interrupted as a result of an overload.

Obviously, when such a contingency arises, one or more of three things may happen: the press crank shaft may be sprung or broken; the side frame members of the press may crack; or the die members and work may be crushed between the ram and bed plate. Such damage to the press and other parts may be expensive, because in addition to the cost made necessary by the required repairs, many man hours may be lost during the period the press is inoperative for such repairs. It is therefore highly desirable that means be provided whereby each time the press becomes momentarily subjected to an overload, the pitman may readily shorten, when a predetermined maximum safe pressure is reached, thereby positively preventing damage to the press or die members.

The present invention therefore, pertains more particularly to a safety mechanism which may readily be embodied in the pitman of a power press, and which is so constructed that it may quickly be adjusted to any desired safe working pressure or tonnage commensurate with the maximum press capacity, and to protect any given set of tools or dies from damage in the event the press is subjected to an overload, which may occur from various causes well known to the trade, the overall length of the pitman automatically relatively shortening when the load on the pitman exceeds a predetermined safe maxi-

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mum pressure, thereby automatically relieving the press, dies and tools of dangerous excessive pressure and assuring that no damage can come to the press or its tools or die members as a result of an overload momentarily being imposed on the press.

A further object of the invention is to provide a safety pitman for power presses comprising a cylinder having means for mounting it on the usual crank of a power press, and a piston being non-rotatably supported in said cylinder and adapted for limited axial movement therein whereby the overall length of the pitman may shorten when the press is subjected to an overload, the inner end of the piston cooperating with the adjacent wall of the cylinder to provide a high pressure fluid chamber having a suitable overload valve in communication therewith through which a portion of the pressure fluid in said chamber may escape when a predetermined overload pressure is imposed on the pitman.

A further object is to provide a safety overload pitman for power presses comprising a cylinder having a piston mounted therein with its inner end normally spaced from the adjacent end of the cylinder to provide a pressure chamber having a high pressure fluid therein, and a fluid reservoir being carried by the pitman and having a valved fluid passage connecting it with said pressure chamber, and means also being provided for pumping fluid from the reservoir to the chamber to maintain a constant pressure therein, and an overload valve being in communication with said chamber and reservoir adapted to automatically release a portion of the pressure fluid from said chamber in the event the pitman is subjected to a predetermined overload.

A further object is to provide a pitman for power presses comprising relatively movable parts in the form of a cylinder and piston, the inner end of said piston being normally spaced from the adjacent end of the cylinder and cooperating therewith to provide a high pressure fluid chamber adapted to contain a pressure fluid for normally holding the piston in a relatively fixed position within the cylinder, an overload valve being in communication with said chamber for releasing a portion of the fluid therefrom when the pressure in the chamber reaches a predetermined figure, and a pump being mounted on the piston and operable by rotation of the crank shaft to constantly pump fluid into the chamber and thereby maintain a predetermined safe working pressure therein.

A further object is to provide a safety pitman

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which readily lends itself for use on conventional presses, and by the use of which a constant ram pressure is assured at the point of operation regardless of stock thickness variation on such operations as forming, pressing, riveing, 5
briquetting or assembling various parts.

Other objects of the invention reside in the unique construction of the pitman which, it will be noted by reference to the application drawings, is extremely simple and inexpensive, and substantially all of the working parts of the safety mechanism are mounted directly upon and carried by the pitman; in the arrangement of the high pressure pump provided for constantly pumping fluid into the high pressure chamber thereby to maintain a constant predetermined safe working pressure therein which may readily be varied to suit each particular job; in the provision of the overload valve which functions only in the event of a predetermined overload being imposed on the piston whereby it permits a portion of the fluid in the pressure chamber to return to the fluid supply reservoir; in the unique construction of the overload mechanism which comprises a unitary structure in the form of a rectangular body comprising suitable fluid passages, a reservoir, a pump for continually pumping fluid into the high pressure chamber in the cylinder, an overload valve, and other associated parts necessary to provide a unitary structure which may be assembled independently of the pitman and subsequently mounted thereon whereby said body becomes in effect an integral part of the pitman, the unique construction of said body being such that it may be quickly detached from the pitman to facilitate making repairs or inspections of the parts thereof without disrupting the mounting of the pitman; in the provision of a safety pitman which may be easily and quickly installed on any conventional punch press, whereby definite hydraulically controlled power on the press ram is assured at all times; and which pitman requires little or no servicing when in use.

Other objects of the invention will appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a view showing a portion of one side of a conventional power press with the invention embodied therein;

Figure 2 is an enlarged front view of the pitman and also showing a portion of the crank shaft of the press;

Figure 3 is a vertical sectional view substantially on the line 3—3 of Figure 2, showing the pressure chamber between the pitman cylinder and piston;

Figure 4 is an enlarged detail sectional view on the line 4—4 of Figure 2, showing the overload valve and associated parts;

Figure 5 is an enlarged detail sectional view on the line 5—5 of Figure 2, showing the pump for constantly pumping fluid into the pressure chamber during the operation of the press, and also showing the check valves in the fluid passage be-

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tween the pump and the pressure chamber in the pitman;

Figure 6 is an enlarged detail view substantially on the line 6—6 of Figure 3;

Figure 7 is a top view of Figure 6;

Figure 8 is a sectional plan view substantially on the line 8—8 of Figures 4 and 6;

Figure 9 is a similar view substantially on the line 9—9 of Figure 6;

Figure 10 is a perspective view of the improved safety overload pitman removed from the press;

Figure 11 is a detail sectional view on the line 11—11 of Figure 4; and

Figure 12 is a schematic drawing showing the interconnections between the various elements of the fluid circulating means.

In the selected embodiment of the invention herein disclosed there is illustrated in Figure 1, for purposes of disclosure, a portion of a conventional power press comprising the usual frame 2 having a crank shaft 3 mounted in suitable bearings provided in the upper portion thereof. The crank shaft has a crank 4 to which the upper end of a pitman, generally designated by the numeral 5, is pivotally connected.

The frame 2 of the press is shown provided with a suitable bed plate 6 to which the usual bolster plate 7 is secured, as is well known. A lower die member 8 may be secured to the bolster plate in the usual manner. The frame of the press, including the bed plate and the usual die cushions, form no part of the present invention, and it is therefore believed unnecessary to further illustrate the press frame in the application drawings.

An important feature of the present invention resides in the means embodied in the pitman 5 whereby should the press accidentally be subjected to an overload, the pitman will automatically shorten in overall length, whereby the crank shaft may go through its usual cycle of operation without causing any damage to the press frame or the usual die members or tools of the press.

To thus prevent an overload from causing damage to the press frame or other equipment, the pitman 5 is shown comprising two members; one, in the form of a cylinder 9, shown having its upper end secured to a suitable split bearing 11 by bolts 11'. The bearing 11 is adapted to receive the usual crank 4 of the crank shaft 3, as will be understood by reference to Figure 3.

The lower member 10 of the pitman comprises the usual ball 12 adapted to be seated in a concave bearing 13 of the usual ram 15 of the press and retained therein by a ball nut 14, received in threaded engagement with the ram, as will be understood by reference to Figure 1. The ram 15 is vertically slidable in the usual guides provided in the side frame members of the press, as indicated at 16 in Figure 1, and may be of conventional construction and therefore need not be further described.

The upper end of the lower part 10 of the pitman is in the form of a piston 17 which is slidable in the cylinder 9 and has its lower end 18 arranged to engage an annular abutment 19 to thereby limit the movement of the piston 17 in a downward direction. The piston is shown provided with a tubular extension 21 which is guidingly supported in an opening 22 provided in a retaining cap 23 secured to the lower end of the cylinder. The retaining cap 23 serves as the abutment 19 for limiting downward movement of the piston within the cylinder. The tubular extension 21 of the piston is shown internally

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threaded, as indicated at 24 in Figure 3, to receive a threaded shank 25 to the lower end of which the ball 12 is secured, and whereby the effective or working length of the pitman may be varied by relative rotation between the shank 25 and piston 17, as will readily be understood by reference to Figure 3.

A split lock ring 26 is shown fitted onto the lower reduced end portion 27 of the piston extension 21 for locking shank 25 in adjusted position relative to the piston 17. It is to be understood also that the reduced end portion 27 of the sleeve portion 21 is split in an axial direction to permit said portion to be contracted into firm contact with the threaded periphery of the shank 25, thereby to prevent it from relatively rotating therein, when the press is in operation.

To prevent the piston 17 from relatively rotating in the cylinder 9, a suitable screw 28 is shown received in a threaded aperture provided in the wall of the cylinder. The inner end of the screw 28 projects into an axial groove 29 in the periphery of the piston, as shown in Figure 3, whereby said terminal will prevent the piston from relatively rotating within the cylinder. The overall length of the piston 17 is such that when the lower end of the piston is seated against the abutment 19 of the retaining cap 23, a pressure chamber 31 is provided between the upper end of the piston and the adjacent walls of the cylinder 9, as clearly shown in Figure 3.

An important feature of the present invention resides in the novel construction of the pitman 5, shown in Figure 10, whereby should the press accidentally become overloaded from any cause whatsoever, during the working cycle of the press, the length A of the pitman will automatically shorten and thus relieve the press frame and the die members of excessive damaging strains. To thus relieve the press of an overload, a suitable inelastic fluid is retained under a predetermined pressure in the chamber 31 of the pitman.

Fluid is supplied to the chamber 31 from a reservoir 33, shown provided within an upright member or body, generally designated by the numeral 34. This body, which preferably is constructed of metal, may be suitably secured to the front face of the bearing bracket 11 of the pitman by suitable bolts 35, indicated in Figures 4 and 6. The construction of the member 34 is important, in that it contains all of the working parts and substantially all of the fluid conducting passages and ports required to automatically direct the pressure fluid to and from the pressure chamber 31, each time the pitman is actuated to prevent an overload from momentarily being imposed upon the press frame or working parts thereof.

To prevent overloading the press, a novel overload valve, generally designated by the numeral 36, is shown mounted in the reservoir 33 and comprises a tubular housing 37 having its lower end portion received in a counterbore 38 provided in the bottom wall of the reservoir 33, as best illustrated in Figure 4. The lower portion of the housing 37 has an annular collar 39 suitably secured thereto shown seated on the bottom wall of the reservoir. The upper end of the housing 37 is preferably internally threaded as shown at 41 to adjustably receive a threaded plug 42. The plug 42 has a reduced cylindrical portion 43 extending upwardly through an aperture 44 in the top wall or cover plate 45 of the reservoir, and through a suitable clamping ring or collar 46 secured to the cover 45. The uppermost end

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47 of the plug 42 is squared or flattened to receive a suitable wrench to facilitate rotating the plug 42, when it is desired to relatively adjust the overload valve, as will subsequently be described.

5 The clamping ring 46 is so constructed and secured to the top wall 45 of the reservoir that it may readily be manipulated to fixedly secure the plug against rotary and axial movement by manipulation of a clamping screw 48, shown in Figure 4.

10 Movably mounted within the tubular housing 37, directly beneath the plug 42, is an abutment member 49 shown supported against upward movement by an anti-friction element or ball 51 interposed between the adjacent ends of the plug 42 and abutment member 49, as best illustrated in Figure 4.

15 A suitable spring 52 has one end seated against the lower end of the member 49 and its opposite end against a collar 53 provided on a needle valve 54 having its lower end normally closing an aperture or duct 55 adapted to establish communication between the interior of the housing 37 and a horizontal bore or fluid passage 56 provided jointly in the lower intermediate portion of the body 34 and bearing bracket 11, as best illustrated in Figure 4. The needle valve 54 may be integrally formed with the collar 53, and has an upwardly extending stem 57 passing through the spring 52 and having its upper end guidingly supported in a socket 58 provided in the abutment member 49. The cylindrical wall of the housing 37 is provided with opposed openings 59 which preferably extend upwardly from the annular collar or flange 39 to the intermediate portion of the housing, as illustrated in Figure 4.

20 The horizontal fluid passage 56 is in communication with the pressure chamber 31 in the pitman through an upright passage 61 provided in the upper wall 32 of the pitman cylinder and in the lower portion of the bearing bracket 11, as best shown in Figure 3.

25 Provided within the lower portion of the body 34 is an upright bore 62, the upper end of which is in communication with the reservoir 33 through a suitable filter screen 63. The axis of the bore 62 preferably intersects the axis of the horizontal fluid passage 56, as will be understood by reference to Figures 4 and 8.

30 A valve device, which will hereinafter be referred to as a bleeder valve 60, comprises a body 64 shown suitably mounted in the member or body 34, as best shown in Figures 4 and 8. A spring actuated valve 65 is provided in the inner end of the body 64 of the bleeder valve 60, and normally loses an opening 66 leading from an upright passage 67 in the valve body 64 to the horizontal fluid passage 56, through an apertured plug 68 shown received in threaded engagement with the inner end of the body 64 of the bleeder valve 60. The ball valve 65 of the bleeder valve 60 is normally retained in closed position and is adapted to be unseated by a stem 71 provided on the inner end of a threaded stem 72 having a knurled head 73 to facilitate rotating said stem.

35 The valve 60 serves as a combination bleeder and filler valve to facilitate initially filling the system with fluid, and to drain the fluid from the system, when necessary. Normally, the inner reduced stem 71 is out of engagement with the ball valve 65, as shown in Figures 4 and 8. When the system is initially filled with fluid, the threaded element 72 is manipulated to unseat the ball valve 65 from its seat, whereby fluid delivered into the reservoir through the filler open-

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ing or cup 74, shown in Figure 10, may readily flow into all of the ducts and fluid passages provided in the composite pitman, which includes the cylinder 9, piston 17, bearing bracket 11, and upright body 34.

Another important feature of the invention resides in the provision of means for maintaining the fluid in the chamber 31 at a constant predetermined pressure during the operation of the press. To accomplish this, a suitable pump, generally designated by the numeral 75, is shown mounted in a bore 79 provided in the body 34, as best illustrated in Figures 5 and 9. The pump is self-contained, and comprises a tubular member 76 having a reduced portion 77 at its lower end which is exteriorly threaded to receive a retaining member 78 which detachably secures, what may be termed a cylinder 79, to the lower end of the member 76, as illustrated in Figure 5.

The member 76 is provided with an axial bore 81 into the lower end of which the upper portion of the cylinder 79 is fitted to provide an annular seat for one end of a suitable spring 82. The upper end of spring 82 is seated against an outwardly directed flange 83 provided at the upper end of a cup-shaped member 84 which provides a support for the upper enlarged head 85 of a piston 86 having its lower end received in the cylinder 79.

A shouldered plug 87 is mounted in the upper end of the bore 81 in the member 76 and has a reduced cylindrical portion 88 which projects through a guide opening 89 in the upper end of the member 76, as shown in Figure 5. A coupling pin 91 is shown having one end engaged with the head 85 of the piston 86 and its opposite end is seated in the bottom of a bore 92 provided in the plug 87. The depth of the bore 92 is such that the lower end of the plug 87 is spaced slightly from the upper end of the cup-shaped member 84, whereby the action of the spring 82 will constantly exert an upward thrust on the coupling pin 91, thereby retaining the cylindrical end portion 88 of the plug 87 in its normal elevated position, shown in Figure 5. A shoulder 93 at the upper end of the bore 81 limits the upward movement of the plug 87 as will be understood.

The tubular member or casing 76 of the pump is secured in fixed position within the bore 70 by suitable screw threads 94. Suitable packings 95 are provided wherever necessary to prevent leakage of the fluid around and between connected parts of the apparatus.

The lower reduced end portion of the cylinder 79 is received in a stepped bore 96 which is in communication with the interior of the lower end of the cylinder 79 and with one end of a duct 97, shown in full lines in Figure 5 and indicated in dotted lines in Figure 9. The opposite end of the duct 97 is in communication with a multiple stepped bore 98 in which two check valves 99 and 101 are mounted. The check valve 99 is supported in a suitable cage or plug 102 which is secured in the relatively larger end portion 103 of the bore 98 by suitable threads 104. A suitable packing 105 is shown interposed between the plug 102 and a shoulder 106 to prevent possible leakage of the fluid from the bore 98 around the valve cage or body 102.

A fluid duct 107 in the lower portion of the valve body 102 is normally closed at its upper end by the check valve 99, and the lower end of said duct is in communication with cross ducts 108, provided in the plug 102. The plug is annu-

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larly grooved, as shown at 109 to establish communication between the ends of the cross ducts 108, as will be understood. The annular groove 109 is in communication with one end of a duct 111, the opposite end of which connects with the upright bore 62, as best indicated in Figures 5 and 9. The check valve 99 is normally retained upon its seat by a suitable compression spring 112, the upper end of which is seated against a nut 113 having a fluid passage 114 therein.

The check valve 101 is normally positioned to close the intake 115 provided in the lower end of a valve cage 116 mounted in the bore 98 and having a reduced portion received in threaded engagement with the bottom wall portion of the bore 98, as shown at 117 in Figure 5. A spring 118 constantly urges the check valve 101 into closing engagement with the duct 115. The upper end of the spring is shown engaged with a suitable nut 119 having an opening 121 therein for establishing communication between the valve chamber and a suction passage 122, the upper end of which is shown in communication with a horizontal passage 123 connecting the duct 122 with the horizontal bore 56 leading to the pressure chamber 31.

To eliminate any possible danger of the pressure in the chamber 31 dropping below a predetermined figure during the normal operation of the press, which may occur as a result of leakage, means is provided for intermittently actuating the pump piston 86 each cycle of the press, and is shown comprising an arm 124 mounted for rocking movement upon a suitable pivot 125. The arm 124 has an anti-friction roller or wheel 126 mounted thereon adapted to be engaged by a cam 127 carried by the crank shaft 3, as clearly illustrated in Figure 3. The cam 127 engages the wheel 126 once each revolution of the crank shaft, and thereby oscillates the arm about its pivot 125, as indicated by the full and dotted lines in Figure 5.

Such operation of the arm 125 intermittently actuates the pump plunger 88, which in turn actuates the pump piston 86 whereby a small quantity of fluid is pumped into the pressure chamber 31 of the reservoir 33, each cycle of the crank, which will compensate for any leakage of the fluid between any of the operating parts of the fluid circulatory system. Should the operating parts of the apparatus be sufficiently leak-proof to prevent any material drop in pressure in the chamber 31, it may be found unnecessary to operate the pump each cycle of the crank. This may readily be accomplished by removal of the cam 127 from the crank shaft. In actual operation, however, it has been found more practical to operate the pump with the cam 127, because then the operator is assured of a working pressure being maintained in the chamber 31 at all times during normal operation of the press. The arm 124 preferably has a reduced portion 128 which may be conveniently grasped by the operator when it is deemed advisable to manually actuate the pump, as when initially filling the circulatory system of the apparatus with fluid, and which may be required periodically, should the press be operated with the cam 127, as above stated.

To afford a clearer understanding of the operation of the novel hydraulic overload pitman herein disclosed, there is illustrated in Figure 12, a schematic representation of the various operating elements of the fluid circulatory system of the

pitman shown interconnected by the various fluid circulating passages and ducts hereinbefore described.

Before starting the press for a given job the fluid circulatory system of the pitman is filled with a suitable inelastic fluid which may be introduced into the reservoir 33 through a suitable filler fitting 74, best illustrated in Figure 10. During the filling of the system the bleeder valve 60 is manipulated to unseat the ball valve 65 so that the fluid may freely flow from the bore 62 into the horizontal passage 56 of the chamber 31. The bore 62, in effect, constitutes the bottom of the reservoir 33. At the same time the various fluid ducts in the member 34, which lead to the check valves and pump, are filled with fluid, or, at least partially filled. During the filling operation, the operator may manually operate the pump 75 by manipulation of the hand lever 128 which will cause all of the fluid control elements and the fluid circulating passages and ducts therebetween to become completely filled with fluid.

A suitable fluid level sight guage 129 is provided on the exterior of the reservoir 33, as best shown in Figure 10, to facilitate filling the reservoir to the proper level. The reservoir 33 is filled to substantially the level shown in Figures 4 and 12, to allow ample space in the reservoir to accommodate the sudden rush of fluid thereinto in the event the pitman is accidentally subjected to an overload, as hereinbefore described, and whereby the level of the fluid in the reservoir will not rise above the filler fitting 74. After the apparatus has been completely filled with fluid, the press may be started whereupon it will operate as a conventional press, under all normal operating conditions. Each time the crank goes through a cycle of operation, the pump is operated as a result of the cam 127 engaging the wheel 126. Such operation of the pump 75 will cause a small portion of the fluid in the reservoir to be pumped into the pressure chamber 31 which, if up to full pressure will cause the overload valve 36 to momentarily open to release any excessive pressure which may develop in the chamber 31 and the connections leading thereto. The fluid released through the overload valve is returned to the reservoir through the openings 59 provided in the tubular housing of the overload valve, as clearly illustrated in Figure 4. In Figure 12, connection 59 represents the openings 59 provided in the housing of the overload valve, as will be understood.

During the suction stroke of the pump piston 86, fluid is drawn from the reservoir 33 through the conduit 111, check valve 99, passage 97-96, into the pump cylinder. When the pump piston 86 is next forced downwardly, as a result of the cam 127 engaging the roller 126 of the arm 124, a portion of the fluid is forced out of the conduit 96-97 through the check valve 101 and through the passages 122 and 123 and into the horizontal passage 56, thence through the passage 61 connecting the horizontal passage 56 with the chamber 31.

When the pressure in the chamber 31 and the connections leading thereto from the pump and the overload valve becomes excessive, the overload valve will automatically open to release a portion of the fluid. The bore 81 in the pump housing 76 in which the spring 82 is mounted is shown having a fluid duct 131 connecting it with the reservoir 33, thereby to prevent the formation of any fluid pressure in the bore 81.

From the foregoing, it will thus be noted that for each cycle of the crank shaft, the pump 75 may be actuated to pump a small portion of fluid into the chamber 31 from the reservoir, which will assure the operator that a predetermined working pressure is constantly maintained in the chamber 31. Should the press suddenly become subjected to an overload, the excessive pressure momentarily developed within the pressure chamber 31 in the pitman will cause the overload valve 36 to function and automatically release the fluid from the pressure chamber 31, whereby the pitman may momentarily shorten to prevent damage to the frame or crank shaft of the press, or to the die members, during such overload. As soon as the obstruction has been cleared, normal working pressure is quickly restored in the chamber 31 by the pump 75, whereupon the press may again be operated in a normal manner, as will be understood.

The predetermined overload pressure at which the overload valve will release the fluid from the pressure chamber, may be varied in accordance with the nature of the work to be done, by adjustment of the upper member or plug 42 in the tubular member 37. It will also be noted that the pitman embodying the invention herein disclosed, is extremely simple and inexpensive. The overload valve, pump and check valves, are all supported within the member 34, as best shown in Figures 4 and 5, thereby greatly simplifying the construction of the fluid control mechanism. The pump operating member 124 is also carried by the member 34, as shown.

By so constructing and assembling the parts, there is less danger of the parts becoming inoperative from contact with other articles, and it permits the entire mechanism to be removed from the pitman as a unit for inspection and repairs whenever necessary. It also results in a very compact and well balanced pitman, as will be noted by reference to Figure 10.

It will be apparent to those skilled in the art that we have accomplished at least the principal objects of our invention, and it will also be apparent to those skilled in the art that the embodiments herein described may be variously changed and modified without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiments are illustrative only, and that our invention is not limited thereto.

We claim as our invention:

1. A safety overload pitman for a power press comprising complementary members mounted for relative axial movement and cooperating to provide a chamber therebetween, an inelastic pressure fluid in said chamber for normally retaining the pitman members in extended operative positions, pump means for maintaining a predetermined fluid pressure in said chamber, and an overload relief valve in communication with the chamber adapted to release a portion of the fluid from said chamber in the event of an excessive pressure therein, said pump being automatically operable to pump additional fluid into said chamber and circulatory passages to compensate for leakage or loss of fluid from any cause, and thereby maintain the fluid within said chamber at a predetermined working pressure.

2. A safety overload pitman for a power press comprising a cylinder having a piston operable therein, the inner end of the piston cooperating

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with the adjacent end wall of the cylinder to form a high pressure fluid chamber, an inelastic pressure fluid in said chamber for normally maintaining the pitman and piston in extended operating positions under a given safe operating pressure, an overload valve in connection with said chamber adapted to be opened by excessive pressure in said chamber and automatically release a portion of the pressure from the chamber and permit the pitman to shorten when subjected to a predetermined overload, and a pump for automatically introducing additional fluid into the chamber to replace fluid lost by leakage or by an overload, while the press is in operation.

3. In a pitman for a power press, a cylinder having bearing means at one end for connecting the cylinder to the usual crank shaft of the press, a piston mounted for limited axial movement in said cylinder and having means on its projecting end for securing a ram thereto, said piston normally being spaced from the adjacent end of the cylinder to provide a pressure fluid chamber, means carried by the pitman and providing a fluid reservoir, an overload valve in communication with the reservoir, a fluid pump, fluid circulating passages between the reservoir, chamber, and the overload valve and pump, and means for actuating the pump to pump fluid into the chamber in the cylinder to maintain a constant pressure therein during normal operation of the press.

4. In a pitman for a power press, a cylinder having bearing means at one end for connecting the cylinder to the usual crank shaft of the press, a piston mounted for limited axial movement in said cylinder and having means on its projecting end for securing a ram thereto, said piston normally being spaced from the adjacent end of the cylinder to provide a pressure fluid chamber, a body carried by the pitman and having a fluid reservoir, a passage connecting said reservoir with the chamber in the cylinder, an overload valve in communication with the reservoir, a fluid pump, a fluid circulating passage between the pump and reservoir having check valves therein for controlling the flow of fluid from the pump to the reservoir, and means for automatically actuating the pump to pump fluid into the chamber in the cylinder to compensate for leakage and to maintain a constant fluid pressure in said chamber during normal operation of the press.

5. In a power press including a crank shaft and a bed plate, a pitman comprising a cylinder having a piston mounted for limited axial movement therein, one end of said pitman having means for connecting it to the crank shaft and the opposite end of the pitman having means for connecting it to a ram, the inner end of the piston normally being spaced from the adjacent end of the cylinder to provide a fluid chamber, a body carried by the pitman and having a reservoir therein, a fluid circulating passage connecting the reservoir with the chamber in said cylinder, a pump interposed in said passage and comprising an operating element, and means on the crank shaft adapted to engage said element during each cycle of the crank shaft, whereby the pump is constantly actuated to pump additional fluid into said chamber when the press is in normal operation, and means for releasing fluid from said chamber when the pressure therein reaches a predetermined maximum figure.

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6. In a power press including a crank shaft and a bed plate, a pitman comprising a cylinder having means for connecting it to the crank shaft, a piston mounted for axial movement in the cylinder and having means on its projecting end for securing a ram thereto, the inner end of said piston being spaced from the adjacent end of the cylinder to provide a fluid chamber, a body carried by the pitman and having a reservoir therein, a fluid passage connecting the reservoir with the chamber in said cylinder, check valves in said passage, and a pump for pumping fluid from the reservoir into said chamber, a fluid return passage between the chamber and reservoir, and an overload valve in said return passage which must be actuated to permit the fluid discharging from the chamber to return to the reservoir.

7. In a power press including a crank shaft and a bed plate, a pitman comprising a cylinder having means for connecting it to the crank shaft, a piston mounted for axial movement in the cylinder and having means on its projecting end for securing a ram thereto, the inner end of said piston being spaced from the adjacent end of the cylinder to provide a fluid chamber, an elongated body carried by the pitman and having a reservoir therein, a fluid passage connecting the reservoir with the chamber in said cylinder, check valves in said passage, a pump for pumping fluid from the reservoir into said chamber, a fluid return passage between the chamber and reservoir, an overload valve in said return passage which must be actuated to permit the fluid discharging from the cylinder to return to the reservoir, and said overload valve being adjustable whereby the maximum safe pressure at which the fluid is released from the pressure chamber, when the pitman is subjected to an overload, may be varied to suit different conditions.

8. A safety overload pitman for a power press, comprising axially movable members normally extended to provide a pressure chamber therebetween, an inelastic pressure fluid in said chamber for normally retaining said pitman members in extended operative positions, a pump in communication with a source of fluid and with said chamber, and means for automatically actuating the pump to introduce additional fluid into said chamber while the press is in operation, to compensate for leakage or the release of fluid from the chamber as a result of an overload.

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