Feb. 7, 1939. J. F. SMITH 2,145,997

PRESSURE INDICATOR FOR SHOE PRESSING MACHINES

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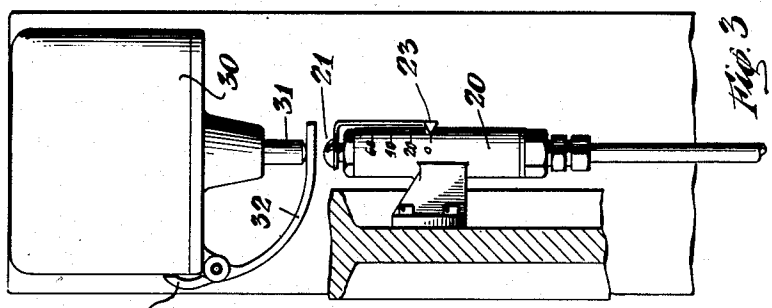


Fig. 3

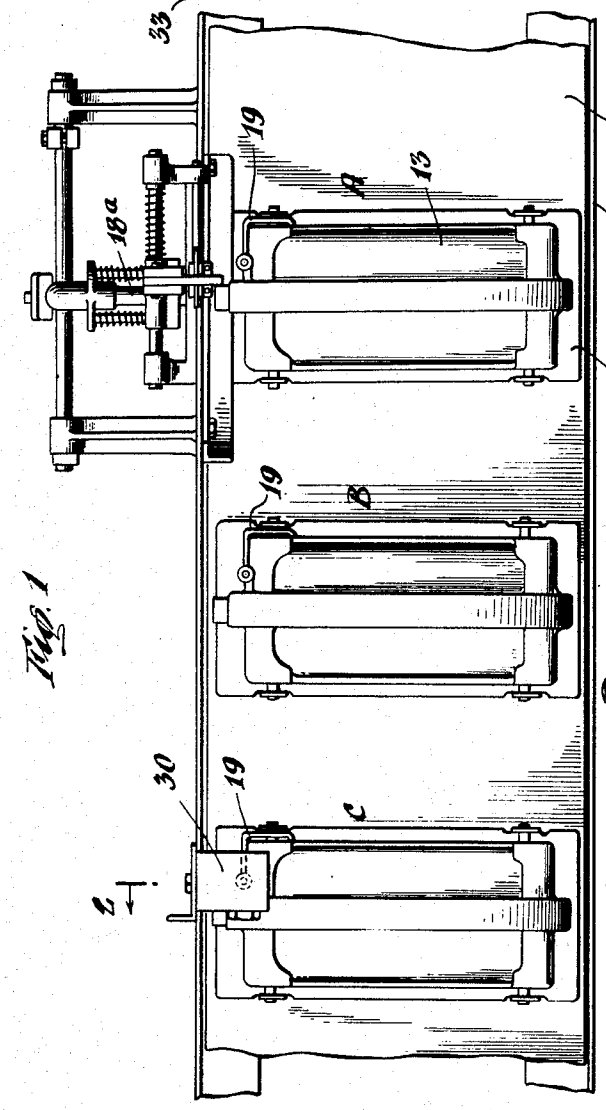


Fig. 1

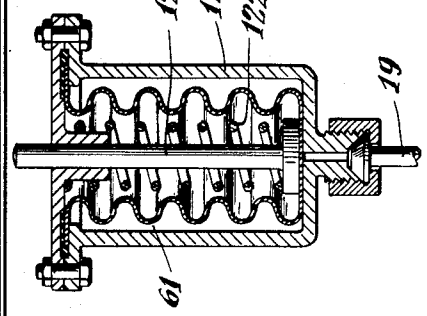


Fig. 4

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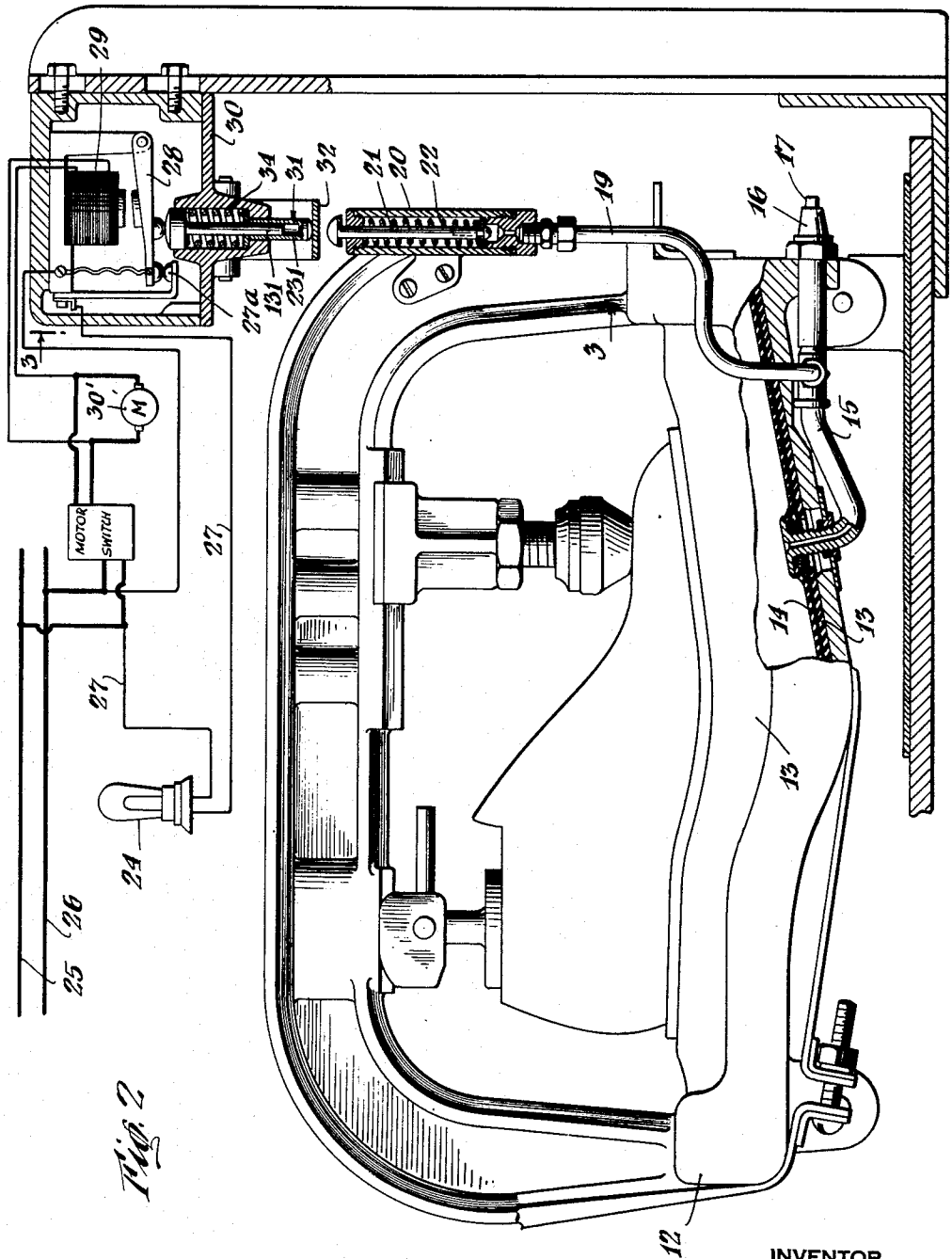


Fig. 2

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Fig. 5

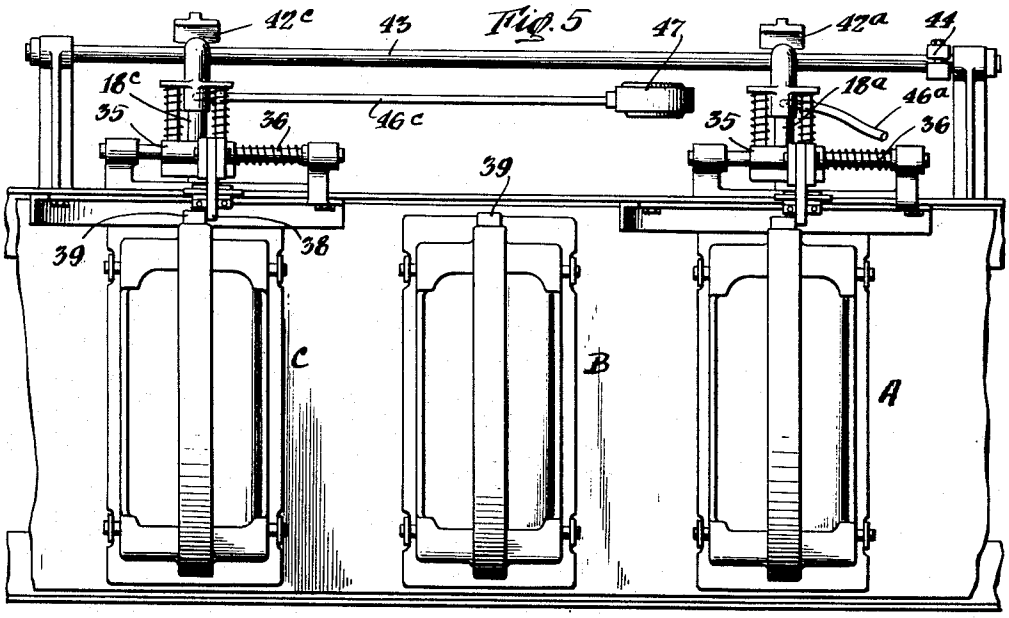


Fig. 9

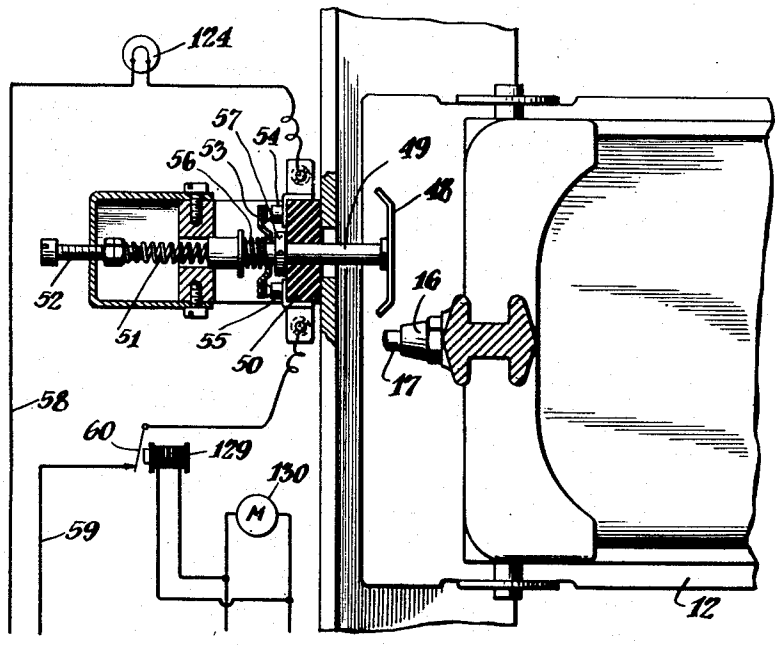
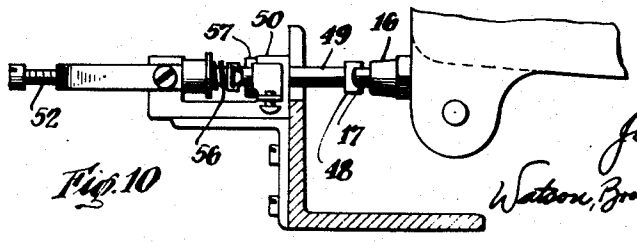


Fig. 10



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Fig. 6

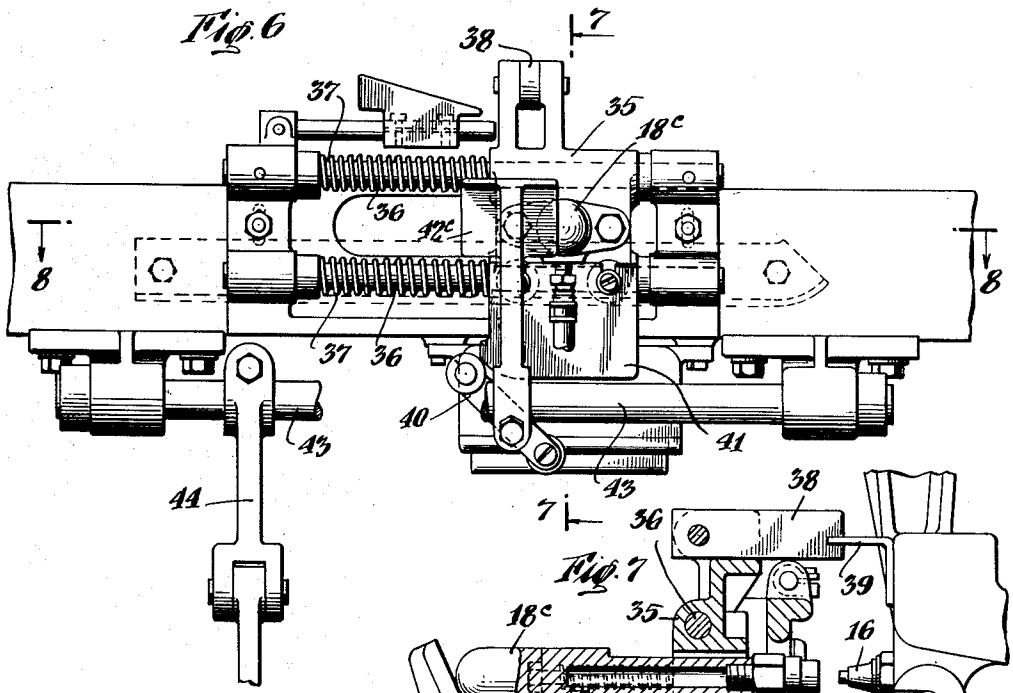


Fig. 7

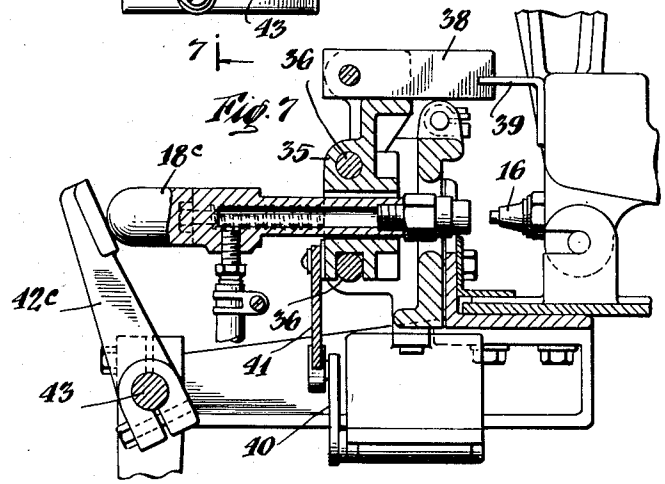
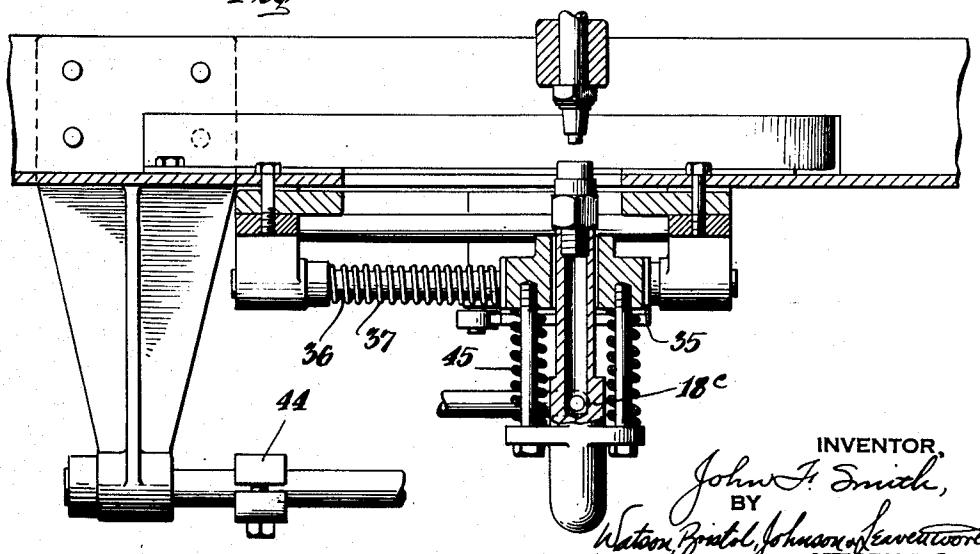


Fig. 8



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UNITED STATES PATENT OFFICE

2,145,997

PRESSURE INDICATOR FOR SHOE PRESSING MACHINES

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Application July 21, 1937, Serial No. 154,717

9 Claims. (Cl. 12—36)

This invention relates to apparatus for use in the manufacture of footwear, and more particularly to devices for indicating certain critical pressures on fluid pressure operated sole pressing machines.

In cement sole-affixing shoes a press having a fluid pressure pad is used to urge the sole against the lasted upper until the cement sets. It is customary to mount these presses on a movable carrier such as a conveyor or rotatable turret, around which they travel during the cement-setting period. The maintenance of adequate pressure during this setting period is dependent on the fluid-tightness of the pressure pad, and if any leakage occurs the pressure may drop to a point too low for satisfactory shoe soling. In the case of air operated shoe presses, the pressure is usually confined by a check valve in the air admittance conduit, and the individual presses are, on most air operated shoe press machines in use today, disconnected from the air supply source during the travel of such presses from the operating or inflating station around the traverse to the deflating station. If the check valve or any of the several connections or joints in the conduit leading to the inflatable member of the pad becomes leaky after being operated for a time, loss of air pressure occurs. This leakage together with whatever leakage there may be in the inflated member caused by it becoming porous or having minute openings occur therein through constant use, seriously affects the adhesion of a sole to a shoe upper. In fact, at present there is no way of telling when or where in its travel the air pressure in a press has diminished sufficiently to affect adhesion, and as the press continues to the deflating station and is deflated regardless of the pressure contained therein, the operator has no means of telling if the shoe was under sufficient pressure to ensure a satisfactory product.

It is an object of this invention to provide means to warn the operator when a press is in such a leaky condition that it will not hold the required pressure for the proper length of time. This means also serves as a reminder that he should carefully examine the shoe in a particular press when the warning occurs. If upon examination, the shoe proves to be unsatisfactory, the sole can be peeled off, recemented and again put under pressure and at the same time the press causing the trouble can be marked for repair.

These difficulties because of loss of pressure through leakage, may occur not only in an air-operated press, but in other known types such as liquid-filled constant-volume press pads adapted to have the pressure on their sole-engaging diaphragms increased or decreased through distortion of the pad, and trouble occasioned through loss of pressure may occur in machines other than sole-affixing machines, such as sole-leveling or conforming, or channel-laying machines. The warning apparatus provided by the present invention is applicable to these various types of presses relying on air or liquid pressure and to the several types of pressing machines which utilize such pad-equipped presses.

General objects of the invention are to provide suitable indicators to inform an operator as to the fluid pressure in a shoe press prior to the removal of a shoe therefrom.

More particularly, an object of the invention is to provide a warning device adapted successively to cooperate with the individual presses on a shoe press carrier at a point in advance of the deflating station but substantially at the end of the carrier traverse, which is capable of indicating to an operator at an unloading station whether adequate pressure was maintained in each press during its passage around the carrier traverse.

Further objects are to provide such fluid pressure indicating devices in forms which are simple and positive in operation, and which preferably are readily adapted to be mounted for cooperation with existing shoe press equipment without undue rearrangement of the latter.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a fragmentary plan view of a portion of a shoe press machine of the conveyor type equipped with pressure indicating devices embodying features of the invention;

Fig. 2 is a fragmentary transverse sectional view, on an enlarged scale, substantially corresponding with line 2—2 of Fig. 1 and including a diagrammatic representation of a portion of the indicator device;

Fig. 3 is a fragmentary sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a fragmentary sectional view showing another form of pressure responsive device useful with the apparatus shown in Figs. 1 and 2;

Fig. 5 is a fragmentary plan view of a portion of a shoe press conveyor showing another form of indicator device embodying features of the invention;

Fig. 6 is a fragmentary rear elevation on an enlarged scale showing details of the pressure indicator equipment of Fig. 5;

Fig. 7 is a fragmentary sectional view taken along line 7—7 of Fig. 6;

Fig. 8 is a fragmentary horizontal sectional view taken along line 8—8 of Fig. 6;

Fig. 9 is a fragmentary view on an enlarged scale of a portion of a conveyor traverse showing another form of pressure indicating device embodying features of the invention; and

Figure 10 is a fragmentary end elevation of the device shown in Fig. 9.

Referring more particularly to the drawings and first to Figs. 1 to 3, there is shown the upper traverse of a press conveyor frame 10 about which an endless belt 11 bearing presses 12 is adapted to be intermittently moved. The conveyor construction including the driving, stopping and starting means and like general features may preferably follow the construction shown in Weiss Patent No. 1,945,762, although it will be obvious that the invention is also applicable to other types of press carriers. The individual presses 12 may preferably be constructed along conventional lines, subject to the attachments incorporated therewith in accordance with this invention. As illustrated in Fig. 2 each press may comprise a base having a pad accommodating cavity spanned by a bow member carrying a toe and heel post to support the shoe against upward displacement. The pad may preferably comprise an outer leather casing 13 enclosing an inflatable rubber bladder 14 having a combined air inlet and outlet 15 in communication therewith. The outer end of this conduit contains a valve 16 which is normally spring closed but is adapted to be unseated through depression of a valve plunger 17, in accordance with well known air valve construction.

As shown in Fig. 1 each press is adapted successively to be moved past an inflating zone A, a deflating zone B and a pressure reading zone C, the movement of the carrier being to the right as viewed in that figure. These zones may be adjacent each other and spaced a distance corresponding to that between adjacent presses as illustrated, or such spacing may take in two or more presses, but the relative locations of the stations with respect to the direction of the carrier movement should be maintained. At the loading and inflating station A, an air supply chuck 18*a* is provided, together with other inflating mechanism which will be more particularly described hereafter. This chuck is adapted to be registered with the valve of the press at the loading station and to inflate the pad on such press. The degree of inflation may depend on the type of work being done. For cement-sole affixing with the leather encased pad of the kind described, a pressure on the order of 55 lbs. per square inch is found to be desirable and the pressure against the shoe bottom should be substantially maintained at this value throughout the cement setting. The press thus loaded is carried about the entire conveyor traverse to the deflating station B, where suitable mechanism (not shown) is situated so as to engage and depress the valve plunger 17 and to deflate the press pad at such station. A suitable and preferable form of deflating mechanism for accomplishing this is shown in my Patent No. 2,078,588, although any other suitable deflating means, including manual deflation, may be employed if desired. After the press had been thus deflated, there is no way to tell whether it had been kept under adequate sole-affixing pressure during its traverse about the conveyor and even close inspection of a shoe unloaded from such deflated press might not reveal such a low pressure condition.

To save the operator the time needed to make such a thorough inspection of the pressed shoes, and positively to inform him when the pressure in each press falls below a selected critical value, each press is provided with a pressure responsive gauge in connection with the press pad, and means is preferably located along the carrier at zone C to cooperate with such gauge and give a visible or audible warning at the loading and inflating zone A.

One illustrative means of accomplishing this comprises an air duct 19 in constant communication with conduit 15, and hence with the interior of the press pad, which duct has a pressure responsive device attached to its outer end. This device comprises an air cylinder 20 containing a plunger 21 having an air-tight piston at its lower end which is subjected to pressure from the pad interior. A compression spring 22 opposes such pressure and is arranged to hold the plunger 21 and its piston in a balanced stationary position responsive to and controlled by the pad fluid pressure. The outer end of plunger 21 projects beyond the head of cylinder 20 and preferably extends in a vertical direction. The head of this plunger is adapted to contact and govern an indicating device if the pad pressure is sufficiently high to project it the required distance, and it is preferably mounted vertically near the upper portion of its associated press as illustrated in Fig. 2, since the uniformity of the vertical position of the various presses on the upper conveyor traverse is easy to maintain, and is not disrupted by shifting of the belt or other factors liable to disarrange the lateral position of the presses with respect to the fixed conveyor frame.

The cylinder 20 is preferably calibrated to give a reading in pounds per square inch, as shown in Fig. 3, and an indicating finger is attached to the upper end of plunger 21 so that a pressure reading may be taken on any press at any point along its traverse. This is useful in checking the operation of a press which has been rendered suspect by the warning device about to be described. This warning device is provided for the convenience of the operator and is arranged to be actuated only when subnormal pressures are encountered in a given press, thus relieving the operator from the duty of constant inspection of each calibrated gauge. However, if desired, the pad gauge 20 alone may be employed to give the operator the desired information.

The warning signal or indicator may be electrically operated and may comprise an audible signal such as a buzzer (not shown) or a light such as that shown at 24 which is adapted to be mounted on the conveyor frame adjacent the loading and unloading station A. This light is energized by current taken from a source of supply 25, 26 through a lead 27 which is connected

through a magnetic switch 27a with the other side of the main current supply line (Fig. 2). One terminal of the switch 27a is mounted on a movable armature 28 which is normally biased by gravity or a suitable spring (not shown) to circuit closing position, but which is adapted to open the light circuit at switch 27a when the magnetic coil 29 is energized. This coil is connected in parallel with the driving motor 30 which operates the conveyor, so that the switch 27a is always open during movement of the conveyor and is normally closed during dwell periods when the conveyor motor is not operated. This switch and its magnet are located in a housing 30 which is mounted on the conveyor frame at zone C. A plunger mechanism 31 extends through and below this housing and has its lower end resting on a pivotally mounted press contactor 32, the lowermost portion of which is located in the path of the several pressure responsive plungers on the individual presses so that as a given press comes to a stop at zone C its plunger 21 is beneath the contactor 32 and the plunger mechanism 31. A stop 33 limits downward movement of contactor 32 but does not interfere with its upward movement under the influence of plunger 21 if the latter is in position to engage it.

Plunger mechanism 31 preferably is a loaded lost motion device and in its preferred form consists of two telescope parts such as a headed male member 131 slidably received by a centrally bored female member 231 having a flange at its upper end slidably mounted in a hole in the housing 30 and cooperating with a portion of the housing 30 to limit the downward movement thereof. A compression spring 34 is positioned between the head of the male member 131 and the flanged upper end of the female member 231 so that when the air cylinder plunger 21 raises to engage the contactor 32 and lift it and the female member 231 the spring 34 will cause the male member 131 having its head engaging the armature 28 to lift until the latter engages the core of the magnet 29. In case the air cylinder plunger 21 is at a maximum height when a press passes beneath the switch housing the lost motion device will permit operation of the apparatus without necessitating depression of the air cylinder plunger 21. The contactor 32, female member 231, male member 131 and armature 28 rise until the latter engages the core of the magnet 29 and thereafter contactor 32 and female member 231 are permitted to rise further, compressing spring 34 and telescoping the male and female members 131 and 231 to compensate for the elevation of the air cylinder plunger 21. It is to be understood, however, that the plunger mechanism 31 may comprise a suitably spring biased unitary plunger if the cooperating structures are correlated in a manner to make such compensation unnecessary.

The vertical height of the fluid pressure cylinder 20 on the individual presses is so arranged with respect to the position of contactor 32 that when the fluid pressure within the pad of a press located at zone C is sufficiently high to assure proper sole pressing results, the plunger 21 will be elevated sufficiently to engage and wipe beneath contactor 32 lifting it and the plunger 31, thus breaking the signal light circuit at 27a. If, however, the pad pressure, because of leakage or some other reason, drops below a predetermined minimum permissible pressure, the plunger 21 will not engage contactor 32 and the switch at 27a may close. As the press, under these conditions, comes to a stop at zone C and the motor circuit is de-energized, magnet 29 is de-energized, permitting current to flow through the signal light circuit whereby the light is illuminated and the operator's attention is called to the fact that the press at zone C is not sufficiently inflated. When this press reaches the loading and inflating zone, the operator may give its shoe particular examination and may resole it if needed. The press also may be examined and repaired or replaced.

With this arrangement, it will be seen that the warning device will only operate during a dwell period and then only when a given press has too little pressure.

In Fig. 4, there is shown an alternative form of air cylinder for mounting on the individual presses in lieu of cylinder 20. It comprises a cylinder or casing 120 in communication with the upper end of a press duct 19. Within the cylinder is an air tight bellows-like compressible chamber 61 of flexible copper or other suitable material. This chamber in turn contains a plunger 121 having a pressure head at its lower end and having its upper end projecting through the cylinder 120 in position to engage and lift, under proper pressure conditions, the press contactor 32 of the indicator mechanism. A compression spring 122 opposes lifting of plunger 121, and balances the latter in a vertical position responsive to air pressure in cylinder 120, which tends to compress chamber 61. This construction is of conventional form, and affords an excellent seal against air losses from duct 19.

In Figs. 5 to 8, another arrangement for informing the operator as to pad pressure conditions is shown. Here a pressure reading is taken on each press as it reaches the zone C and this reading is shown on an indicator plainly visible to the operator at station A. The mechanism for doing this, comprises an air chuck substantially like the air inlet chuck adjacent station A, except that such chuck instead of being connected with an air supply source is connected to a pressure indicator. Specifically, the mechanism includes an air chuck 18c mounted for reciprocation in a slidable carriage 35 (Figs. 6, 7 and 8) which is mounted on guide rods 36 extending along the conveyor frame. Springs 37 mounted on such rods normally urge the carriage to the right as viewed in Figs. 6 and 8. A lever 38 is pivotally mounted on the upper portion of carriage 35 in the path of a lug 39 carried by each press. As the press comes to a drift stop adjacent to zone C, lug 39 picks up the lever 38 so as to carry the carriage 35 along with the press with the chuck 18c in alignment with the air valve 16 on such press. The means for bringing the press to a drift stop may comprise a motor cut-off switch 40 (Figs. 6 and 7) adapted to be engaged by a cam plate 41 mounted on the carriage 35. Rotation of this switch 40 under the influence of cam plate 41 cuts off the driving motor and stops the conveyor. The circuit including this cut-off switch may be like that described in the above-mentioned Weiss Patent No. 1,945,762 wherein suitable means is provided for again starting the conveyor. While for purposes of convenience, the cut-off switch has been shown mounted adjacent the pressure reading chuck 18c at zone C, it will be understood that this switch may, with equal facility, be located elsewhere and that it preferably is mounted on the air inflating chuck carriage at zone A. Such zone A inflating chuck 18a is mounted on a sliding carriage 35 identical with the carriage bearing chuck 18c and the air in-

flating chuck mechanism is otherwise identical with the pressure reading chuck mechanism just described. After the presses have been brought to a drift stop with one of them adjacent zone C and another adjacent zone A, and with the chucks 18a and 18c, respectively, in alignment with the press valves 16 of their opposed presses, these chucks are both urged into cooperative relation with their respective press valves by means of arms 42a and 42c which are fixed for rotation with a rod 43 mounted on suitable brackets along the conveyor frame and adapted to be twisted by suitable treadle operated linkage indicated at 44. This linkage is so arranged that depression of a treadle (not shown) swings the arms 42a and 42c in a clockwise direction (Fig. 7) and forces the chucks 18a and 18c against the opposed press valves against the bias of springs 45 (Fig. 8). The chuck 18a is connected with an air supply conduit 46a while the pressure reading chuck 18c is connected with a conduit 46c leading to a pressure indicator 47 mounted on the conveyor frame adjacent the station A. By this means, the operator at the loading and inflating station can readily note the pressure in the press at zone C prior to its deflation and can determine whether it is adequate for required sole pressing results and can take appropriate measures to remedy any faults due to low pressure when a defective press from zone C reaches him.

In Figs. 9 and 10 another arrangement for signalling the operator when the pad pressure is too low is shown. Here, a press 12 is illustrated just in advance of a point along the conveyor traverse corresponding with zone C in the previously described figures. The plunger 17 of its air inlet and outlet valve 16 is adapted to engage and wipe past a contactor 48 affixed to a plunger 49 slidably mounted in a bracket 50 fixed along the conveyor frame opposite the point at which the press 12 comes to a drift stop and at a station in advance of the deflating station. The plunger 49 is urged toward the press by a spring 51 which is adjusted by a screw 52 to a pressure corresponding with the minimum permissible pressure value within the press pad as exerted on and transmitted through the press valve seat and plunger 17. If, when such plunger 17 stops at contactor 48, the pad pressure is adequate, the press valve will be held in seated position, and the spring 51 will be forced to yield. If, however, the pad pressure is too low the valve plunger will yield and plunger 49 will remain fixed under impulsion of spring 51. Plunger 49 has a conductor bar 53 loosely carried on it with its ends urged normally into contact with electric terminals 54 and 55 under the bias of a spring 56 seated between a shoulder on plunger 49 and the conductor bar. A collar 57 carried by plunger 49 is adapted to unseat conductor bar 53 and break its contact with terminals 54 and 55 upon inward movement of such plunger. Terminal 54 is connected through a signal lamp 124 with one side 58 of a source of current and the terminal 55 is connected with the other side 59 of such source through a normally closed magnetic switch 60. This switch or relay is adapted to be held open by a magnet 129 connected in parallel across the motor circuit so that when the driving motor 130 for the conveyor is operating and the presses are in motion, the signal light circuit is held open. When the motor stops and the magnet 129 is de-energized, the switch 60 closes under its normal bias, and if at this time the press at zone C opposite contactor 48 has insufficient pressure in its pad to enable its plunger 17 to overcome the pressure of spring 51, the light circuit remains closed and the signal lamp is illuminated, calling the operator's attention to this low pressure condition. If, on the other hand, the pressure within the pressure pad is adequate, the pressure pad plunger 17 unseats the conductor bar 53 and the warning signal is not actuated.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a shoe pressing machine having a plurality of pressure pad equipped shoe presses mounted on a movable carrier, a pressure responsive device mounted on each press in communication with its pad, a signal, and means for successively operating said signal in accordance with the condition of each of said devices.

2. In a shoe pressing machine having a plurality of pressure pad equipped shoe presses mounted on a movable carrier and means for driving said presses step by step past an operating station, the combination comprising, a signal, means rendering said signal inoperative during carrier movement, and means successively operable from each of said presses during a dwell period of said carrier to actuate said signal in accordance with the pressure in one of said press pads.

3. In a shoe pressing machine having a plurality of pressure pad equipped shoe presses mounted on a movable carrier and means for driving said presses step by step past an operating station, the combination comprising, a signal, means for operating said signal, a pressure responsive device on each press in communication with its pad, a part of said signal operating means being in the path of said presses in position to be engaged and actuated by said device when the pressure in its press pad is high, said device being ineffective to actuate said part when the pad pressure is low, said signal being operable in accordance with the actuation or non-actuation of said part.

4. A fluid pressure signal apparatus for pressure pad equipped shoe presses mounted on a movable carrier, comprising, in combination an electric signal, a switch for said signal, a pressure responsive device on each press in communication with its pad, said devices being successively operable to open said switch when the pressure within their respective pads is at or above a determined value.

5. A fluid pressure signal apparatus for pressure pad equipped shoe presses mounted on a movable carrier, comprising, in combination, an electric signal, a plunger equipped pressure gage on each press in communication with its pad arranged to have its plunger advanced proportionately to the degree of pressure in such pad, a

switch mechanism for said signal, part of said mechanism being located in the path of said plunger in position to be contacted thereby and moved to a switch opening position only when the pressure in the pad adjacent said mechanism is at or above a determined value.

6. In a shoe pressing machine having a plurality of pressure pad equipped shoe presses mounted on a movable carrier and an electric motor for driving said presses step by step past an operating station, the combination comprising, an electric signal, a circuit for said signal including a switch, means holding said switch open when said motor is running and permitting said switch to close when said motor is not running, pressure responsive means on each press in communication with its pad, and a device positioned successively to contact said pressure responsive means during a dwell period of said carrier and to maintain said signal switch in open position except when the pressure in the pad adjacent said device falls below a determined value.

7. In a shoe pressing machine having a plurality of pressure pad equipped shoe presses mounted on a movable carrier and means for driving said carrier, the combination comprising a pressure indicator positioned at a point along the carrier traverse, and means for successively coupling said indicator with the pad of each loaded press after the latter has traversed a substantial portion of its sole pressing path around the carrier.

8. In a shoe pressing machine having a plurality of inflatable pressure pad equipped presses mounted on a movable carrier, and means for driving said carrier past a deflating zone to an inflating zone, the combination comprising a pressure indicator fixed along the carrier traverse for observation from said inflating zone, and means for successively coupling said indicator with each of said press pads at a point beyond said inflating zone and in advance of said deflating zone.

9. In a shoe pressing machine having a plurality of inflatable pressure pad equipped presses mounted on a movable carrier, and means for driving said carrier past a deflating zone to an inflating zone, the combination comprising a pressure indicator, an air chuck at said inflating zone for inflating said presses, a second chuck positioned along said carrier traverse at a station in advance of said loading zone, a conduit connecting said second chuck and said indicator, and means for respectively coupling said chucks with the pads on presses located at said inflating zone and said advance station.

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