March 6, 1951

I. GALPER

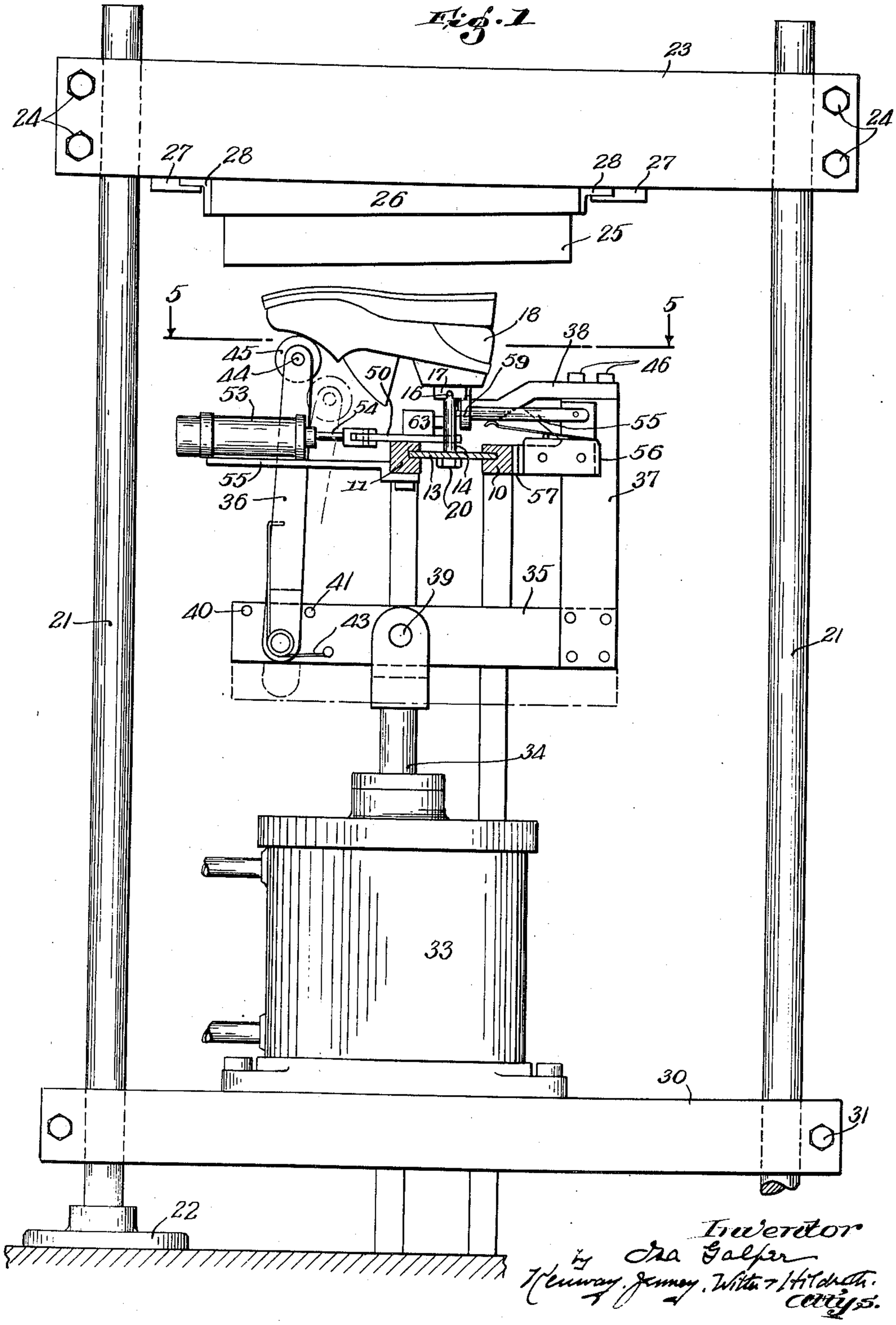
2,543,771

AUTOMATIC SOLE LAYING PRESS

Filed July 3, 1948

3 Sheets-Sheet 1

Fig. 1




Inventor

by Ira Galper

Kenway, Jenney, Witter & Hildreth.

Attys.

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I. GALPER

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3 Sheets-Sheet 2

Fig. 2

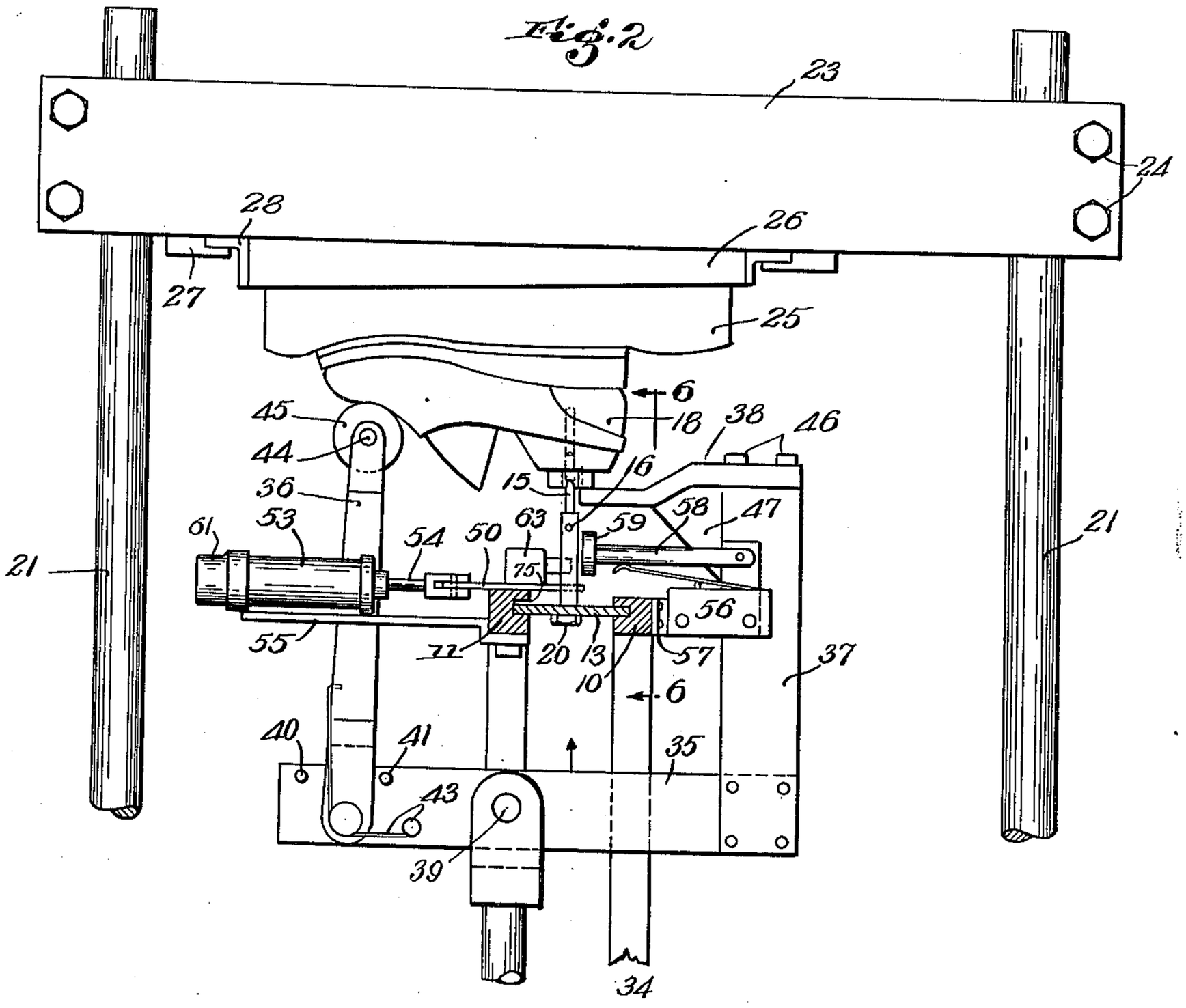



Fig. 3

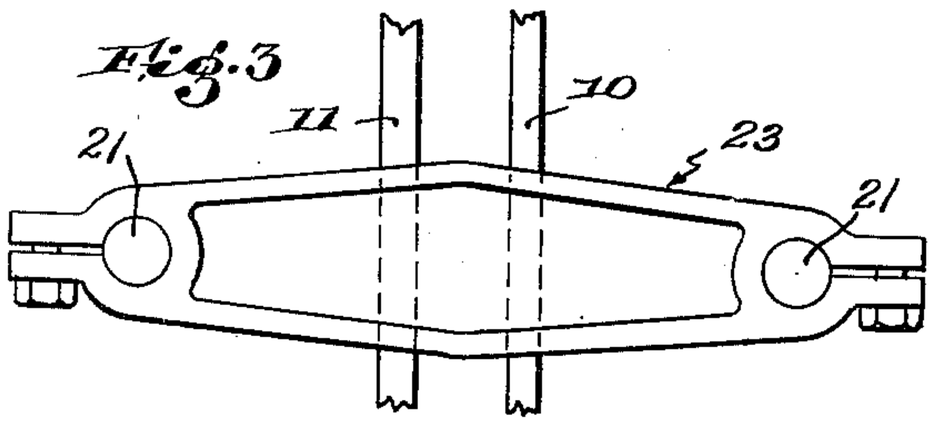
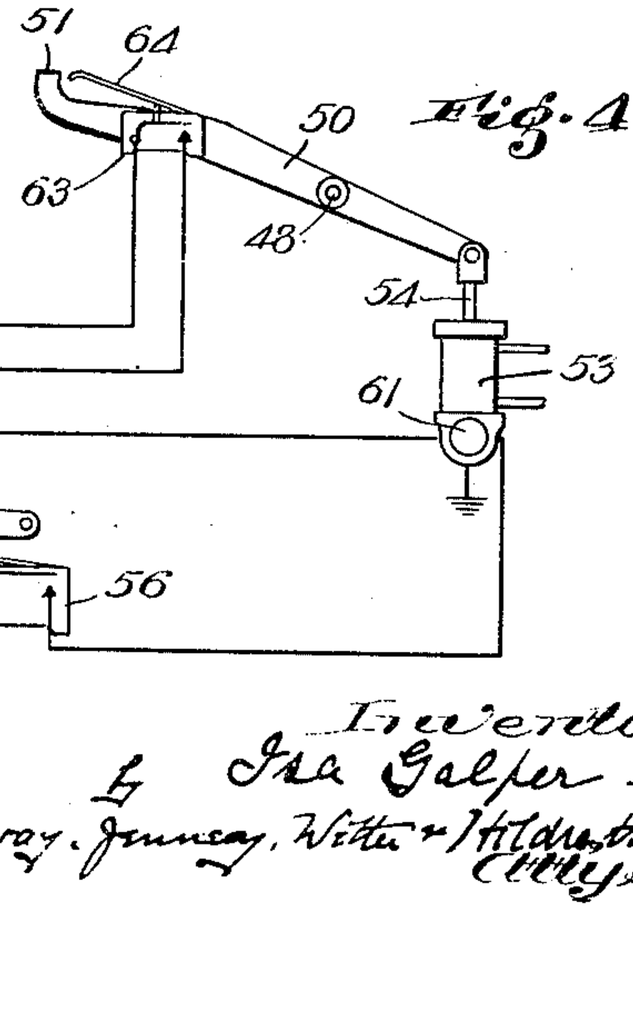



Fig. 4




Inventor:
I. Isa Galper
by Hemway, Jenney, Witter & Hildreth
Attys.

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I. GALPER

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Fig. 5

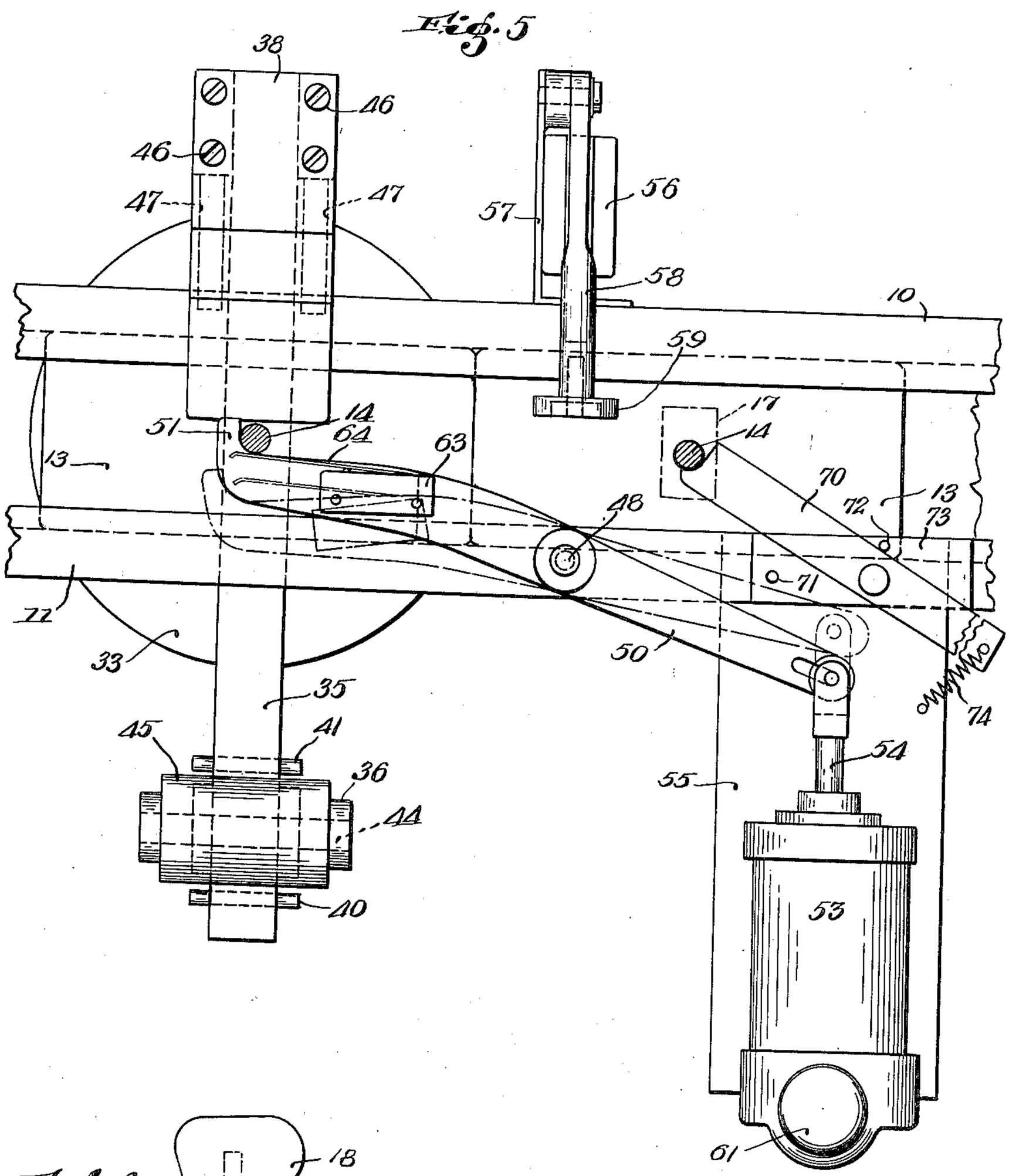
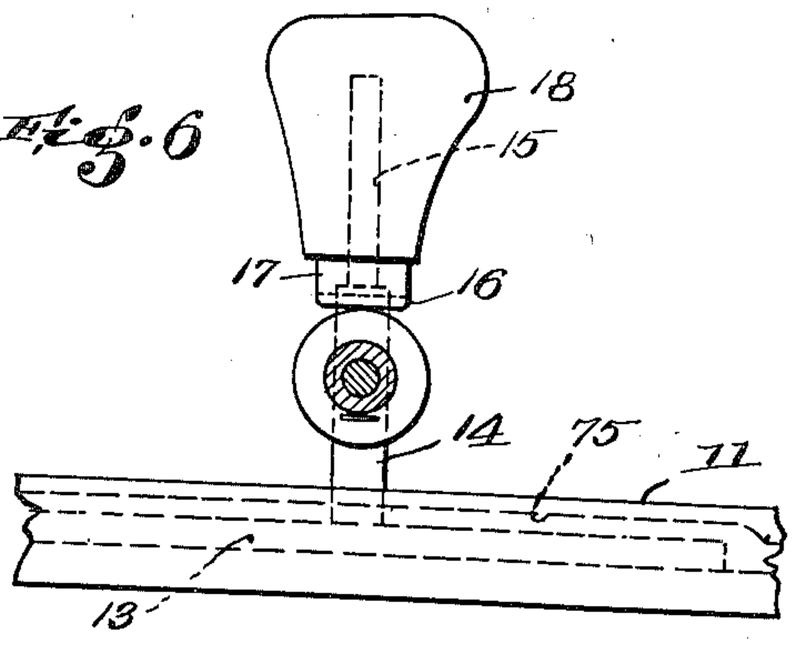



Fig. 6




Inventor
Isa Galper
Kenway Jenney. Witter & Hildreth.
Attys.

Patented Mar. 6, 1951

2,543,771

# UNITED STATES PATENT OFFICE

2,543,771

## AUTOMATIC SOLE LAYING PRESS

Isa Galper, Manchester, N. H., assignor to Bee Bee Shoe Co., Manchester, N. H., a corporation of New Hampshire

Application July 3, 1948, Serial No. 37,031

16 Claims. (Cl. 12—36)

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This invention relates to the manufacture of shoes and more particularly to automatic sole laying presses used in conjunction with shoe manufacturing assembly lines such as the one described in my copending application Serial No. 733,084.

Sole laying presses of conventional design usually take either one of two forms; i. e. the so-called two-station press or the multi-station press. These conventional presses are designed to allow the operator to save time and to minimize his motions by placing a lasted shoe in the machine or taking it away while another lasted shoe and sole is being held under pressure. However, they have numerous disadvantages. First, they take up considerable space. The multi-station press usually involves a massive frame and a large turntable. The two-station press is smaller but also takes up substantial floor space, and in addition both machines are expensive. Second, neither type is automatic and perforce they both require the constant attention of operators. In the third place, the operator in working with these machines is forced to go through an excessive number of motions. He must reach for the last, place it in position on the press, withdraw his hands, actuate the press, reach again for the last, and finally withdraw it from the press after the pressing operation. A fourth disadvantage is seen in the requirement of skill on the part of the operator. He must become sufficiently dextrous to place the shoe properly without unnecessary delay, but yet he must operate slowly enough to ensure an effective bonding between the sole and the upper of the shoe. This latter point leads to a fifth disadvantage, namely the possibility of hazard to the operator's fingers. If the operator, through hurry or fatigue, becomes careless with the conventional press, he may inadvertently actuate the press before he has withdrawn his fingers from the last.

An object of my invention is to provide a sole laying press which is both compact and inexpensive. Another object of my invention is to provide a sole laying press which is completely automatic and which may be used in a shoe manufacturing assembly line without the necessity for an individual operator to run it. A further object of my invention is to provide an automatic means for gauging the length of time the last and sole are to be pressed and to assure uniform pressure for each last and shoe. Still another object of my invention is to provide a sole laying press that accomplishes the pressing operation with a minimum of delay between successive operations, and in which the step of feeding the lasted

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shoes into the machine is a simple operation requiring no skill and which is performed without the possibility of danger to the operator.

To accomplish these objects, I employ a continuous conveyor which feeds the lasts into the press. When the lasted shoes reach the proper position in the press they trip switches closing circuits which actuate such mechanism that the shoes are automatically halted, raised, and pressed against a resilient pad. An automatic timer then serves to gauge the pressing time and finally actuates means for lowering the last and allowing it to continue along the conveyor. Thus the operation being completely automatic, the machine is readily adaptable to a shoe manufacturing assembly line and requires no other skill than that necessary for the simple task of initially placing and finally withdrawing the lasted shoes from the conveyor at the beginning and end of the manufacturing process.

A further feature of my invention is an especially designed means for raising and pressing lasts of various sizes against the resilient pad while at the same time, maintaining an even pressure distribution between the heel and toe. As herein illustrated the said means comprises two arms, one engaging the heel portion of the last, and the other supporting a pivotally mounted arm and roller which engage the toe portion of the lasted shoe.

Another feature of my invention is the positioning of the resilient pad with relation to the last so that the last can pass freely under the pad, but yet when the last is raised and pressed against the pad, it is not completely disengaged from the spindle.

Another feature of my invention comprises the combination of a series of last carriers movable along a track, with means for engaging a last and elevating it into a position of pressure while the carrier remains undisturbed upon its track and then returning the last to initial position so that it may be advanced in the further movement of the carrier. Such an arrangement has the advantages of simplicity and compactness in structure as well as reliability and accuracy in operation.

Inasmuch as the press of my invention occupies only a few inches of space to either side of the conveyor track, it represents a substantial saving of floor space. Furthermore, since my press may involve only one pressing station there is a substantial saving in the number of parts used.

These and other features of the invention will

best be understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings, in which:

Fig. 1 is a view in side elevation of the press showing the conveyor track in section, but not showing the conveyor track supports,

Fig. 2 is a view in side elevation of the press at the top of its stroke, while pressing the lasted shoe against the resilient pad,

Fig. 3 is a plan view of the cross-head as seen from above of the frame which supports the resilient pad,

Fig. 4 is a wiring diagram showing the circuits of the machine,

Fig. 5 is a plan view at the level of the conveyor track indicated by the line 5—5 in Fig. 1 and showing the spindle stop, elevating arms and micro-switches, and

Fig. 6 is a view in rear elevation of a lasted shoe mounted on the spindle, as viewed from the line 6—6 of Fig. 2 and showing also a portion of the track.

In the preferred embodiment of my invention, I employ a shoe manufacturing assembly line such as the one described in my copending application Ser. No. 733,084. Since the only function of the assembly line with respect to this invention, is to feed the lasted shoes into the press, a detailed description of the assembly line will be omitted.

The parts of the assembly line which cooperate with the preferred embodiment of my invention are the tracks 10 and 11 which are provided with opposed grooves. Sliding in these grooves is a series of rectangular plates 13 which constitute the base of the last carriers. Each last carrier has a vertical spindle 14 provided at its upper end with an upstanding last pin 15 (see Fig. 6) and a transverse last-locating pin 16. The last 18 is slidably mounted on the last pin 15. The locating pin 16 cooperates with a transversely grooved last plate 17 secured to the cone of the last 18 and fixes the angular position of the last upon the spindle 14. The spindle 14, at its lower end, is shouldered and passes through the base plate 13, being threaded to receive a hexagonal nut 20 by which it is secured firmly and permanently to the base plate 13. A conveyor belt (not shown) runs beneath the tracks 10 and 11 and serves continuously to slide the last carriers by frictional contact along the tracks 10 and 11 while permitting any selected carrier to be arrested and held stationary when this is in order.

Bridging the assembly line is a frame comprising upstanding posts 21, one on each side of the assembly line, resting upon cast iron bases 22, and a cross-head 23 bolted to the posts 21 by the bolts 24 passes horizontally across the assembly line. A resilient pad 25, fastened to a wooden base block 26, is mounted with its rubber facing downward on the under side of the cross-head 23 by means of flanged clamps 27 which are welded to the cross-head 23 and which interlock with flanges in the wooden block and supports 28. The resilient pad 25 is positioned to lie substantially in a plane parallel to the mean plane of the shoe bottom as mounted on the last 18, and it is located close enough to the last 18 to permit the last to be raised and pressed against the pad 25 without the last's becoming completely disengaged from the last pins 15. Also the pad 25 is located far enough above the assembly line to permit lasted shoes to pass unobstructed under it when the lasts 18 are in the normal or lowered position on the last pins 15.



A last elevating mechanism is supported above a stationary transverse beam or lower cross-head 30 which passes under the assembly line tracks 10 and 11, and is bolted to the upstanding posts 21 by the bolts 31. Upon the transverse beam 30, a double acting compressed air cylinder 33 is mounted vertically and centrally beneath the tracks 10 and 11 and longitudinally beneath the resilient pad 25. The cylinder 33 drives a piston from which projects a piston rod 34 upon which a cross arm 35 is pivotally mounted by means of a pin 39. The cross arm 35 supports a pivotally mounted toe engaging arm 36 on one side and an upstanding support 37 for a heel lifting plate 38, on the other side. The pivotally mounted toe engaging arm 36 is limited in its arc of movement by pins 40 and 41 projecting from the cross arm 35, and is held in restrained position against the inner pin 41 by the spring 43. At its upper end, the toe engaging arm 36 is forked and drilled to accommodate a longitudinally disposed pin 44 upon which a rubber roller 45 is mounted. The heel lifting plate 38 is disposed horizontally and bolted to the upstanding support by the bolts 46, and it is further braced by the lateral braces 47 which slant obliquely and are welded to each side of the lifting plate 38 at one end and at the other to each side of the support 37. At its inner end the heel lifting plate 38 is recessed to accommodate the plate 17 on the cone of the last. The cross arm 35 is pivotally mounted for the purpose of accommodating lasts of different sizes and to allow the toe engaging arm 36 and heel lifting plate 38 to force each end of the last against the resilient pad 25 with substantially equal pressure.

Pivotally mounted on a pin 48 projecting from the track 11 is a pawl arm 50 provided with an extending lug 51 at one end, the pawl being placed in such position that when it is swung inwardly it crosses the path of the spindles 14 and the lug 51 engages successive spindles 14, halting the lasts 18 in position under the pad 25. The pawl 50 is swung automatically by a compressed air mechanism which comprises a double acting cylinder 53 and piston rod 54, the cylinder 53 being mounted on the bracket 55 which is welded or otherwise attached to the track 11, and the piston rod 54 being pivotally and slidably connected to the pawl arm 50.

A micro-switch 56, having an arm 58 which supports a metal roller 59, is mounted on the bracket 57 which in turn is welded to the track 10 in such position that the roller 59 will contact each last plate 17 and depress the arm 58 shortly before the last reaches a position under the pad 25. The micro-switch 56 is in an electrical circuit which has as a source of power the transformer 60, see Fig. 4, and passes through the switch 56, thence through a double acting solenoid 61 and out to ground. This circuit, when the switch is closed, operates through the solenoid 61 to place the air valves (not shown) of the cylinder 53 in position so as to retract the piston rod 54 and swing the pawl arm 50 into the path of successive spindles 14 moving along the track 10—11. This circuit is broken by the passage of the last plate and the consequent releasing of the switch 56, but yet it is closed long enough to accomplish its purpose. Furthermore, the valves will remain in position until changed.

A micro-switch 63 is mounted on the pawl arm 50 in such position that its arm 64 will be de-

pressed by each spindle when the spindle is engaged and arrested by the lug 51. The micro-switch 63 is in a second electrical circuit which includes the source of power 65, a spring loaded solenoid 66, and an automatic timer 67. This circuit serves the purpose of placing the valves (not shown) of the cylinder 33 in such position as to impart upward thrust to the piston 34 and in turn to lift and press the last 18 against the pad 25. This circuit also starts the automatic timer 67 which, at the end of its selected time interval makes a third circuit comprising a line direct from the timer 67 to the double acting solenoid 61 and ground. The third circuit operates to return the valves (not shown) of the cylinder 53 into such position as to project the piston rod 54 and retract the pawl arm 50 and lug 51 from the path of the spindle 14, concurrently breaking the circuit 65, 63, 66, 67 and allowing the last 18 to advance along the track. The timer 67 automatically resets itself and in doing so, breaks the circuit 60, 67, 61 and ground.

The operation of my device is completely automatic except for the operations of placing and removing lasted shoes from the spindles. As a last 18 progresses along the assembly line and approaches the press, it trips the micro-switch 56, which through the double acting solenoid 61 actuates the compressed air cylinder 53 retracting the piston 54 and swinging the pawl arm 51 across the path of the spindle 14. When the spindle 14 becomes lodged against the pawl arm lug 51, it trips the micro-switch 63 which through the spring loaded solenoid 66, places the valves of the compressed air cylinder 33 in such position as to impart upward thrust to the piston 34, and starts the automatic timer 67. As the piston 34 arises, the last lifting head is elevated, the plate 38 contacts the last plate 17 and the roller 45 contacts the instep portion of the last, rolling down it and finally lodging in the concavity on the upper part of the toe portion of the lasted shoe. Thence the last 18 is raised and the shoe bottom pressed against the pad 25. At the end of the run of the automatic timer 67, the third circuit is energized and through the double acting solenoid 61 returns the valves of the compressed air cylinder 53 which projects the piston 54 and retracts the pawl 50 and lug 51. The circuit to the spring loaded solenoid 61 is then broken by the retraction of the pawl 50 and the valves of the compressed air cylinder 33 return to their initial position causing the lasted shoe to lower onto the last pin 15 and to continue along the tracks 10 and 11. Thereupon the operation is repeated.

When the press is used in continuous operation, the leading edge of the base plate 13 of the next last to be pressed, or the "on deck last," collides with the trailing edge of the base plate 13 of the last in the press, and because of the intermittent pressure of the conveyor, it has a tendency to disturb the micro-switch 63 on the pawl arm 50. In order to eliminate this, a ratchet 70 is pivotally mounted on a plate 73 which is welded to the track 11. The ratchet 70 is located in position to swing across the path of the spindles, and by wedging against the trailing edge of the spindle 14 of the "on deck" last, hold the base plate 13 of the "on deck" last firmly against the base plate 13 of the last in the press. The arc of pivot of the ratchet 70 is limited by pins 71 and 72, and it is at all times urged inwardly from the track 11 against the pin 72 by a tension spring 74.



When pressing lasts of different sizes, the cross arm 35 will tilt slightly as the heel or toe tends to seat more into the resilient pad 25. In extreme cases, this tilt may cause a binding which will impede free sliding of the last upon the spindle. To take care of this possibility, the track 11 is given a slight clearance 75 above the base plate 13 thereby allowing the spindle a limited rocking motion when such is desirable.

The press of my invention is herein shown as having a single station and being located in a shoe manufacturing assembly line. With this arrangement, however, the assembly line must wait for the full pressing time of each shoe before advancing. In some cases the pressing time amounts to three or four seconds. It is apparent that by placing several of my presses consecutively along the assembly line, the pressing time at each station can be proportionately reduced and the number of shoes per minute, passing along the assembly line, proportionately increased.

Of course, my device could also be used separately with a circular track feeding it, and also using several stations. If this variation were used it would have considerable advantage over the conventional multi-station press because the only acts the operator would have to perform would be to place the lasts on the spindles and take them off, nor would there be any danger of having fingers crushed.

The press of my invention is not exclusively designed for sole laying, although it may be described as a sole laying press for purposes of convenience. Actually it is readily adaptable to any stage in the manufacture of shoes where it is desirable to apply pressure to the shoe, i. e. platform fixing after spotting; wrapper pressing after lasting, etc.

These and other variations will be readily apparent to those skilled in the art, and it is to be understood that the invention is not to be limited by the precise embodiment shown herein, but is rather to be measured by the terms of the appended claims.

Having thus disclosed my invention and described in detail an illustrative embodiment thereof, I claim as new and desire to secure by Letters Patent:

1. An automatic press in a shoe manufacturing assembly line, comprising a frame bridging the said assembly line, a resilient pad suspended by the said frame adjacent to the assembly line, means for feeding a series of lasted shoes along the assembly line, automatic means located adjacent to the said resilient pad for arresting the shoes one by one adjacent to the pad and pressing each lasted shoe against the said pad for a predetermined length of time, the said automatic means being actuated by contact with the shoes as they pass in procession on the said assembly line and approach a position adjacent to the said pad.

2. An automatic press as described in claim 1 further characterized by three electrical control circuits as follows: a first circuit actuating means for arresting the shoes adjacent to the pad, a micro-switch in the said first circuit so located as to be tripped by the shoe as it approaches a position adjacent to the pad and for closing the first circuit, a second circuit actuating means for pressing the lasted shoes against the pad, a micro-switch in the second circuit tripped by the shoe when it has reached the arrested position adjacent to the pad, an automatic timer in the second circuit, and a third circuit closed by the

automatic timer at the end of the selected interval, actuating means for releasing the shoes from the arrested position, and breaking the second circuit.

3. An automatic sole laying press as described in claim 2 further characterized by the last passing the micro-switch in the first circuit, releasing the said micro-switch and breaking the said first circuit before reaching the arrested position.

4. An automatic sole laying press as described in claim 3 further characterized in that the automatic timer includes means by which it is automatically reset after the second circuit has been broken, and that the said third circuit is broken by action of the said automatic timer.

5. A machine of the class described comprising a track, a series of last carriers slidable along the track at a fixed level and each provided with a projecting last pin, a resilient pad mounted above the track at a fixed level and maintained there at all times, and automatic mechanism for engaging the lasts upon successive carriers as they pass beneath the pad and lifting the lasted shoes relatively to their respective carriers into pressing engagement with said pad while each last remains upon its respective last pin and its carrier remains in position in the track.

6. An automatic shoe press comprising, a conveyor for a series of shoe lasts, a frame, a resilient pad suspended by the frame above the said lasts and conveyor, means actuated by the lasts as they pass in procession for successively arresting their movement at a position centrally under the said pad, means, actuated by each last when it reaches position under the pad, for elevating and pressing the last against the pad, automatic timing means governing the length of pressing time, and mechanism actuated by the automatic timing means at the end of its selected time interval for lowering the last and withdrawing the arresting means.

7. A machine of the class described, comprising a track, a series of last carriers movable along the track, a sole pad located above the track, and a head having arms extending on both sides of the track shaped to engage the toe of a lasted shoe and the heel end of its last on one of said carriers and being movable to lift a last away from its carrier and press it against the sole pad while the carrier remains in position in the track.

8. An automatic press comprising, a conveyor for a series of shoe lasts, a frame, a resilient pad suspended by the frame above the said lasts and conveyor, means for successively arresting the movement of the lasts along the conveyor at a position centrally under the pad, the said arresting means being actuated by the lasts as they pass in procession and approach the pad, a last lifting device operatively associated with the said pad and mounted to move vertically beneath it, arms carried by the said lifting device and so positioned that when the lifting device is raised, the said arms engage the toe portion of the shoe and heel portions of its last when it is in position centrally under the said pad, and automatic mechanism for operating the said last lifting device arranged to be set in operation by the last when it reaches a position centrally under the pad.

9. An automatic sole laying press comprising a conveyor for a series of shoe lasts, a supporting frame located adjacent to the conveyor, a resilient pad supported by the said frame, a pivotally mounted arm mounted to swing across the



path of the lasts and arrest their progress at a position adjacent to the pad, compressed air means actuated by the lasts as they approach the pad for swinging the arm into position to arrest successive lasts, a last-lifting head constructed and arranged to engage a last when it is held in arrested position by the arm, compressed air means for elevating the said head and pressing the last against the pad when it reaches arrested position, an automatic timer gauging the length of time the last is pressed against the pad, and mechanism actuated by the timer at the end of a selected time interval for lowering the head and retracting the pawl.

10. In a shoe manufacturing assembly line including a conveyor track, last carriers movable along said track, upstanding spindles projecting from the carriers and adapted to hold shoe lasts slidably thereon, an automatic sole laying press comprising a frame, a resilient pad suspended by the said frame above the conveyor track, a spindle stop comprising a pawl arm pivotally mounted adjacent to the conveyor track and so constructed and arranged as to swing across the path of successive spindles and halt their progress beneath the said pad, means actuated by the last carriers as they approach the pad for swinging the said spindle stop into position to engage a spindle, mechanism for elevating a last and pressing a shoe bottom against the said pad arranged to be actuated by the spindle when the last reaches position under the said pad, an automatic timing means gauging the length of time the shoe bottom is pressed against the said pad, and means controlled by the said timer at the ends of its selected time interval for reversing the action of the said elevating mechanism and retracting the said spindle stop.

11. An automatic sole laying press comprising a conveyor, last carriers supported by the conveyor, upstanding spindles projecting from the last carriers and shaped to support shoe lasts slidably thereon, a frame extending above and across the conveyor, a resilient pad supported by the frame in position such that the lasts, in the lowered position on the spindles, will pass clear beneath the pad, automatic mechanism for arresting the movement of consecutive lasts along the conveyor, elevating and pressing them against the pad comprising the following elements, viz; an arm pivotally mounted so as to swing across the path of the spindles and to halt the lasts in position centrally under the pad, compressed air means actuated by the last carrier as the last approaches position under the pad and acting to swing the arm across the path of the spindle, a head mounted to slide vertically and so constructed and arranged as to engage the last when elevated, slide the last up the spindle, and press the last against the pad, a second compressed air means, actuated by contact of the spindle with the arm, acting to elevate the head, an automatic timing means gauging the length of time contact with the pad is to be maintained and at the end of its selected time interval counter-actuating each compressed air means so as to return the last into lowered position on the spindle and withdraw the spindle stop from the spindle thus allowing the last to continue along the conveyor.

12. An automatic sole laying press as described in claim 11 further characterized by last carriers of sufficient length so that when one spindle is engaged with the spindle stop, the next last carrier will not be sufficiently advanced along the

conveyor to actuate the said first compressed air means.

13. An automatic sole laying press as described in claim 12 further characterized by elevating means that includes a recessed arm so constructed and arranged as to engage the heel portion of lasts of various sizes when the head is raised and the last is in position centrally under the said pad, a pivotally mounted arm, and a roller located at the upper end of the said pivotally mounted arm, the said pivotally mounted arm and roller being so constructed and arranged as to roll along the instep portion of the last and to seat itself in the top concavity of lasts of various sizes when the head is raised and the last is in position centrally under the said pad.

14. Apparatus for the manufacture of shoes in assembly line, comprising an elongated track, a series of carriers movable along the track and each having an upstanding spindle with means for holding a lasted shoe thereon in predetermined angular position, an overhead pressure pad in fixed location above a section of the track, means for arresting one carrier after another in position beneath the said pressure pad, and a power operated device shaped to engage the toe of a lasted shoe and the heel end of its last on each spindle and being movable to lift the shoe bottom into pressing relation with the said pad while the last maintains sliding engagement with said spindle and the carrier remains at rest.

15. Apparatus for the manufacture of shoes in assembly line, comprising an elongated track, a series of carriers movable along the track and each having an upstanding spindle with means for holding a lasted shoe thereon in position transverse to the track, an overhead pressure pad



in fixed location bridging a section of the track, means for automatically arresting one carrier after another in position beneath the said pressure pad, and a power operated device having supporting members disposed on opposite sides of the track and shaped to engage the toe of a lasted shoe and the heel end of its last as presented between them by a carrier and being movable to lift the lasted shoe upwardly from its carrier into pressing relation with the said pad while the carrier remains at rest beneath the pad.

16. Apparatus for the manufacture of shoes comprising a horizontal track, a series of carriers movable along the track and each having an upstanding spindle for holding a lasted shoe, an overhead pressure pad in fixed position above the track, automatic mechanism for positively arresting one carrier after another in position on the track beneath the said pad, and a power operated vertically movable device for lifting a lasted shoe upwardly from its carrier into pressing engagement with said pad while the carrier is held in place by said arresting mechanism.

ISA GALPER.


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