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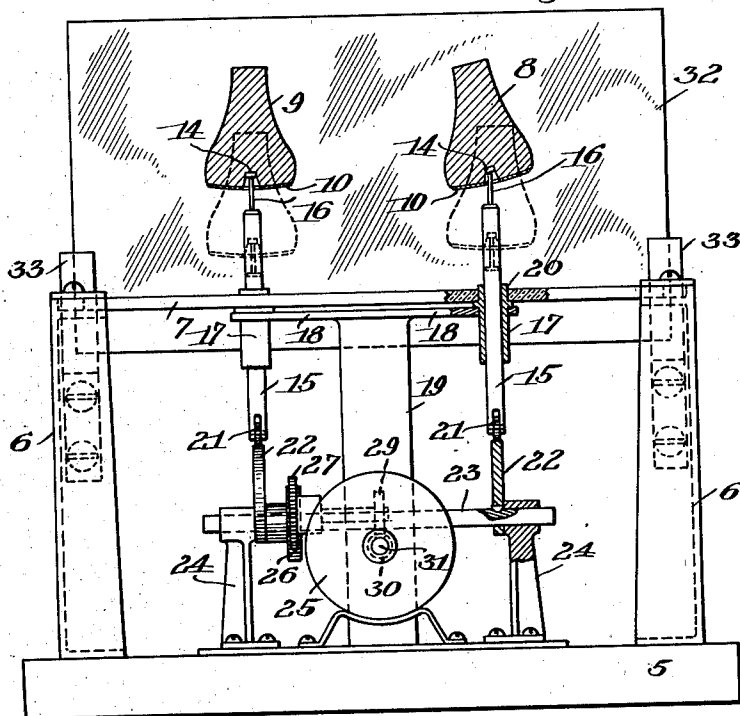
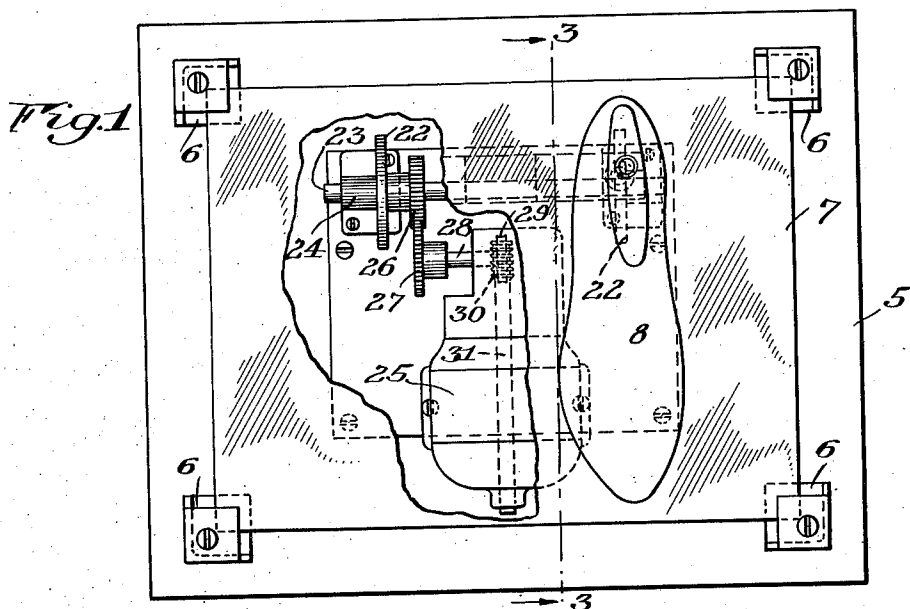
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2,102,038

METHOD OF AND APPARATUS FOR DISPLAYING SHOE LASTS AND THE LIKE

Filed July 1, 1935

2 Sheets-Sheet 1



*Fig. 2*

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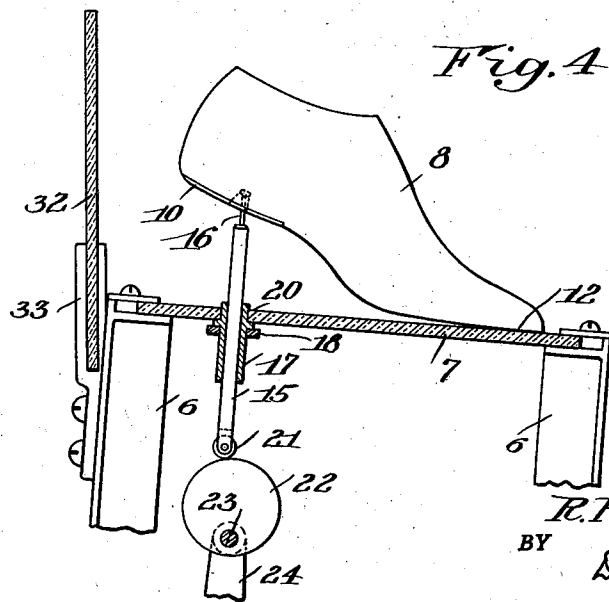
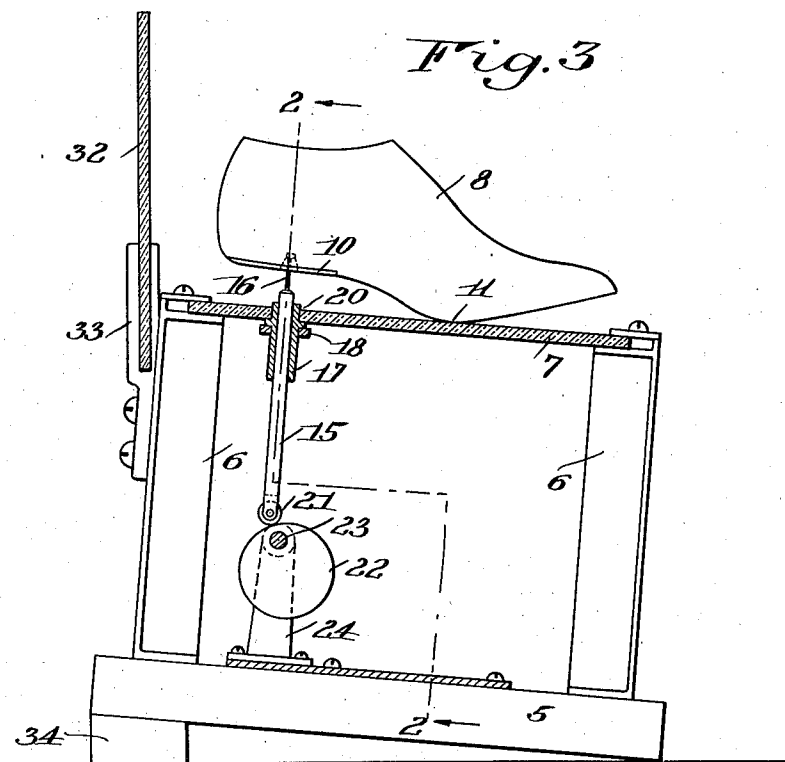
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## UNITED STATES PATENT OFFICE

2,102,038

METHOD OF AND APPARATUS FOR DISPLAY-  
ING SHOE LASTS AND THE LIKE

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13 Claims. (Cl. 35—50)

This invention relates to a method of and to apparatus for displaying one or more shoe lasts in motion.

In showing the merits of a shoe last or in demonstrating the superiority of one shoe last over another, it is desirable to move the last or lasts in a manner simulating the movements of a human foot while taking a step. It has been found that a shoe built on a last, which is substantially stable when the heel portion thereof is raised and lowered by the apparatus herein disclosed, will properly fit the wearer's foot while in motion as well as at rest. However, shoes built on lasts, which wobble or are unstable when manipulated as herein shown, do not properly fit the feet of the wearer as he or she walks, although the shoe might be comfortable while at rest.

It is the purpose of the present invention, therefore, to provide a method of effecting unrestrained movements of a last or lasts to display the stability or instability thereof, and to provide apparatus for carrying out the method.

The various features and advantages of the invention will appear from the detailed description and the claims when taken with the drawings in which Fig. 1 is a plan view of the display device of this invention with a portion of its last platform broken away to more clearly illustrate the mechanism located therebeneath and with the mirror at the rear of the device as well as one last and its operating rod, omitted; Fig. 2 is a front elevation of the device with the mirror in position but with a part of the device including the two lasts sectioned on substantially the line 2—2 of Fig. 3; Fig. 3 is a vertical section taken substantially on the line 3—3 of Fig. 1, illustrating a last in one extreme position, the base being shown in full; and Fig. 4 is a fragmentary vertical section similar to that shown in Fig. 3, except that the last is illustrated in its other extreme position.

The device includes a rectangular rigid base 5 having four vertical posts 6 preferably formed of angle iron secured thereto adjacent its respective corners. On the upper ends of these posts, there is mounted, in any suitable manner, a transparent platform 7 preferably of glass on which portions of lasts 8 and 9 can rest, the last 8 being represented as unstable and the last 9 being represented as stable or balanced. In order to actuate these lasts through a cycle of movements simulating the motions of a human foot in the act of taking a step, the heel portion 10 of each last is arranged to be reciprocated between its extreme lowermost position shown in Fig. 3 wherein the

ball area 11 of the last engages the platform 7, and its extreme uppermost portion shown in Fig. 4 wherein the toe portion 12 of the last engages this platform. The lowering of the heel of the last to position illustrated in Fig. 3 is to insure the engagement of the entire forward sole portion of the last with the platform during each cycle of movement of the last. It will be understood that as the heel of the last is raised from the position shown in Fig. 3 to the position in Fig. 4, successive areas of the sole of the last from the ball portion thereof to the toe portion thereof, engage the platform. Similarly during the lowering of the heel portion of the last, successive portions of the sole of the last from the toe portion to the ball portion, engage the platform in the reverse of the order just described. One complete raising of the last and one complete lowering of the same constitute a cycle but in operating the display device, the lasts are raised and lowered continuously to effect a continuous series of cycles of movements.

The sole of the heel portion 10 of each last has a rather deep central depression therein, the bottom of which depression is armoured by a substantially flat metal disk 14 serving as a bearing. In order to raise and lower each last to effect the movements just referred to, an upwardly reciprocating rod 15 is provided which rod terminates at its upper end in a rigid pin 16 the free end of which engages the disk 14 in the depression in the heel portion of its last. The upper end of each pin 16 approximates substantially a point support for the heel of the last, so that the last can rock freely thereabout. As herein illustrated, however, the upper or free end of the pin is somewhat rounded so that it gives the effect of a point support and yet it will not wear away as quickly as if its free end actually tapered to a sharp point. Each rod 15 makes a freely sliding fit in a sleeve 17 which sleeves are carried at the outer ends of horizontal arms 18, in turn supported by a bracket 19 mounted on and extending upwardly from the base 5. Preferably the upper end of each sleeve extends through an opening 20 in the platform 7.

While the rods 15 can be reciprocated in any suitable manner, each rod at its lower end is provided herein with a roller or cam follower 21 engaging the periphery of a cam 22. These cams 22 are mounted on a horizontal shaft 23 adapted to rotate in suitable bearings provided in the upper ends of the uprights 24 secured to the base. The shaft 23 is continuously rotated in any convenient manner preferably by a motor

25, through suitable speed reduction means. This means, as herein illustrated, includes a gear 26 on the horizontal shaft 23, which gear meshes with a second gear 27 mounted on a stub shaft 28 supported by means not shown, for rotation in parallel relation to the horizontal shaft 23. This stub shaft has secured thereto, near one end, a worm gear 29 which meshes with a worm 30 provided on the end of the shaft 31 of the motor.

At the rear of the platform a mirror 32 is mounted in suitable brackets 33, attached to the rear posts 6 with the angle between the mirror and the platform slightly greater than the right angle, preferably about 105 degrees so that when the device is tilted in operation by reason of the rear portion of the base being elevated as by resting on a block 34, the mirror 32 is in substantially a vertical plane. This tilting of the device during its operation is desirable since the platform 7 is preferably inclined downwardly away from the mirror so that the toe portions of the lasts will not swing in arcs about the pins 16 because the force of gravity tends to maintain the long axes of the lasts substantially at right angles to the plane of a mirror.

In the operation of the device, the motor 25 through the previously mentioned speed reduction means including the worm 30 and worm gear 29 as well as the gears 26 and 27, continuously rotates the horizontal shaft 23 carrying the cams 22. As these cams rotate from the position representing their low points illustrated in Fig. 3 to their high points as illustrated in Fig. 4, the rods 15 are elevated to raise the heel portions of the last from their extreme lower position to their extreme upper position. During this elevation of the heel portion of each last, successive areas of the last from the ball area 11 to the toe portion 12 thereof, engage the platform 7. If the last such as 8 is unstable, it will wobble during its elevation from its dotted line position shown in Fig. 2 to its full line position shown in that view and also during its subsequent descent, whereas, the last 9 which is a stable or balanced last is elevated and lowered without any wobbling action. As the cams 22 rotate from their high points to their low points, the reverse of the operations just described, takes place. Thus an observer standing at the front of the machine can observe the actual wobbling of the unstable last and the absence of wobbling of the stable last directly and can also view in the mirror the reflection of the various movements of the heel portion of the last.

While applicant has illustrated a preferred form of the invention, there can be many modifications and changes therein within the scope of the present claims, without departing from the spirit of the invention.

What I claim is:

1. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of a human foot while taking a step, which comprises a platform, a last having at least a portion thereof resting on said platform, said last being freely movable in all directions about an upwardly extending axis, and means loosely contacting said last for raising and lowering the heel portion thereof.

2. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of the human foot while taking a step, which comprises a platform, a last having at least a portion thereof resting on said platform, said last being freely movable in all direc-

tions about an upwardly extending axis, and means for loosely reciprocating the heel portion of the last toward and away from said platform.

3. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of a human foot while taking a step, which comprises a platform, a last having at least a portion thereof resting on said platform, said last being freely movable in all directions about an upwardly extending axis, and reciprocating means loosely contacting a small area of the bottom of the heel portion of said last for moving said portion toward and away from said platform.

4. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of a human foot while taking a step, which comprises a platform inclined to the horizontal, a last having at least a portion thereof resting on said platform with said portion inclined downwardly, said last being freely movable about an upwardly extending axis, and means for raising and lowering the heel portion of the last.

5. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of a human foot while taking a step, which comprises a platform inclined to the horizontal, a last having at least a portion thereof resting on said platform with said portion inclined downwardly, said last being freely movable in all directions about an upwardly extending axis, and means disconnected from said last but loosely contacting a portion of the bottom of the heel portion of the last for raising and lowering said heel portion.

6. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of a human foot while taking a step, which comprises a platform inclined to the horizontal, a last having at least a portion thereof resting on but disconnected from said platform with said portion inclined downwardly, and means making substantially a loose point contact with the bottom of the heel portion of the last for raising and lowering said heel portion toward and away from said platform.

7. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of a human foot while taking a step, which comprises a platform, a last having at least a portion thereof resting on said platform, said last having a depression in the bottom of its heel portion, a rod having its upper end loosely contacting said depression, and means for reciprocating said rod along its principal axis.

8. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of a human foot while taking a step, which comprises a platform, a last having at least a portion thereof resting on said platform, said last having a depression of appreciable area centrally located in the bottom of its heel portion, an upwardly extending rod terminating at its upper end in a reduced area approximating a point which loosely engages said depression, and means for reciprocating said rod.

9. An arrangement for displaying the behaviour of a last during movements thereof approximating movements of a human foot while taking a step, which comprises a platform, a mirror adjacent the rear edge of said platform and making approximately a right angle therewith, a last having at least a portion thereof resting on said platform and having the rear of its heel portion facing said mirror, said last being freely movable

in all directions about an upwardly extending axis, and means loosely engaging the heel portion of the last for raising and lowering said portion.

10. An arrangement for displaying the behaviour respectively of a stable last and an unstable last during movements thereof approximating movements of the human foot while taking a step, which comprises a platform, a stable last and an unstable last, said lasts having at least portions thereof resting on said platform, said lasts being freely movable in all directions about upwardly extending axes, and means loosely engaging said lasts for raising and lowering the heel portions thereof.

11. An arrangement for displaying the behaviour respectively of a stable last and an unstable last during movements thereof approximating movements of the human foot while taking a step, which comprises a platform, a stable last and an unstable last, said lasts being freely movable in all directions about upwardly extending axes and having at least portions thereof resting on said platform, and means loosely en-

gaging the bottom of the heel portions of said lasts for raising and lowering said heel portions.

12. The method of demonstrating the action of a last through a cycle of movements like those through which a foot moves in walking, which comprises supporting the last in an exposed position with the forward portion thereof on a substantially flat surface, said last being freely movable bodily with respect to said surface, and alternately pushing the heel portion of the last upwardly and then lowering it.

13. The method of demonstrating the action of a last through a cycle of movements like those through which a foot moves in walking, which comprises supporting the last in an exposed position with the forward portion thereof on a substantially flat surface, said last being freely movable bodily with respect to said surface, and applying force to substantially a point area on the bottom of the heel portion of the last and gradually reducing said force to raise and lower said heel portion.

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