

July 3, 1923.

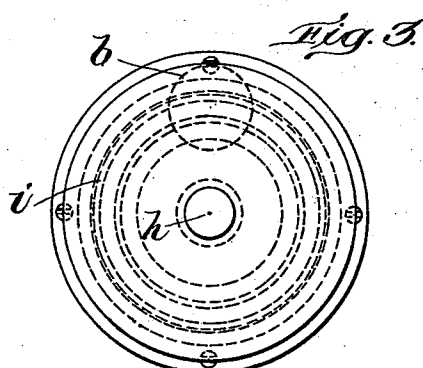
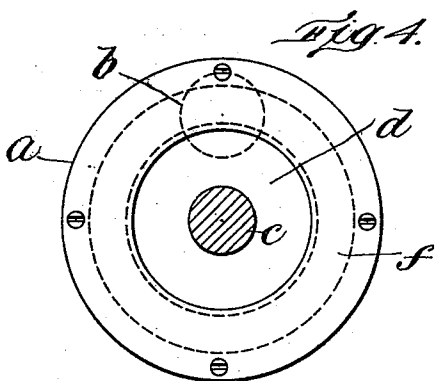
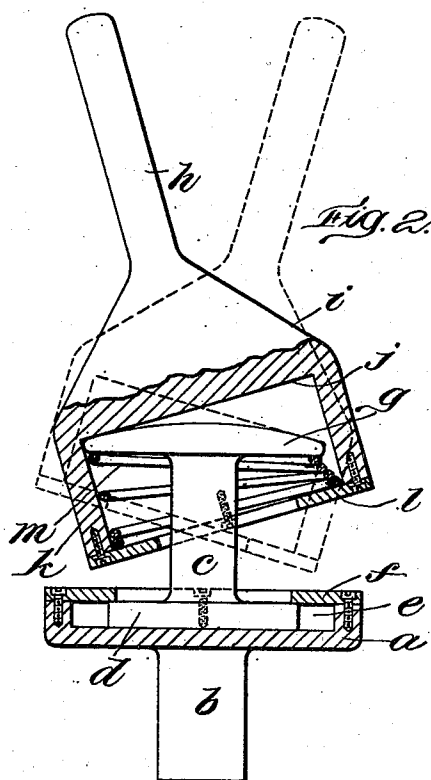
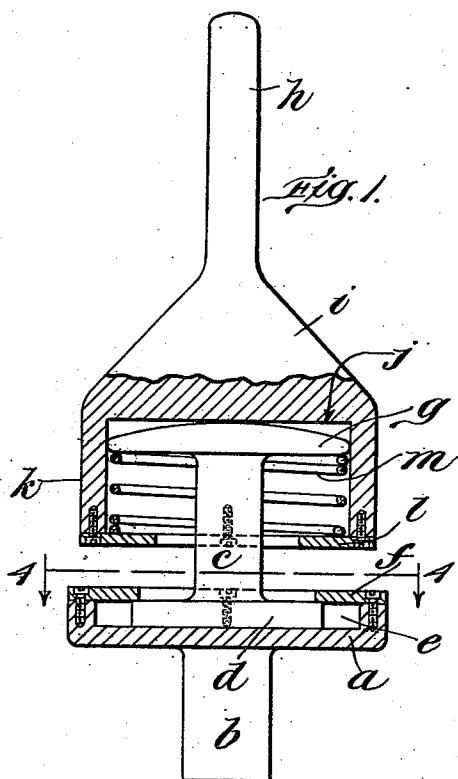
W. V. NEAL

1,460,433

WORK SUPPORT

Filed June 9, 1920

2 Sheets-Sheet 1



Inventor:
Walter V. Neal,
By Wright, Brown, Lundy & Tracy,
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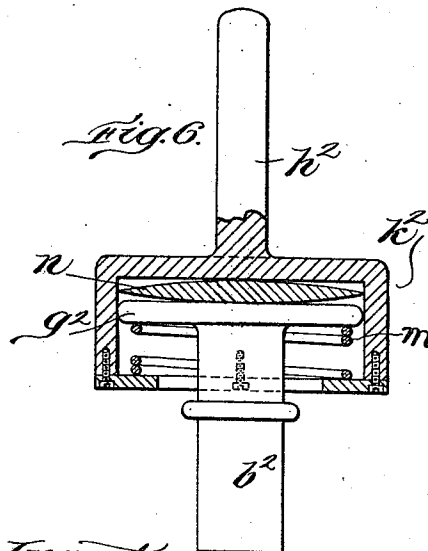
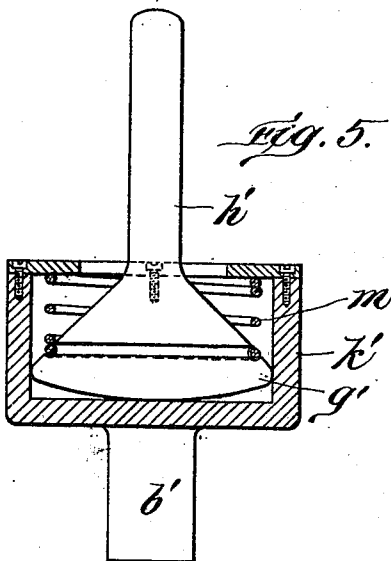
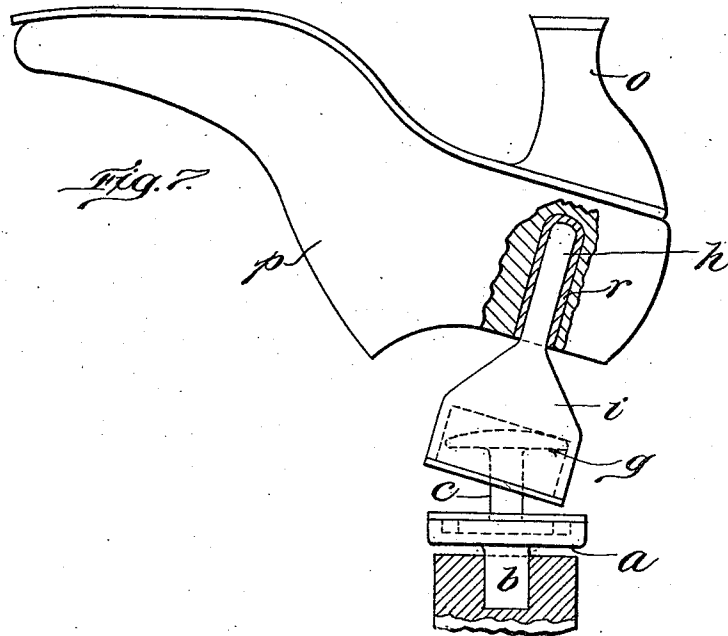
W. V. NEAL

1,460,433

WORK SUPPORT

Filed June 9, 1920

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

WALTER V. NEAL, OF MALDEN, MASSACHUSETTS, ASSIGNOR TO THE UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WORK SUPPORT.

Application filed June 9, 1920. Serial No. 387,589.

To all whom it may concern:

Be it known that I, WALTER V. NEAL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Work Supports, of which the following is a specification.

This invention relates to work supports and is illustrated as embodied in a last support comprising a thrust element adapted to apply and receive pressure in a direct line even though the parts by or through which thrust is transmitted may be inclined to one another. It is an object of the invention to construct a thrust element comprising a plurality of members adapted to be placed either in the line of thrust or at an inclination thereto, and to provide in connection with said members means by which the thrust is transmitted in a direct line without tendency to alter the inclination of such members to the line of thrust.

The work support of the present invention is particularly useful in slugging high heel shoes mounted upon lasts. The operation of slugging heels consists in driving headless fastenings through the toplift of the heel from the tread surface thereof for purposes of ornamentation, more securely to affix the toplift to the heel body, and to give increased wear to the heel.

In the manufacture of a large proportion of shoes, for example, shoes made according to the Goodyear welt process, the last is retained in the shoe up to a point in the manufacturing process later than the heel slugging operation, and the last with the shoe on it is then held, bottom upward, by a last pin entering its socket, the last pin being supported by a work support or jack which is part of the slugging machine. The tread surface of the heel is pressed upward by the jack against an overhanging guide plate or abutment through which an awl and a slug driver operate, the awl being used to form holes in the heel into which the slugs are driven, and the driver to set the slugs. By the action of the awl and driver, a line of slugs is inserted in the heel near the edge of the top lift around the heel or along as great an extent of the sides and back of the top lift as may be desired, the shoe meanwhile being rotated upon the last pin to bring successive points into posi-

tion for receiving slugs. In this operation the last pin is a thrust-transmitting member, transmitting the pressure of the work support and receiving and withstanding the force applied by the awl and driver.

It has been difficult heretofore satisfactorily to drive slugs into certain types of heel on account of the fact that the tread surface of a heel often is not perpendicular to the socket of the last. The difficulty increases progressively in proportion to the height of the heel because the higher the heel the greater is the inclination of its tread surface to the last socket and the last pin occupying such socket. The difficulty referred to arises from the fact that with the last pins heretofore used it is impossible to maintain the tread of a heel horizontal when turning the shoe to bring the different parts of the peripheral portion of the toplift of the heel into the driving position, and that there is a tendency for high heels to "kick out", as it is called, from the pressure plate due to the inclination of the last pin to the thrust of the awl and driver when the heel is placed with its tread surface squarely against the pressure plate.

Owing to the fact that rotation of the last about an inclined last pin changes the inclination of the tread surface, it has become the practice so to arrange any specific last pin that it will hold the heel approximately in a mean position, wherein its tread face is not exactly parallel to the press plate at either limit of the rotational movement. The reason for so doing is that, although it is possible to place any last so that the top lift is square with the press plate when driving slugs at one side, yet the rotation of the last brings the tread face more and more out of parallel with the press plate, whereby, according as the limit of stroke of the driver is fixed, the slugs may be driven either too deep or not deep enough in different parts of the heel, and not uniformly. If the driver is set to advance exactly to the surface of the pressure plate and the jack adjusted to bring the heel tread surface parallel to the face of the plate when one side of the heel is presented to receive slugs, the slugs will be driven flush with the tread surface at that side, but will project more or less at all other parts of the tread surface. The projecting ends of slugs

are harmful in the finishing step of buffing the tread surface because they injure the buffing rolls.

The highest heels of all, for example full Louis heels, have their tread surfaces at so great an inclination to their heel seat surfaces that prior to the present invention it was quite impractical to slug them all around while on the last, and shoemakers have been impelled on this account to limit the slugs in such heels to three points, namely, the breast corners and the back, thus sacrificing the benefits due to a continuous row of slugs.

By the present invention I have produced a last pin which may be applied to a heel slugging machine, and to other shoemaking machines, and is capable of supporting shoes with heels of all heights and tread inclinations, in a manner enabling them to be slugged all around and uniformly and with elimination of danger of the heels kicking out. By the same invention I have produced a thrust transmission element useful for a variety of purposes, the illustrated machine having means for transmitting thrust in a direct line through members which may be more or less inclined to one another and which are arranged for rolling contact in a manner to facilitate self-adjustment thereof.

Referring now to the drawings forming part of this specification, Figure 1 is a vertical sectional view of a last pin embodying the invention showing the parts of the complete combination in alinement with one another.

Figure 2 is a similar view showing the last pin proper of the combination at an inclination to the supporting bar.

Figure 3 is a plan view of the structure of Fig. 1.

Figure 4 is a horizontal section on line 4—4 of Figure 1.

Figures 5 and 6 are sectional views illustrating modified embodiments of the invention.

Figure 7 is a diagrammatic view illustrating the invention as applied to the slugging of a high heel.

In these drawings *a* designates a base having a stud *b*, which is adapted to be set into a socket in the jack post of a fastening inserting machine, or other machine used in carrying out operations on a shoe in which the last is retained, such stud typifying any kind of attaching means by which the base may be connected to the jack post. The base is preferably circular, as also is the stud or equivalent attaching means, and the latter is preferably eccentric to the base and designed to permit the base to be rotated, whereby it may be shifted laterally in position. A post *c* is supported by the base *a* and is provided with a bottom flange *d* which occupies a cavity *e* in the upper side of the base and is re-

tained therein by an overhanging annular washer or guard *f* secured to the base. Flange *d* is smaller than the cavity *e*, and the central hole of the annular guard *f* is larger than the post *c* by approximately the same amount, whereby shifting of the post to different parts of the base is permitted.

The post *c* has a head *g* which, in the form shown in Figures 1 and 2 has a convex or crowned upper surface, on which the last pin *h* is supported. Said last pin has an enlarged bottom *i* furnished with a plane under surface *j* and with a flange *k* which surrounds the head *g* and prevents the last pin slipping off. A washer *l* is secured to the flange *k* beneath the head for the purpose mainly of providing an abutment for a spring *m*, which is confined between it and the under side of the head, said washer also preventing accidental separation of the pin from the head. The inner circumference of the washer or disk *l* is enough larger than the post to permit the full extent of tilting for which the last pin is designed.

Owing to the crowning of the head *g* and the plane formation of the bottom surface *j*, tangent contact only exists between the post and pin, the latter being adapted to tilt in all directions and in tilting to roll on the head, whereby the point of contact is shifted toward the circumference of these surfaces in accordance with the degree of tilting. The radius of curvature of the convex surface is such that whatever may be the direction and degree of tilting, the point of contact is always vertically beneath that part of the last pin which applies and sustains the thrust. In the usual heel slugging machine the post is mounted vertically and the direction in which force is applied is vertical, wherefrom it follows that this contact point should be vertically below the fastenings or in the line of drive when the fastenings are inserted, and this is substantially the condition which exists under all circumstances in the use of the illustrated embodiments of the invention. The spring *m* tends to hold the pin in line with the post, opposing readily yielding resistance to inclination of the pin and returning it to the position of alinement when tilting forces are removed.

The shifting of the contact point above described is illustrated by a comparison of Figures 1 and 2, sufficiently accurate results being obtainable when the convex surface of the head *g* is made as the polar segment of a sphere having its axis in the axis of the post.

The invention is not limited to the form of Figs. 1 and 2 in which the upper surface of the head is convex and the under surface of the pin bottom is plane, for similar results may be secured by a reversal of this arrangement, as shown in Figure 6, or by making both tangent surfaces convex,

or by interposing a double convex body n between plane surfaces on the post and pin, as shown in Figure 6, or by making one of the tangent surfaces convex and the complementary surface concave. In either of the modifications described the degree of curvature of the curved surface or surfaces can be made such that the contact point will shift in essentially the manner described when the pin is tilted.

Also I am not limited to the arrangement of the retaining flange k on the bottom of the pin instead of on the post, since in any of the forms described an equivalent flange k' may be provided to rise from the post and surround the bottom of the pin, as is indicated in Figure 5. The form of pin shown in Figure 1 has an advantage over other forms, however, because the flaring sides of the enlarged bottom part i makes it impossible for the lining of a shoe to become pinched and cut between the last pin and the last carrying an unfinished shoe placed upon such pin.

Reference to Figure 7 shows diagrammatically the manner in which the last pin transmits and supports the thrusts of the slugging machine when operating on high heels. Here o represents a Louis heel attached to a shoe which is on a last p . r represents the thimble of the last which receives the pin h , and upon the bottom of which the end of the pin bears. The position shown is that taken when slugs are being driven on one side of the heel near the breast. Although the positioning of the heel with its top lift horizontal tilts the pin to a considerable angle, yet the contact point between the pin and the post and the bearing point of the pin on the last, are in line with the direction of thrust. As the last is rotated to bring different points on the heel into position for receiving slugs, the pin is tilted in different directions and to different degrees, until in the completely reversed position from that shown, the direction and degree of tilting of the pin are opposite and equal to those shown. In all these conditions, intermediate as well as extreme, the pin is supported at a point in the direct line of thrust.

Although the supporting point of the pin shifts to different parts of the post, this does not change the direction of thrust or create a hinge knuckle at one side of the direction of thrust because the post and last pin are each rigid and the post has a wide and firm base. Thus the operative can manipulate the work with ease, since the operation of the machine produces no tendency to push the work out of its correct position.

By reason of the capacity for lateral movement of the last pin h given by the base a being rotatable about an eccentric axis, and the post c being displaceable laterally on the base, it is possible to shift the last pin h

bodily in any direction by the amount needed to bring any point of the top lift of a heel of any style into line with the driver of a slugging machine so that the top lift may be made horizontal when it is in place to receive a slug in any part thereof; and by reason of the fact that the supporting tangent point between the post and last pin h is directly under the thrust point of the pin, there is no tendency of the driving impact or of the supporting thrust to tilt the pin, the initial tilting of the pin creating no tendency of the heel to "kick out". When the slugging machine is in operation, the heel is held solidly between the jack and the pressure plate with its tread face set squarely against the under surface of the pressure plate. Thus by reason of this invention it is made possible to slug all around the periphery of heels and it is rendered unnecessary to change the last pin in the machine in getting ready to slug heels of different styles.

In a broad sense the work support here described is a thrust transmitting element comprising two principal members (embodied in the post c and pin h) having contacting tangent surfaces which diverge in all directions with a relative convexity of curvature such that rocking of one part upon the other, with a rolling contact, is permitted. With such rocking the tangent point shifts equally in the same direction with the shifting of the line of thrust of the machine. Such an element may be used in various other machines used in the making of shoes, as well as in slugging machines, and in machines for other purposes. Accordingly it should be understood that the invention should not be limited to the details of the constructions shown and described since other modifications are evidently within the scope thereof and of the appended claims.

In this specification the term "spherical", and terms of like import used to describe the character of curvature of the head g , or of the bottom of the last pin h , or other inserted piece, do not mean necessarily that the surfaces thus described are segments of perfect spheres, but they are intended to include spheroidal and other surfaces which have the characteristic of smooth curvature on all radiating lines from the highest point of the surface.

The term "radius of curvature" herein used applies to all forms of tangent surface which may be used in this combination, for a plane surface is the limiting form of a spherical surface and may be considered as a spherical surface of infinite radius. Thus, the plane surface which contacts with a spherically curved surface in either of the embodiments of the invention hereinbefore described has a greater radius of curvature than the contacting curved surface.

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

1. A machine element for sustaining or
5 applying thrust comprising two members adapted to be placed with respect to one another either in a given alinement or at an inclination to such alinement in any direction and in various degrees; said members
10 being in engagement with one another on tangent contact surfaces the degree of relative curvature being such that the line of thrust sustained by said element passes through the point of tangency of said surfaces at any inclination of the members, and
15 means tending to move said members into alinement when the thrust is removed.

2. A machine element for sustaining and
20 applying thrust comprising two members adapted to be placed with respect to one another either in a given alinement or at an inclination to such alinement in various degrees; said members having rolling contact with one another on tangent contact
25 surfaces, the degree of relative curvature being such that the line of a thrust sustained by said element passes through the point of tangency of said surfaces in any inclination of the members.

3. In a machine of the class described the combination of a supporting member and a thrust-receiving member bearing against the supporting member, one of said
35 members having a plane surface and the other having a convex surface making tangent contact with said plane surface and curved in all directions on a radius such that rocking of one member relatively to the
40 other shifts the tangent point equally with the point of pressure application of the thrust-receiving member.

4. A support, and a thrust-receiving member adapted to be placed at inclinations in different directions and to different degrees
45 with respect to said support, said support and member having contact surfaces one of which diverges from the other in all directions radially from the contact point, whereby with rocking of one member relatively
50 to the other, the tangent point shifts in the same direction as that in which the rocking takes place.

5. A last support comprising a post and a pin having a bottom surface which bears
55 against a supporting surface on the post, one of said surfaces having a spherical curvature the axis of which substantially coincides with the axis of the pin when the latter is alined with the post, and the degree or
60 rate of curvature of which has a value to cause shifting of the point of tangency between the surfaces in the same direction and to substantially the same extent that the pressure sustaining point of the pin is displaced by tilting of the pin, whereby thrust

is transmitted through the said combination always in the same direction and substantially in a direct line however the pin may be inclined.

6. A last support comprising a base, a
70 post mounted on said base with provision for lateral shifting movement, means preventing separation of the post from the base, a last pin having a bottom surface bearing against and diverging from the adjacent end surface of the post for rocking
75 movement with respect thereto, one of said surfaces being convex with a substantially spherical curvature, and means preventing displacement of the pin from the post.

7. A last support comprising a base, a
80 post mounted on said base with provision for lateral shifting movement, means preventing separation of the post from the base, a last pin having a bottom surface bearing against and diverging from the adjacent end surface of the post for rocking
85 movement with respect thereto, one of said surfaces being convex with a substantially spherical curvature, and means preventing displacement of the pin from the post, said
90 means comprising a flange projecting from one of the members constituted by the pin and post and embracing the adjacent end of the other of said members.

8. A work support comprising a post and a last pin mounted upon said post, there being between said post and last pin contacting surfaces one of which is spherically
100 curved and the other of which has a longer radius of curvature than said spherically curved surface; the radii of curvature of said surfaces being so proportioned that tilting of the last pin causes shifting of the point of tangency between the surfaces in the same direction and to substantially the
105 same extent as the relative displacement of the line of thrust which produces that tilting.

9. A last support comprising a last pin
110 having a plane bottom surface, and a support for said last pin having a crowned substantially spherical surface making tangent contact with said plane bottom surface and being so curved that the point of tangency is brought in the line of thrust applied by or upon the last pin when the latter is in alinement with or in a position of inclination to the direction in which thrust and supporting pressure is applied.

10. A last support comprising a last pin
120 having a plane bottom surface, and a support for said last pin having a crowned substantially spherical surface making tangent contact with said plane bottom surface and being so curved that the point of tangency is brought in the line of thrust applied by or upon the last pin when the latter is in alinement with or in a position of inclination to the direction in which thrusting and sup-
125 130

porting pressure is applied, one of the aforesaid members having a flange embracing the adjacent part of the other, a lip projecting inwardly from said flange, and a spring abutting against said lip and bearing on the other of said members constantly tending to place and hold the last pin in substantial alinement with the direction of pressure application.

11. A last support for a shoe machine comprising a base, means for holding said base pivotally with provision for lateral rotation about an eccentric axis, a post supported upon said base with provision for lateral movement relatively thereto, and a last pin supported upon said post, the post having a crowned top surface and the last pin a plane bottom surface permitting rocking movement in all directions and corresponding shifting of the contact point between the surfaces.

12. A last support for a shoe machine comprising a base, means for holding said base pivotally with provision for lateral rotation about an eccentric axis, a post supported upon said base with provision for lateral movement relatively thereto, and a last pin supported upon said post, the post having a crowned top surface and the last pin a plane bottom surface permitting rocking movement in all directions and corresponding shifting of the contact point between the surfaces, said post being under cut, and the last pin having an embracing flange with an internal abutment, and a spring confined between said abutment and the undercut head and tending to hold the pin in an upright position.

13. A work support comprising a last pin and a supporting member therefor, sur-

faces of the last pin and the supporting member having rolling contact to permit rocking movement of the last pin on the supporting member in any direction.

14. A work support comprising a last pin and a supporting member therefor, the last pin and the supporting member being formed with contacting surfaces shaped to permit rocking movement of the last pin in any direction, and a spring tending to return the last pin to a vertical position.

15. A work support comprising a last pin, a supporting member therefor, said last pin being arranged to have rolling contact with the supporting member to permit rocking movement in any direction, and means to limit said rocking movement.

16. A work support comprising, a last pin and a supporting member therefor, said last pin being mounted to have rolling contact with the supporting member to permit rocking movement of the last pin, and means to prevent the escape of the last pin from the supporting member.

17. In a machine of the class described, the combination of a jack post, a supporting member carried by said jack post and mounted for movement transversely thereof, and a last pin carried by said supporting member and having rolling contact therewith.

18. A work support comprising a last pin and a supporting member therefor, contacting surfaces of the last pin and the supporting member being formed to permit rolling contact between the last pin and the supporting member.

In testimony whereof I have affixed my signature.

WALTER V. NEAL.