Oct. 14, 1941. L. MAWBEY 2,258,711

WORK SUPPORT

Filed June 25, 1940 2 Sheets-Sheet 1

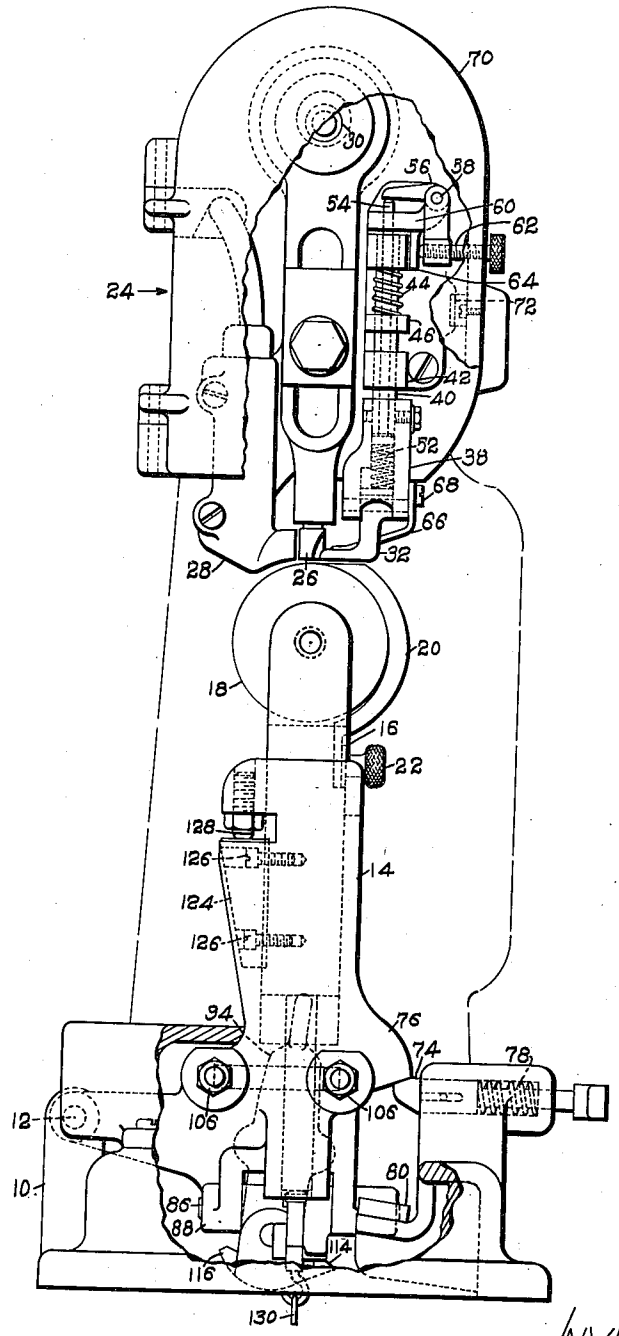

Fig. 1.

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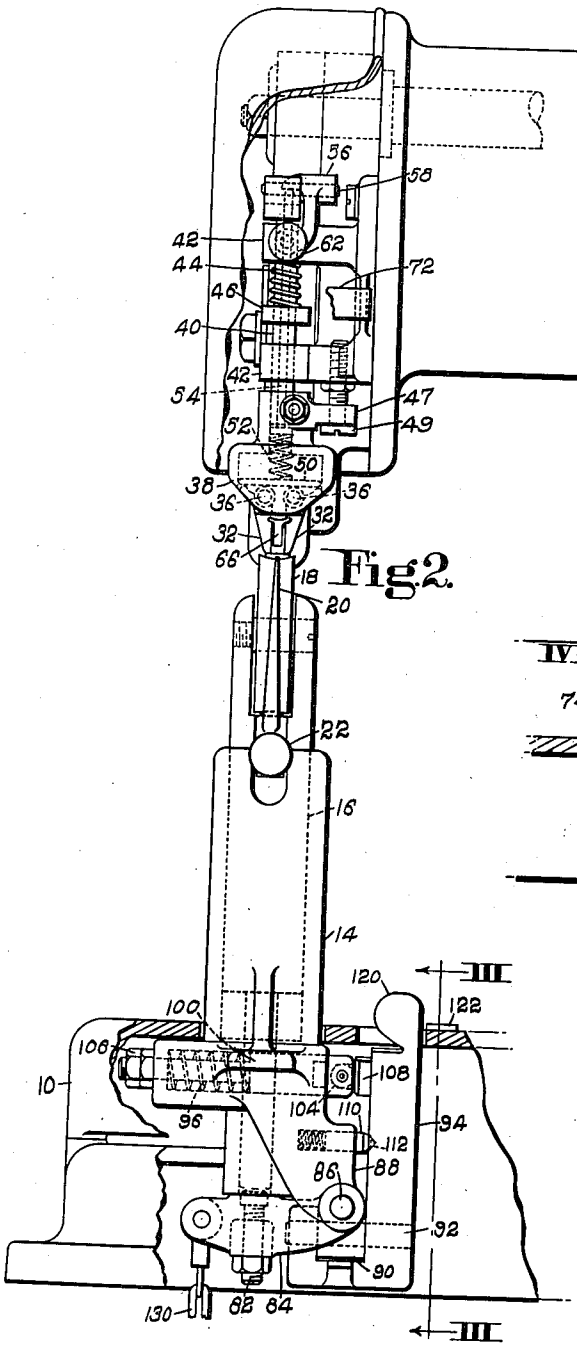

Fig.2.

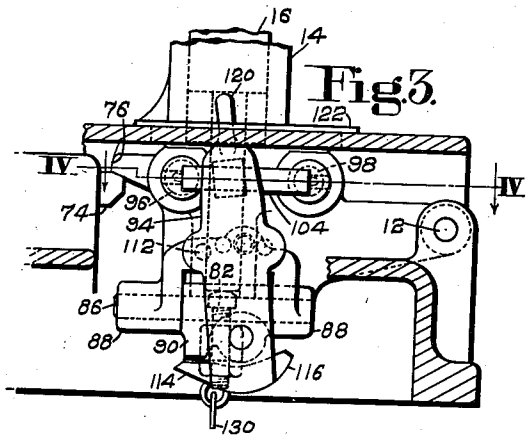

Fig.3.

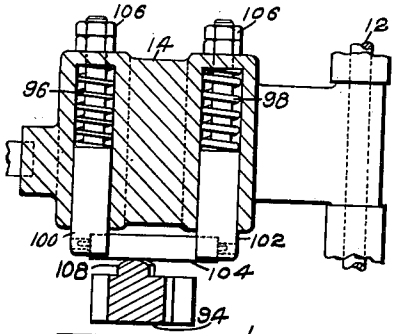

Fig.4.

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2,258,711

UNITED STATES PATENT OFFICE

2,258,711

WORK SUPPORT

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Application June 25, 1940, Serial No. 342,304
In Great Britain February 22, 1940

12 Claims. (Cl. 12—51)

This invention relates to means for supporting work pieces which are to be operated upon and is illustrated as embodied in a machine for applying pressure to a seam ridge formed by joining two or more pieces of material such as parts of shoe uppers although it is to be understood that the invention is not limited to such application.

In machines of this type it is desirable that the pressure applied to the work be a yielding pressure to prevent damage to the work and this may be accomplished by providing a yielding mounting for the work support. In order to accommodate different types of work, it is desirable that provision be made for varying the forces exerted by the yielding mounting which opposes movement of the support away from the operating means.

Accordingly it is an object of this invention to provide a work support having an improved yielding mounting, the effectiveness of which may be easily adjusted to vary the force resisting the pressure applied thereto through a work piece resting on the support.

To this end and as a feature of the invention, a pair of springs of unequal size are arranged to oppose downward movement of the work support and means are provided to vary the relative effectiveness of the springs on the support. These springs in the illustrated arrangement are arranged to act on a bar which transmits the force exerted by the springs to a pivoted arm one end of which is in contact with the bar and may be moved therealong between the points of applications of the springs. The force exerted on the arm through the bar varies with the point of contact between the bar and the arm by reason of the unequal forces exerted by the springs and this arm in turn transmits the force to the work support to resiliently oppose movement thereof by pressure applied to the support through a work piece thereon.

These and other features of the invention will now be described in detail in the specification and illustrated in the drawings, in which

Fig. 1 is an end elevation, partly in section, of one form of machine in which the invention may be embodied;

Fig. 2 is a front elevation, partly in section, of the machine;

Fig. 3 is a vertical section on the line III—III of Fig. 2; and

Fig. 4 is a horizontal section on the line IV—IV of Fig. 3.

The illustrated seam-rubbing machine comprises a frame having a base 10 in which is pivotally mounted at 12 a housing 14. The housing 14 slidably supports a post 16 carrying at its upper end a freely rotatable roll 18 for supporting the work to be operated upon. A vertically adjustable guide plate 20 is secured to the post 16 by a screw 22, this guide plate being arranged to engage the seam of a work piece.

The machine also includes a head 24 in which is mounted a work presser or hammer 26 and a seam-rubbing tool 28, these members being operated with a four-motion cycle by an eccentric 30 in a well known manner successively to hammer the seam and set or rub it. A pair of guides 32 are arranged to engage opposite sides of the seam ridge and are mounted for independent yielding movement to accommodate variations in thickness of the material being operated upon. These guides are formed at the lower ends of bell crank levers pivoted at 36 within a sleeve member 38 secured to a slidable post 40 guided by bearings 42 in the head of the machine. The post 40 is urged downwardly by a spring 44 acting between the upper bearing 42 and a collar 46 secured to the post. Downward movement of the post is limited by an extension 47 (Fig. 2) of the sleeve 38 engaging the head of a screw 49 threaded into a bracket supoprting the lower bearing member 42.

The guides 32 are urged inwardly by a plate 50 engaging the upper arms of the bell crank levers on which the guides are formed, this plate being urged downwardly by a spring 52 the upper end of which engages the lower end of a rod 54 slidably mounted within a vertical bore in the post 40. The upper end of the rod 54 (Fig. 1) is engaged by an arm of a bell crank lever 56 pivoted at 58 to a bracket 60 secured to the head of the machine, the vertical arm of the bell crank lever 56 being threaded to receive an adjusting screw 62 the inner end of which engages a depending lug 64 of the bracket 60. Accordingly, the force exerted by the spring 52 to urge the guides 32 inwardly may be readily adjusted by the screw 62.

A gage 66 secured by a screw 68 to the sleeve 38 extends between the guide members 32 to engage the upper face of the seam ridge. A hinged cover 70 encloses the driving mechanism in the head 24, this cover being maintained closed by a spring-pressed latch 72.

The housing 14 in which the supporting post 16 is slidably mounted is normally held in vertical position by a latch 74 urged into engage-

ment with the lower surface of a shoulder 76 of the housing 14 by a spring 78. Upon moving the latch 74 out of engagement with the shoulder 76, the housing 14 will tilt by gravity in a clockwise direction as viewed in Fig. 1 about the pivot 12 to a position in which the shoulder 76 contacts a resilient bumper 80 secured in the base 10 of the machine. This permits movement of the supporting roll 18 toward the operator and from under the operating members carried by the head of the machine, whenever desired, to permit access to the operating parts of the machine, etc.

The lower end of the supporting post 16 bears against the head of a screw 82 (Fig. 2) secured to a horizontally extending arm of a lever 84 fulcrumed at 86 between a pair of arms 88 extending downwardly from the housing 14. The lever 84 has an extension 90 (Fig. 2) extending downwardly from the pivot 86 and carrying a pivot pin 92 extending horizontally at a right angle to the pivot 86. A vertically extending arm 94 is pivoted on the pin 92 and forms an arm of the lever 84. The arm 94 is arranged to be acted upon by a pair of springs 96 and 98 shown as compression springs to move the lever 84 in a clockwise direction, as viewed in Fig. 2, thus exerting an upward force on the post 16. The springs 96 and 98 act in a direction parallel to the pin 92 upon which the arm 94 is pivoted so that they exert no force tending to rotate the arm 94 about the pin 92.

The springs 96 and 98 are supported in horizontal bores in the lower end of the housing 14 and act on plungers 100 and 102, respectively, these plungers carrying at their outer end a bar 104. Movement of the plungers 100 and 102 toward the arm 94 is limited by nuts 106 secured to the inner ends of the plungers and engaging the outside of the lower portion of the housing 14. The vertically extending arm 94 has a bearing member 108 which engages the adjacent surface of the bar 104 at various points along the bar depending upon the position of the arm 94 relative to its supporting pin 92. The arm 94 is held against accidental displacement from various positions relative to the bar 104 by a spring-pressed detent 110 (Fig. 2) arranged to engage one of a plurality of recesses 112. The movement of the arm 94 about the pin 92 is limited by projections 114 and 116 (Fig. 3) the projection 114 being arranged to engage the lower end of the arm 90 of the lever 84 and the projection 116 being arranged to engage the lower surface of one of the arms 88 of the housing 14.

As indicated in Fig. 4, the wires of which the springs 96 and 98 are made are of different thicknesses, the spring 96 being relatively weak compared to the spring 98 so that the forces exerted by these springs through the bar 104 to the arm 94 are considerably different. Accordingly, the force transmitted through the bar 104 by the springs 96 and 98 to the arm 94 will vary in accordance with the point of contact of the bearing member 108 carried by the arm 94, with the bar. Thus if the arm 94 be moved toward the right, as viewed in Figs. 3 and 4, or toward the plunger 102 acted upon by the heavy spring 98, the effect of this spring on the arm 94 will be increased while the effect of the light spring on the arm will be decreased. The net result is that a greater force is transmitted by the springs to the arm 94, this force being transmitted through the lever 84 to the supporting post 16 so that a greater force must be exerted on the roll 18 to cause downward movement thereof. The arm 94 has a finger piece 120 extending upwardly through the base of the machine by which the position of the arm 94 relative to the bar 104 may be easily adjusted by the operator, this adjustment varying the force exerted on the supporting post 16. The top of the base 10 is provided with a plate 122 adjacent to the finger piece 120, this plate having suitable indicia to indicate the force exerted on the supporting post.

The upward movement of the post 16 by the springs 96 and 98 is limited by a bracket 124 (Fig. 1) secured to the post 16 by screws 126 and arranged to engage the lower end of a stop screw 128 threaded through the upper end of the housing 14.

In order to permit downward movement of the roll 18 for presentation of work to the machine without tilting the supporting housing 14 about the pivot 12, a chain 130 is secured to the outer end of the lever 84 and may be secured at its other end to a treadle whereby the operator may move the lever 84 downwardly against the forces exerted by the springs 96 and 98 to permit the post 16 to move downwardly by gravity, thus increasing the spacing between the roll 18 and the operating members.

With the construction above described, the force opposing downward movement of the post 16 is very easily adjusted by moving the arm 94 through the finger piece 120 about its supporting pin 92 to vary the point of contact between the member 108 carried by the arm 94 and the bar 104. With this arrangement the force exerted on the supporting post may be varied between the force exerted by the light spring 96 and that exerted by the heavy spring 98. This adjustment is easily and quickly made and the amount of force acting upwardly on the post 16 may be ascertained by the position of the finger piece 120 relative to the indicia in the plate 122.

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

1. In combination, a work support, means providing a yielding mounting for said work support, said means comprising a plurality of springs arranged to exert unequal forces, and single means for varying the relative effectiveness of said springs.

2. In combination, a work support, means providing a yielding mounting for said work support, said means comprising a pair of springs of different strength, and single means for varying the relative effectiveness of said springs.

3. In combination, a vertically movable work support, a lever against one end of which the lower end of the support rests, a pair of compression springs acting against the opposite end of said lever, said springs being arranged to exert different forces on said lever, and means for simultaneously varying the effect of said springs on said lever.

4. In combination, a vertically movable work support, a lever against one arm of which the lower end of the support rests, the other arm of said lever being pivoted thereto on an axis at right angles to the axis of the fulcrum of said lever, a pair of springs arranged side by side, said springs being arranged to exert unequal forces, and a bar between said other arm of said lever and the adjacent ends of said springs for transmitting the forces exerted by said springs to said lever.

5. In combination, a vertically movable work

support, a lever pivoted about a horizontal axis, said work support resting on one arm of said lever, the other arm of said lever being pivoted thereto about an axis at right angles to the axis of the fulcrum of said lever, a bar parallel to the axis of the fulcrum of said lever and arranged to be engaged at any one of a plurality of points along the length thereof by the outer end of the other arm of said lever, and a pair of springs acting against opposite ends of said bar, one of said springs being relatively strong and the other being relatively weak.

6. In combination, a vertically movable work support, a bell crank lever pivoted about a horizontal axis and having a horizontally extending arm underlying the lower end of said work support, the other arm of said bell crank lever extending upward and being pivoted to said lever about a horizontal axis at right angles to the axis of the fulcrum of said lever, the lower end of said upwardly extending arm being provided with stops to limit the pivotal movement of said upwardly extending arm relative to the other arm of the lever, and means for opposing rotation of said bell crank lever constructed and arranged to exert a force varying with the pivotal movement of the upwardly extending arm.

7. In combination, a vertically movable work support, a bell crank lever pivoted about a horizontal axis and having a horizontally extending arm underlying the lower end of said work support, the other arm of said bell crank lever extending upward and being pivoted about a horizontal axis at right angles to the axis of the fulcrum of said lever, the lower end of said upwardly extending arm being provided with stops to limit the pivotal movement thereof, a horizontally extending bar parallel to the axis of the fulcrum of said lever with which the upper end of the upwardly extending arm of the lever is arranged to engage, a pair of compression springs acting against opposite ends of said bar and urging said bell crank lever in a direction to oppose downward movement of said work support, said springs being arranged to exert unequal forces on said bar, and means cooperating with the upwardly extending arm of said bell crank lever for maintaining the upper end thereof in various positions relative to said bar.

8. In combination, a pair of coiled compression springs arranged side by side, said springs being of different compression strength, a bar against the outer ends of which said springs act, an arm bearing against said bar for transmitting the forces exerted by said springs on said bar, said arm being arranged to bear against any one of a plurality of points on said bar along the length thereof.

9. In combination, a pair of coiled compression springs arranged side by side, one of said springs being stronger than the other, a bar connected at its ends to the outer ends of said springs, an arm pivoted about an axis substantially parallel to the axes of said springs, the outer end of said arm being arranged to engage said bar, said arm being also pivoted about an axis substantially parallel to said bar.

10. In a seam-rubbing machine, a work-supporting roll, instrumentalities located above said roll for operating upon the seam of a work piece supported on the roll, a vertically slidable post supporting said roll, a pair of springs of different strength acting on said post to oppose downward movement of the roll, and means for simultaneously varying the effectiveness of said springs on said post.

11. In a seam-rubbing machine, a work-supporting roll, instrumentalities located above said roll for operating upon the seam of a work piece supported on the roll, a vertically slidable post supporting said roll, a lever pivoted about a horizontal axis, one arm of said lever underlying said post, said lever including an arm pivoted about an axis at right angles to the axis of said lever, a pair of compression springs of different strength parallel to the pivotal axis of said last-named arm, and a bar connected to the outer ends of said springs and transmitting the forces exerted thereby to the outer end of said last-named arm.

12. In a seam-rubbing machine, a work-supporting roll, instrumentalities located above said roll for operating upon the seam of a work piece supported on the roll, a vertically slidable post supporting said roll, a lever pivoted about a horizontal axis, one arm of said lever underlying said post, said lever including an arm pivoted about an axis at right angles to the axis of said lever, a pair of compression springs of different strength parallel to the pivotal axis of said last-named arm, a bar connected to the outer ends of said springs and transmitting the forces exerted thereby to the outer end of said last-named arm, and means cooperating with said last-named arm for maintaining the arm in any one of several different positions relative to said bar.

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