

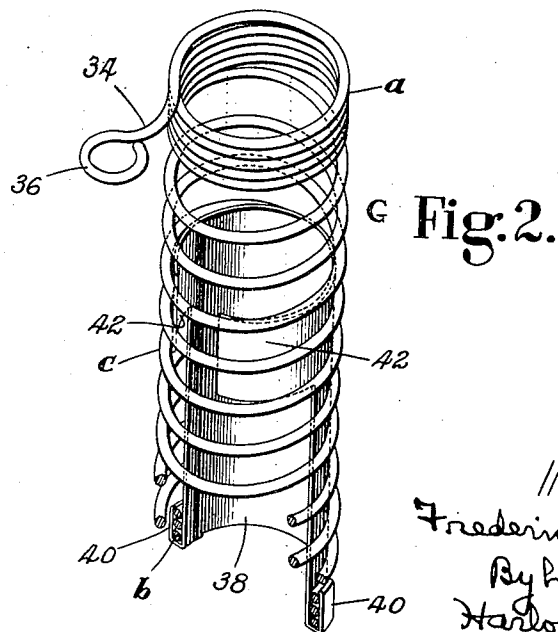
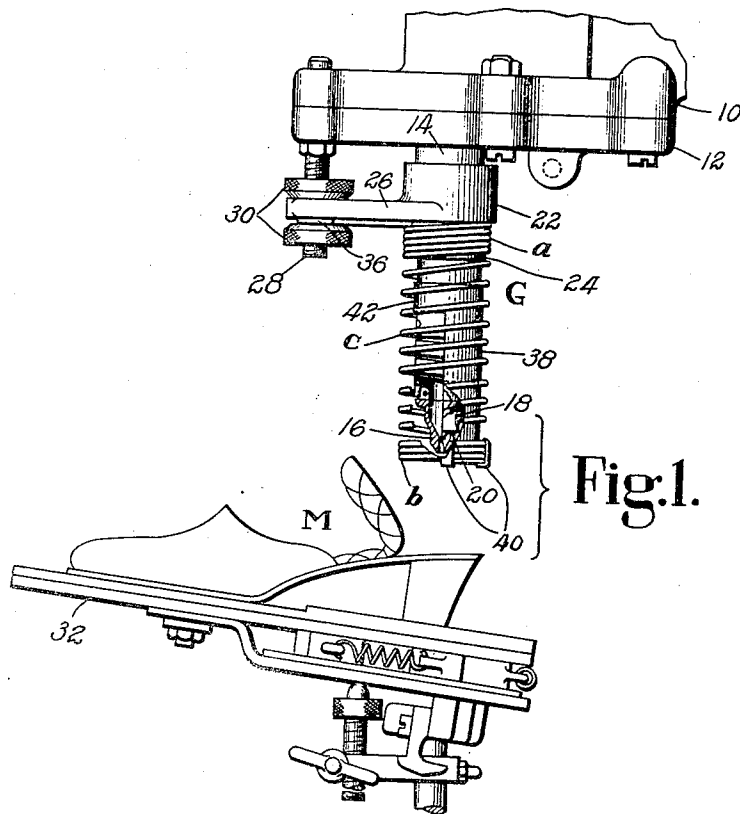
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TOOL GUARD

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TOOL-GUARD

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This invention relates to means for protecting the hands of an operator from moving tools, it being herein disclosed in connection with a machine for attaching heels to shoes.

5 In Letters Patent of the United States No. 1,948,499, Bertrand, February 27, 1934, there is disclosed an apparatus by which a countersink or depression is formed about an opening previously drilled through the heel-seat of a shoe into a heel, and then a screw inserted in said opening to secure the shoe and heel together. The rotatable tools employed for this work, and more especially the countersink, may seriously injure the hands of the operator coming in contact with 10 them. This is particularly liable to occur when the mule-type of slipper is being operated upon, since then there is no counter-portion interposed between the tools and the operator's hand which holds the work at the rear to position it. It is an object of my invention to continuously protect the operator at this danger-point by a simple means which will in no way interfere with his manipulation of the work or his ability to inspect it during the operation. To this end, I surround 15 the tool with a guard in the form of a non-rotatable spring-helix which, while preventing contact of the operator's hands with the tool or tools in all operating positions, will yield in engagement with the work, and, because of the spaces between its convolutions, will offer negligible obstruction to the operator's view. The maximum freedom from interference is attained by spacing the convolutions of a portion of the helix a considerable distance from one another, while at 20 the extremities they are more closely placed to stiffen the guard and furnish attaching portions. At one extremity these closer convolutions may fit over a portion of a gage associated with the tool, while at the opposite extremity a shield or contact member may be secured to them. This shield, which is preferably of sheet-material, is shown as extending between the guard and gage where it will move smoothly over the latter, preventing the spring from catching upon the end 25 of the gage, and retaining said spring against lateral deflection.

In the accompanying drawing illustrating a particular embodiment of my invention,

Fig. 1 shows my improved guard, together with 30 the more closely associated portions of a countersinking and screw-inserting machine; while

Fig. 2 is a perspective view of the guard with the lower portion of the helix broken away.

Of the previously mentioned patent, there appears in the drawing a frame-arm 10 having se-

cured to it a plate 12. A sleeve 14 depends from the plate, and within the sleeve rotates a tubular and sectional countersink 16 within which turns and moves longitudinally a screw-driver. The latter is not directly related to the present invention and is not illustrated. Surrounding the sleeve 14 is a cylindrical gage member 18, which, by the engagement of the work with its lower extremity, determines the depth to which the countersink 16 operates, since this countersink projects for a definite and normally unvarying, though adjustable, distance below the work-contacting end 20 of the gage. This gage may have three portions, an upper hub 22, a succeeding cylindrical portion 24 of somewhat less diameter, and the work-contacting portion 18 already referred to, this being semi-cylindrical. From the hub 22 an arm 26 extends, it having an opening through which passes a screw 28 carried by the arm 10 and the plate 12. By nuts 30, 30 upon opposite sides of the arm 26, the gage may be adjusted vertically to determine the depth to which the countersink 16 operates. The gage-portion 18 has its open side toward the front of the machine, permitting inspection of the work by the operator. For the operation upon it, the work is positioned by the operator upon a vertically movable supporting table 32. During each operating cycle, the table rises to force the pre-drilled heel-seat of a shoe against the countersink 16 to an extent determined by the end 20 of the gage 18. Then the table descends sufficiently to clear the work from the countersink, a screw is delivered between the countersink-sections to the opening, the screw-driver is lowered and inserts the screw, and the elements resume their normal positions.

Since the end 20 of the gage must be above the countersink so the latter may enter the work, it will be evident that the hand of the operator, as it locates the work for countersinking and screw-inserting, may enter the space below the gage-end and, by contact with the countersink-sections, be injured. With a shoe having a counter-portion, some protection would be furnished by the work itself; but with a mule, such as is illustrated at M in Fig. 1, the operator must depend upon his own care. The present invention protects against negligence by interposing between the hand and the tool a guard G which is fully effective at all times. This guard preferably consists of a helix of spring-wire surrounding both the countersink 16 and the gage 18. The convolutions of the helix are arranged in three groups. Those designated as a and b, situated respectively at the opposite 55

extremities, are closely spaced with respect to one another, being shown as in substantial contact. The third group consists of a greater number of more widely spaced convolutions which furnish the larger portion of the length of the guard, these offering practically no obstruction to sight. The internal diameter of the helix is substantially the same as the external diameter of the gage-portion 24, so when the guard is placed over the gage the closely wound end *a* will so securely fit the gage as to hold it in position laterally, with the group of turns *c* concentric with the gage-portion 18 but somewhat spaced from it. The guard *G* may be held against longitudinal displacement by extending the upper extremity of the helix as an arm 34 having a terminal eye 36. This eye encircles the screw 28 and is forced against the gage-arm 26 by the lower adjusting nut 30. The bottom of the guard, furnished by the closely wound turns *b*, is thus held at least as low as the point of the countersink 16.

To the helix-portion *b* is attached another element of the guard. This consists of a shield or lining 33, preferably formed of relatively thin sheet-metal extending into the space between the gage 18 and the helix, it being shown as substantially concentric to both and capable of contacting with them. It is supported upon the helix turns *b* by lugs 49, which may be three in number, bent up outside and over the portion *b*. The close turns give a comparatively wide and stable body for this attachment. The shield is shown as semi-cylindrical, like the gage-portion 18, the open side being similarly toward the front of the table 32. At the upper extremity, near the top of the helix-portion *c*, it may have lateral extensions 42 in position to contact with the front of the helix. When the helix is compressed, the shield moves longitudinally of it over the convolutions *c* and over the gage. Engagement of the shield with the rear of the gage and with the guard retains the turns of the latter against lateral deflection, as do also the shield-extensions 42. The shield further prevents the helix, when compressed, from catching upon the lower end of the gage, and furnishes at the rear of the tool an imperforate partition between said tool and the operator's hand or other approaching object.

When the table 32 of the machine rises with a mule or other shoe *M* upon it for the countersinking and screw-inserting operations, the projection of the guard *G* about and below the countersink 16 completely protects the operator's hand, which is grasping the rear of the shoe to locate it upon the table. In fact, all movable operating elements which might cause injury are fully encircled by the guard. The heel-seat-portion of the ascending shoe contacts with the lugs 40 of the guard, compressing the spring-helix, the lower portion *b* and the shield 33 rising together so the operation is not interfered with. The continuity of the guarding action is maintained during this movement, there at no time being a space between the guard and the shoe through which the operator's hand may pass. When the countersinking and screw-inserting are completed, the table falls with the shoe, the helix expanding and following it so the closure remains unbroken throughout the operating cycle. At all times a practically unobstructed view of the work may be had between the widely separated convolutions *c* of the helix.

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

1. The combination with a movable tool, of a guard comprising a spring-helix having convolutions spaced from one another and surrounding the tool at its point of engagement with the work, said helix being at all times held against rotation about its axis.

2. The combination with a machine having a movable tool, of a guard comprising a helix of wire surrounding the tool, one end of the wire being secured to a stationary portion of the machine and the opposite end being free to be moved by the work.

3. The combination with a rotatable tool, of a guard surrounding the tool and comprising a helix and a contact member of sheet-material carried by the helix.

4. The combination with a rotatable tool, of a guard surrounding the tool and comprising a helix and a contact member of sheet-material interposed between the helix and the tool and secured to said helix.

5. The combination with a rotatable tool, of a guard surrounding the tool and comprising a helix and a lining of sheet-metal bent over one extremity of the helix.

6. The combination with a movable tool, of a guard surrounding the tool comprising a helix, the convolutions of the extremities of the helix lying in close proximity to each other while the intermediate convolutions are more widely spaced, there being a lining member within the helix, said member being provided with lugs folded over the outside of the close convolutions at one extremity of the helix.

7. In a heel-attaching machine, a shoe-support, a tool for operating upon a supported shoe, the support and shoe being movable relatively to permit action of the tool upon the shoe, a gage associated with the tool to limit the extent of its action, and a guard for the tool surrounding the gage.

8. In a heel-attaching machine, a shoe-support, a tool for operating upon a supported shoe, the support and shoe being movable relatively to permit action of the tool upon the shoe, a gage associated with the tool to limit the extent of its action, and a guard for the tool movable longitudinally of the gage.

9. In a heel-attaching machine, a shoe-support, a tool for operating upon a supported shoe, the support and shoe being movable relatively to permit action of the tool upon the shoe, a gage associated with the tool to limit the extent of its action, and a guard extending along the tool and being yieldable longitudinally of the gage.

10. In a heel-attaching machine, a shoe-support, a tool for operating upon a supported shoe, the support and shoe being movable relatively to permit action of the tool upon the shoe, a gage associated with the tool to limit the extent of its action, means for adjusting the position of the gage, and a guard for the tool held in place by the adjusting means.

11. In a heel-attaching machine, a shoe-support, a tool for operating upon a supported shoe, the support and shoe being movable relatively to permit action of the tool upon the shoe, a gage associated with the tool to limit the extent of its action, and a helical guard surrounding the tool and including a shield interposed between the gage and helix.

12. In a heel-attaching machine, a shoe-support, a tool for operating upon a supported shoe, the support and shoe being movable relatively to permit action of the tool upon the shoe, a cyl-

inder gage partly surrounding the tool and provided with portions of different diameters, and a helical guard having convolutions closely placed with respect to one another fitting over a portion 5 of the gage of greater diameter and with more widely placed convolutions spaced from a portion of the gage of less diameter.

13. In a heel-attaching machine, a shoe-support, a tool for operating upon a supported shoe, 10 the support and shoe being movable relatively to permit action of the tool upon the shoe, a cylindrical gage partly surrounding the tool and provided with portions of different diameters, a helical guard having at its opposite extremities 15 groups of convolutions closely placed with respect to one another and intermediate convolutions more widely separated, the last-mentioned convolutions being spaced from a portion of the gage of less diameter and one of the terminal-groups of 20 convolutions fitting a portion of the gage of greater diameter, and a shield secured to the opposite terminal-group of convolutions and extending between the gage and guard.

14. A guard for movable tools, comprising a 25 spring-helix, and a sheet-metal shield open at

one side, said shield being secured to one extremity of the helix and extending into said helix.

15. A guard for movable tools, comprising a helix of spring-wire having at one extremity a 5 group of closely placed convolutions with adjacent convolutions more widely spaced, and a sheet-metal shield secured to the close convolutions and extending into the helix.

16. A guard for movable tools, comprising a 10 helix of spring-wire having at its opposite extremities groups of closely placed convolutions with the intermediate convolutions more widely spaced, and a sheet-metal shield provided with 15 lugs folded over the close convolutions at one extremity of the helix and extending therefrom substantially concentric to said helix.

17. A guard for movable tools, comprising a helix of spring-wire having at its opposite 20 extremities groups of closely placed convolutions with the intermediate convolutions more widely spaced, one end of the helix extending outwardly from the close convolutions and being provided with an eye.

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