

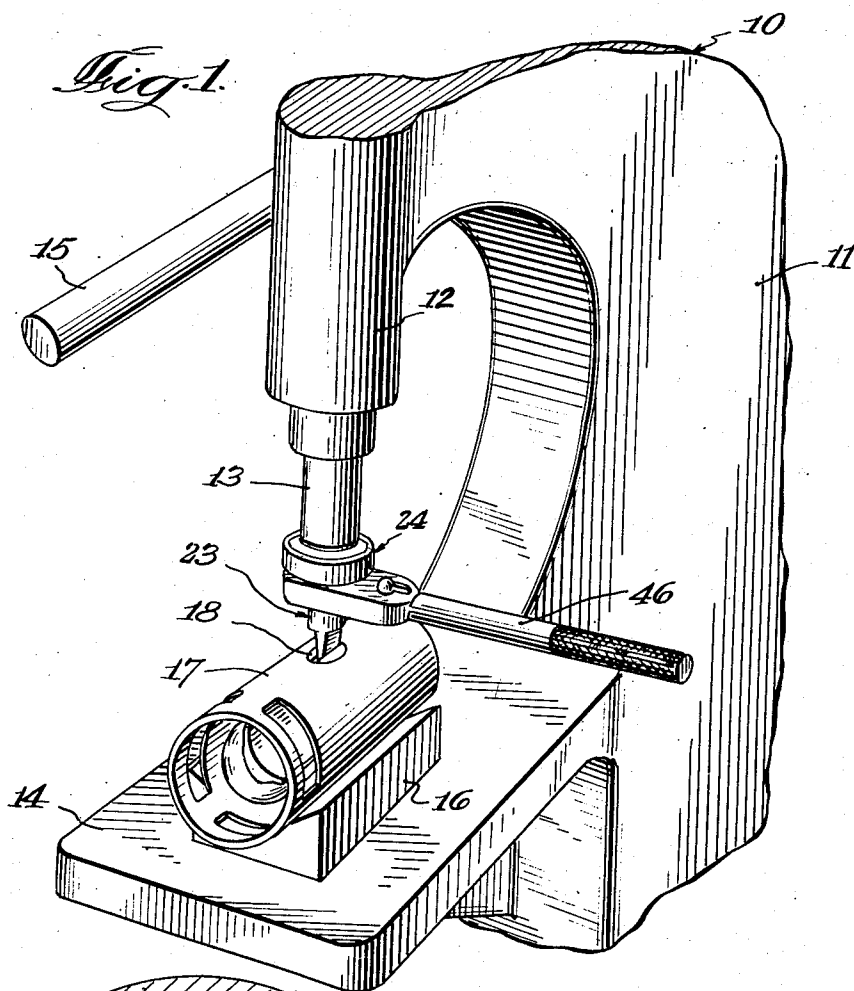
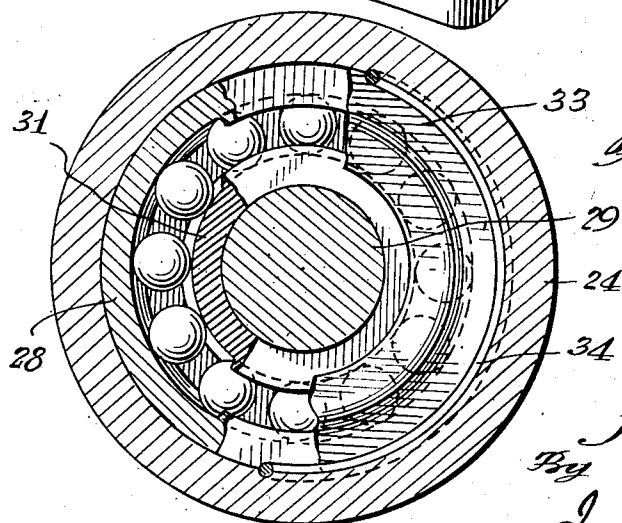
Sept. 8, 1953

J. T. BECKER
POLE-SHOE TOOL

2,651,338

Filed June 20, 1951

2 Sheets-Sheet 1



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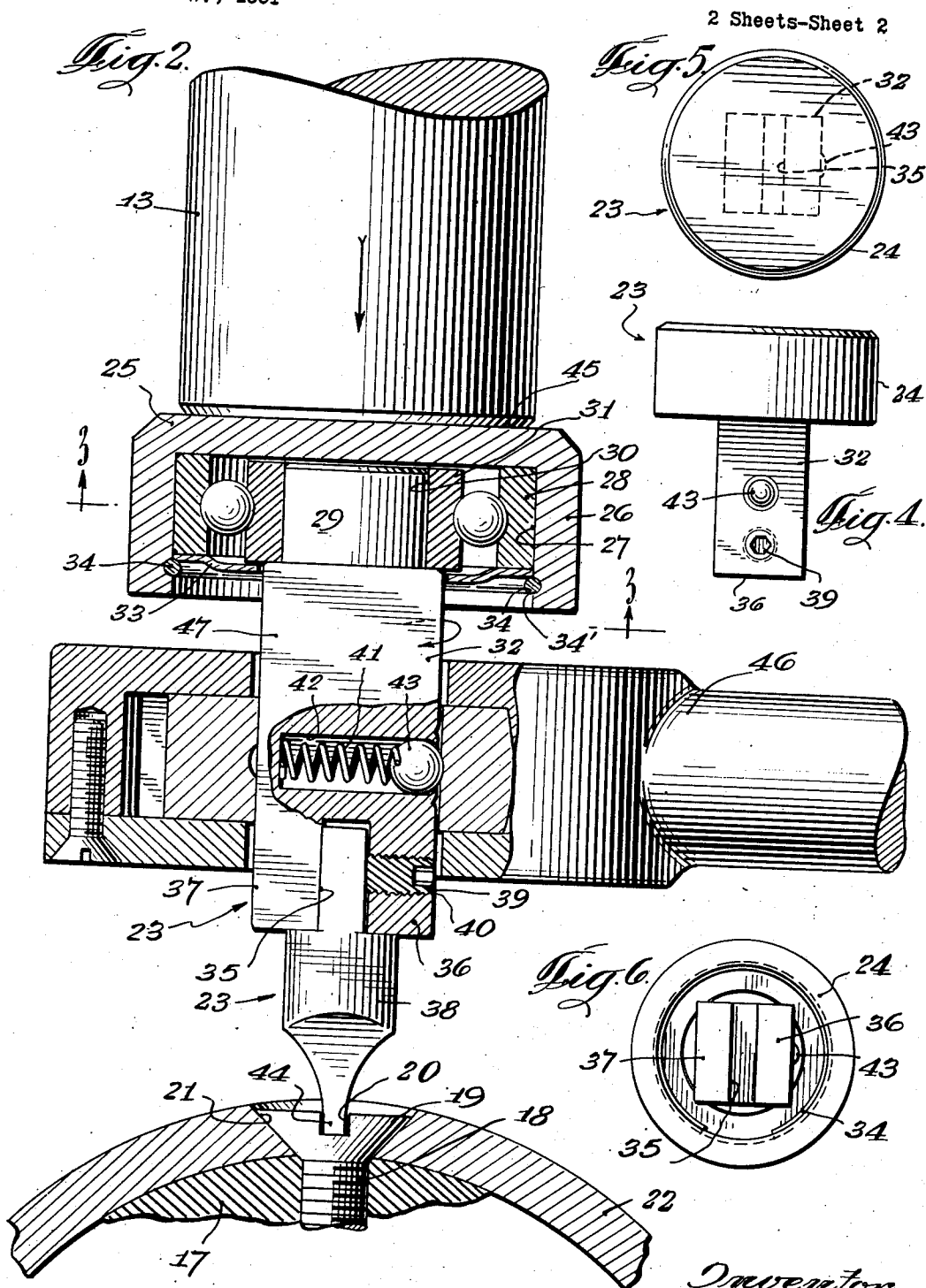
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POLE-SHOE TOOL

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3 Claims. (Cl. 144-32)

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This invention is concerned with improvements in the construction of a tool adapted particularly for use in replacing or removing pole-shoes of automotive generators and starting motors.

In a generator or starting motor of the type herein concerned, the field coils are wrapped around the pole-shoes and the pole-shoes are held in place by means of pole-shoe screws. It is essential that the pole-shoe screws be drawn up very tightly in order to maintain proper clearance between the field coils and the armature. Electrical machinery of this type is relatively expensive and should the field coils burn out, as often occurs after long use of the motor, it is desirable to replace the burned out coils with new ones by removing the pole-shoes from the frame, thereby saving the cost of a new motor or generator. The pole-shoe screws ordinarily are difficult to remove because they must be securely tightened and likewise they are difficult to draw up tightly in order to maintain correct clearance between the field coils and the armatures. Obviously, great care must be exercised not to damage the pole-shoe screw head or the frame when removing and replacing the pole-shoes. Specially designed tools have been provided for this purpose which are intended to exert vertical pressures on the pole-shoe screw while same is being turned. These tools in the main are large, bulky and expensive constructions made and sold as specialized units and hence not adapted for use with conventionally available equipment such as an arbor press which is capable of easily exerting great vertical pressures.

Accordingly, it is a principal object of this invention to provide a pole-shoe tool of the character described adapted to be used with an arbor press or the like for removing and replacing pole-shoes of generators or starting motors.

Another object of the invention is to provide a tool of the character described which is inexpensive to manufacture, simple and easy to use, which provides for rapid and safe removal and replacement of the pole-shoes and which is durable.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and a combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit

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or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of this invention, there is illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, this invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

Fig. 1 is a perspective view of an arbor press having the pole-shoe tool embodying the invention associated therewith and showing the manner in which said press and tool may be operated for removing or replacing a pole-shoe.

Fig. 2 is an elevational view of the arbor press and pole-shoe embodying the invention as shown in Fig. 1 and having portions thereof in section to show construction details.

Fig. 3 is a sectional view through the pole-shoe tool taken along the line 3-3 of Fig. 2 and in the direction indicated, with parts broken away to show certain details.

Fig. 4 is an elevational view of the pole-shoe tool embodying this invention.

Fig. 5 is a top plan view of the pole-shoe tool embodying this invention.

Fig. 6 is a bottom plan view of the pole-shoe tool embodying this invention.

Referring to the drawings, the reference character 10 designates generally an arbor press with which my tool is adapted to be associated. Only those portions of the press 10 which are pertinent to an understanding of the invention have been shown, it being understood that the size and construction thereof may be varied and that the press per se forms no part of the invention. Same has a vertical frame 11 ordinarily supported at its lower end on a base (not shown). A housing 12 is formed on the upper end of the press, said housing having the operating parts for exerting vertical pressures contained therein. Protruding from said housing is a rod 13 which is adapted to be reciprocated vertically over a table 14 secured on the frame. I have shown generally a handle 15 secured to the housing 12 by means of which the rod 13 may be reciprocated vertically, however it should be understood that other well-known means such as a foot-operated treadle or suitable electrical means also would be appro-

prate for this purpose. I provide a suitably shaped grooved block 16 adapted to rest upon the table and support thereon a frame 17 in position to have the pole-shoe thereof removed. Referring to Fig. 1, I have shown the frame 17 in position on the base or block 16 with the pole-shoe screw 18 disposed directly beneath the rod 13 and facing same. The head 19 of said screw is provided with a slot 20 and when the screw is tightened it is disposed within the countersunk opening 21 in the outer casing 22 of the motor.

The pole-shoe tool embodying the invention is designated generally 23. Same has a circular cap member 24 comprising a top wall 25 and a side wall 26 defining a central cavity 27 therebetween. A ball-bearing unit is force-fitted in said cavity, with the outer race 28 disposed against the inner surface of the wall 26. I provide a shaft having an upper portion 29 adapted to be received in the central bore 30 of the inner race 31 of said ball-bearing, and a rectangular body portion 32 integrally formed with said portion 29. The body portion 32 extends downwardly from said cap member. A seal 33 is mounted in the cap member against the ball-bearing unit and a spring clip 34 engaged in an annular groove 34' on the inner surface of the wall 26 keeps the ball-bearing unit and lubricant in the cap member. Thus, the shaft portion is adapted to rotate freely in the cap member 24.

The lower end of the body portion 32 is provided with a vertically arranged slot 35 between the vertical walls 36 and 37. A screw driver bit 38 is adapted to be received in said slot and fastened therein by means of a set screw 39 threaded into the opening 40 in wall 35. A spring detent device 41 is mounted in the recess 42 above the slot 35 and includes a ball 43 having a portion thereof protruding from the recess 42.

The manner in which the herein described tool is operated may best be seen from Figs. 1 and 2. The motor 17 is placed in position on the base 16 so that the pole-shoe screw 18 is opposite the rod 13. A bit 38 is selected which has a tapered end 44 appropriate for engagement in the slot 20 of the pole-screw 18 and secured in the slot 35 of the tool. The tool is positioned with the tapered end 44 of the bit in the slot 20 and the handle 15 is manipulated to drop the rod 13 into engagement with the upper surface 45 of the cap 24. A ratchet wrench 46 of conventional construction which has previously been inserted over the body portion 32 is held in place by means of the detent device 41. In Fig. 2, the tool is shown in position to remove the pole-shoe screw 18. The handle 15 is manipulated to cause the rod 13 to bear down on the cap 24 thereby exerting a tremendous vertical pressure on the head 19 of the screw 18. The ratchet wrench 46 is easily turned in a clockwise direction indicated at 47 at the same time that the press 10 is exerting a vertical pressure on the screw 18. Thus, at all times that the screw 18 is being turned a tremendous vertical pressure is being exerted thereon by means of the arbor press 10 so that the screw may be removed easily and quickly without damage to the screw head 19 or the frame of the generator or starting motor 17.

It will be apparent that I have provided a pole-shoe tool which by reason of its being capable of association with a machine such as an arbor

press, permits the easy and rapid removal and replacement of the pole-shoe of generators or starting motors. The efficient operation of devices of this type depends in great measure on having a tremendous vertical pressure exerted on the head of the pole-shoe screw as the screw is being turned. By providing a pole-shoe tool capable of being associated with an arbor press, and used with a simple ratchet wrench efficient removal of pole-shoe screws is insured and the bulky and expensive frames heretofore used in devices of this type are eliminated.

It is believed that the invention has been sufficiently described without any necessity for further details and it is to be understood that many variations are possible without departing from the spirit of the invention as defined in the appended claims.

What is claimed and desired to be secured by Letters Patent of the United States is:

1. A tool for removing pole-shoes from motors having said shoes secured therein by means of pole-shoe screws, the tool adapted to be used in combination with a press having a reciprocal member capable of exerting substantial vertical pressure, said tool comprising a cap member having a top wall of substantial thickness and side walls defining a downwardly opening cavity therebetween, a ball bearing unit forcefitted into said cavity having an inner and outer race, a shaft member having a reduced end portion supported in said inner race and a body portion on its opposite end depending from said cap, said body portion having a vertically arranged slot in the free end thereof and a screw-driver bit removably secured therein, said shaft adapted to receive a ratchet wrench thereon for turning the same, said top wall arranged against the reciprocal member with a said bit engaging a pole-shoe screw whereby said tool may have said pressure exerted against the cap member simultaneously as the tool is being turned by said wrench.

2. A tool as described in claim 1 in which said outer race is disposed against the inner surface of said side walls whereby said shaft member may be rotated freely in said cap member.

3. A tool as described in claim 2 in which said side walls have an annular groove on the inner surface thereof and a spring clip retained in said groove for holding said unit in said cap member and a seal member in said cap member arranged between said unit and spring clip.

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