United States Patent [19]

Gregg et al.

[11] **3,866,299**

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[54] **SEAL ASSEMBLY TOOL**

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[52] **U.S. Cl.** **29/235**

[51] **Int. Cl.** **B23p 19/02**

[58] **Field of Search** 29/235, 235.5

[56] **References Cited**

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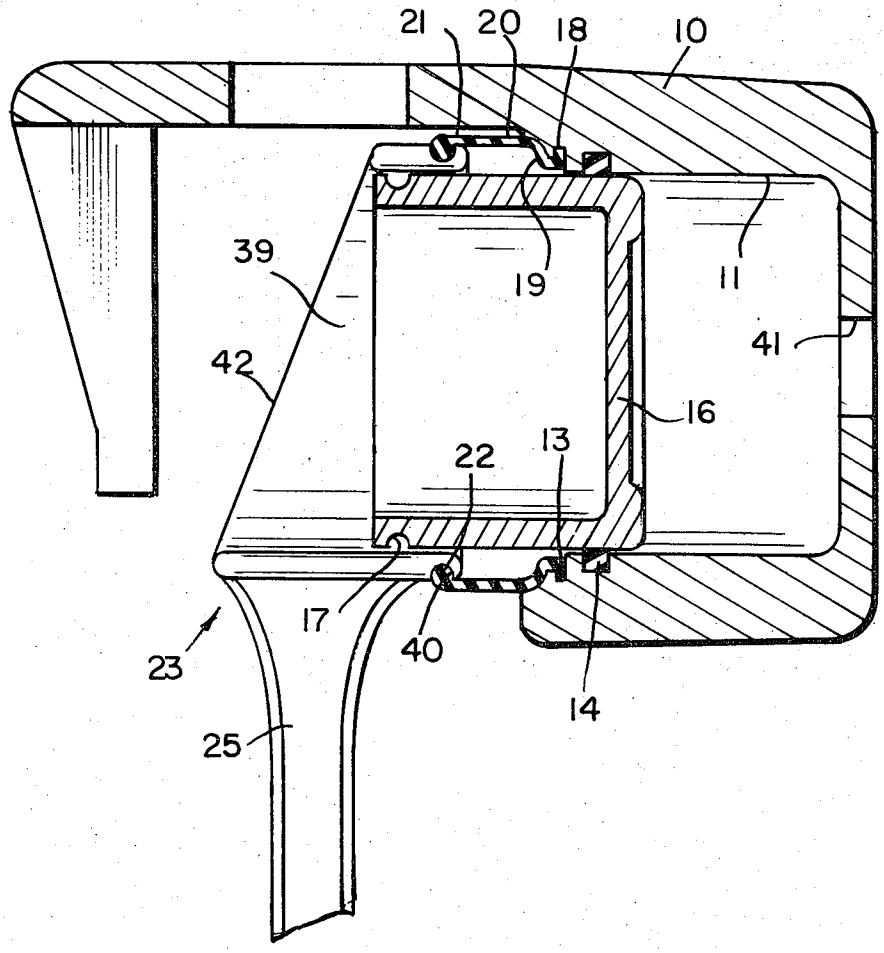
Attorney, Agent, or Firm—William R. Coffey

[57] **ABSTRACT**

A tool for facilitating the assembly of a dust boot or seal with the cylinder and piston of a caliper disc brake actuator, comprising a pair of allochirally arranged bars pivoted together to define relatively long handle sections and relatively short distal sections, the distal sections carrying mating plates shaped as part-circular arcs, the plates being arranged to define an oval when their distal tips are in contact and to lie in a common circle when their tips are separated, the plates being formed with external grooves lying in a plane perpendicular to the axis of such common circle and adapted to receive an internal bead at the proximal end of such a boot for radially expanding and longitudinally extending the boot, and resilient means resisting separation of the plates.

1 Claim, 6 Drawing Figures



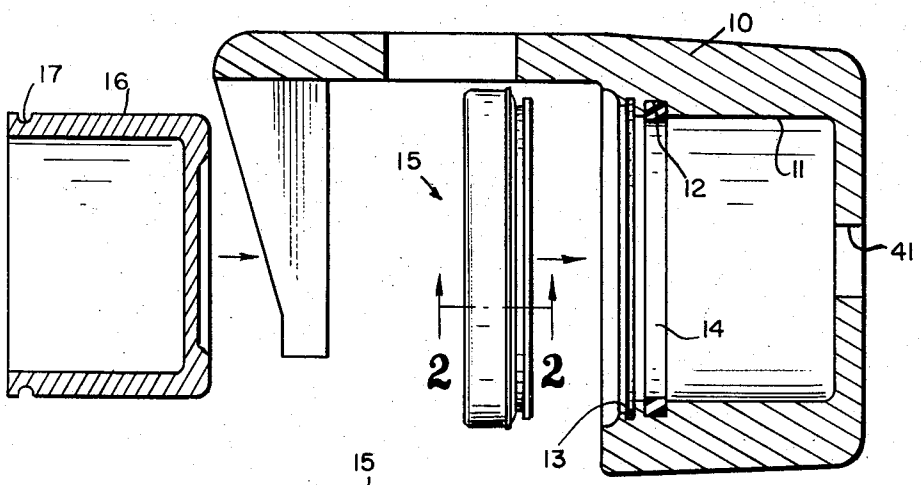


Fig. 1

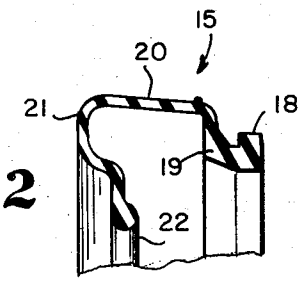


Fig. 2

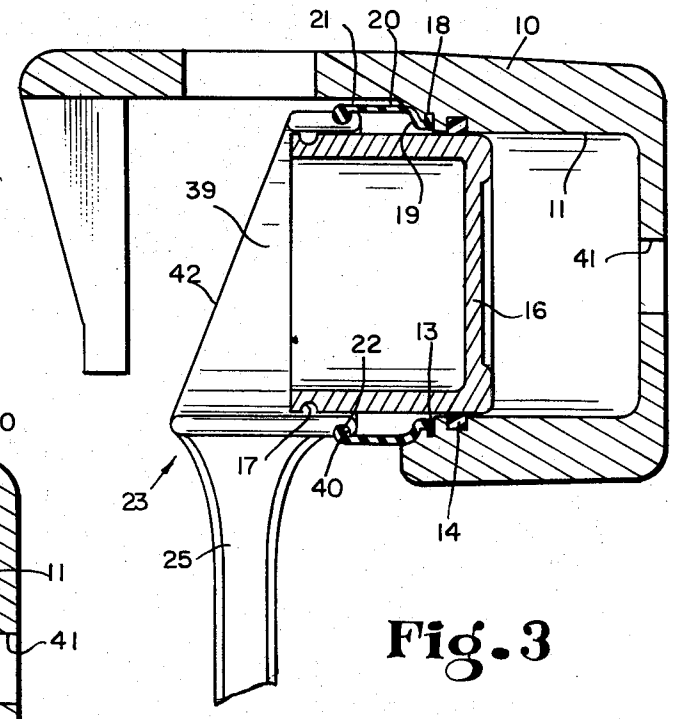


Fig. 3

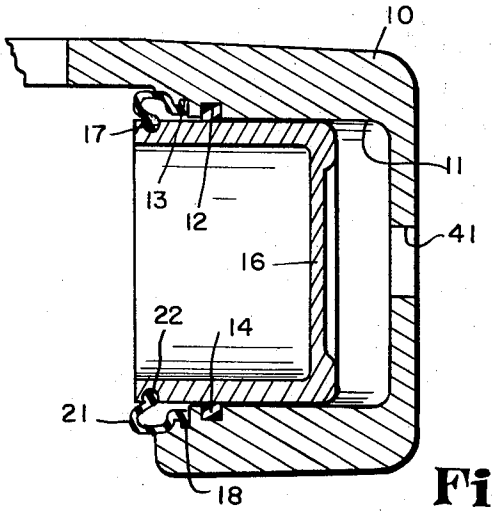
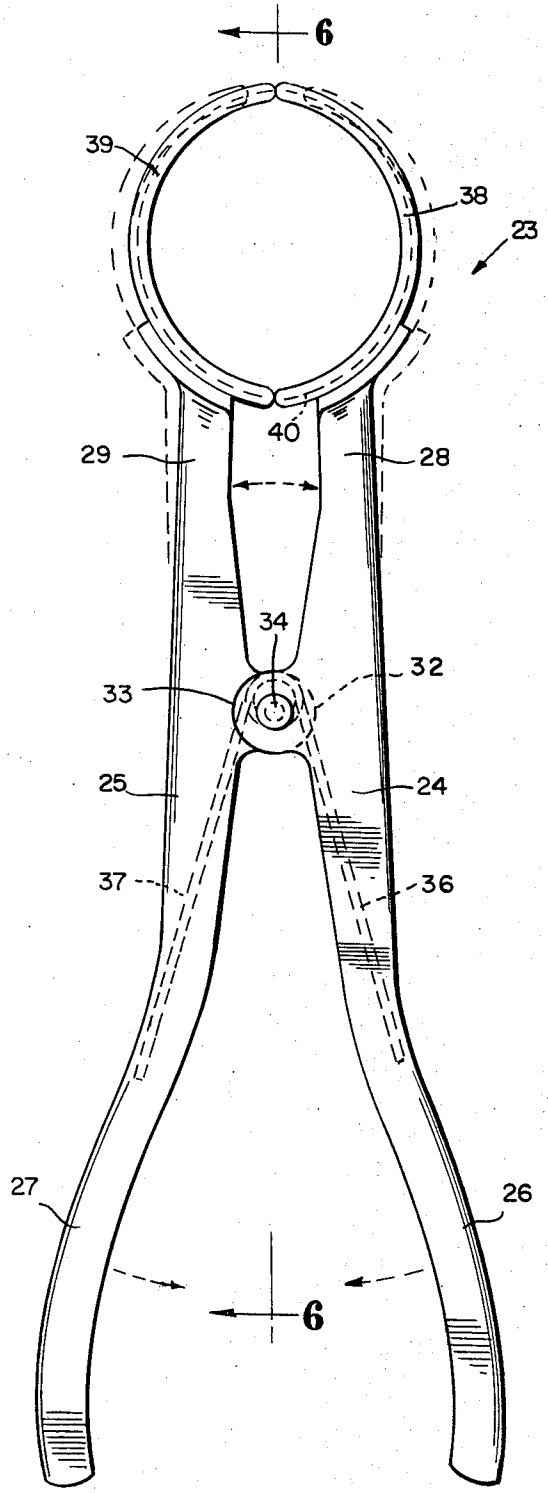


Fig. 4


6
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26
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Fig. 5

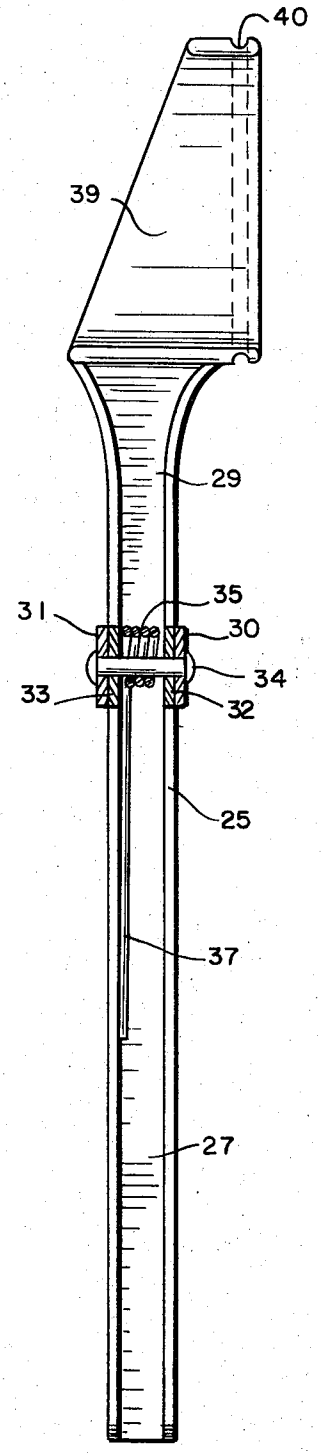
40
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Fig. 6

SEAL ASSEMBLY TOOL

The present invention relates to an applicator tool for facilitating the installation of a seal or boot between the open end of a cylinder and the outer end of a piston reciprocable in the cylinder; and the primary object of the invention is to provide a novel tool specifically designed to perform that function. Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, our invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

In the drawings:

FIG. **1** is an exploded, somewhat diagrammatic longitudinal section of a caliper housing for a known power disc brake assembly, a piston for cooperation therewith and a known form of boot;

FIG. **2** is an enlarged, fragmentary section through such a boot;

FIG. **3** is a section similar to FIG. **1**, showing the piston partially entered in the cylinder and showing our tool in use in an intermediate stage of manipulation to make the operative connection between the boot and the piston;

FIG. **4** is a similar section, showing the parts fully assembled;

FIG. **5** is an elevation of our improved tool; and

FIG. **6** is a section taken on the line **6—6** of FIG. **5.**

Referring more particularly to the drawings, it will be seen that we have illustrated a conventional caliper housing **10** formed to provide a cylinder **11.** Near the open end of the cylinder, there is provided an inwardly-opening peripheral groove **12** and between the groove **12** and the open end of the cylinder is provided a further internally opening groove **13.** Conventionally, an O ring or similar packing **14** is installed in the groove **12.** According to conventional practice, a seal or boot **15,** formed of soft, flexible and elastic rubberoid material, is installed between the cylinder **11** and a piston **16** adapted to be mounted for reciprocation in the cylinder **11.** Said piston is conventionally formed with a peripheral outwardly opening groove **17** near its trailing end.

The configuration of the boot **15** is illustrated in FIG. **2.** As shown, it has an external bead **18** at one end for snug reception in the groove **13,** whereby that end of the boot is anchored with respect to the casing **10.** An outturned section **19** merges with a substantially cylindrical body portion **20** which, in turn, merges with an inwardly and axially rolled section **21** which terminates in an internal peripheral bead **22** proportioned and designed for reception in the groove **17** of the piston **16.** It will be apparent that, since the bead **22** must have a significantly smaller diameter than does the bead **18,** difficulty will be encountered in entering the piston **16** past the bead **22** without rolling the portion **20, 21, 22** axially inwardly. It is to overcome that difficulty that we have devised the tool of the present disclosure.

The tool is best illustrated in FIGS. **5** and **6** wherein it is generally designated by the reference numeral **23.** The tool comprises allochirally arranged bars **24** and **25** each having a handle portion **26** or **27** and a shorter, distal portion **28** and **29.** The bar **24** is provided with arms **30, 31** while the bar **27** is provided with arms **32,** 33 so spaced as to be received between the arms **30** and **31** when the two bars are brought into facing relation. The arms are perforated for the reception of a pivot **34,** and a coiled spring **35** is wrapped about the pivot **34** and comprises arms **36** and **37** extending, respectively, into contact with the handle portions **26** and **27** to bias the handle portions away from each other and the distal portions **28** and **29** toward each other.

Suitably secured, as by welding, for instance, to the distal regions of the tool are mating, arcuate plates **38** and **39.** Each of these plates is part circular but somewhat less than semi-circular so that, when their distal regions are in contact under the influence of the spring arms **36** and **37,** the mating plates define an oval figure. However, when the handle portions **26** and **27** are pressed toward each other against the tendency of the spring **35,** the plates **38** and **39** will be separated so that they may lie in a common circle slightly larger than the outside periphery of the piston **16.**

As is most clearly shown in FIGS. **3** and **6,** the axial dimension of the plates **38** and **39** tapers from their ends nearer the sections **28** and **29.**

At or near its end remote from the taper, each plate **38** or **39** is formed with a peripheral, outwardly opening groove **40,** the cross-section of which closely approximates the cross-section of the groove **17** of the piston **16.**

In use, the ring or seal **14** is installed by hand. Then, the bead **18** is manually tucked into the groove **13.** Now, with the plates **38** and **39** in their solid line position of FIG. **5,** the rolled portion **21, 22** of the boot **15** is rolled outwardly and the bead **22** is slipped over the forward end of the tool **23** and worked into the groove **40.** Preferably, the interior surface of the boot and the exterior surface of the tool will be somewhat lubricated with, for instance, conventional brake fluid.

At this time, the tool orifice will be substantially in register with the open end of the cylinder **11.** Now, the handle portions of the tool will be squeezed to expand the orifice between the plates **38** and **39,** thereby likewise expanding the left-hand end portions of the boot **15.** The piston **16** is then introduced through the tool orifice and into sealing engagement with the ring **14.** The tool is now moved toward the left completely to straighten the rolled portion **21** of the boot and, in some cases, to stretch the elastic boot longitudinally, care being taken not to dislodge the bead **18.** When the right-hand extremity of the plates **38** and **39** has passed the groove **17** in the piston, (or the piston has been manually moved to the right to cause the groove **17** to pass the plate extremities) then the bead **22** will snap or be worked off the end of the tool and will enter the groove **17** to complete the assembly of the boot between the cylinder and the piston.

Now, that the tool has been completely released from the boot, the boot will tend to return to the equilibrium position illustrated in FIG. **2,** thus drawing the piston **16** more deeply into the cylinder **11,** as indicated in FIG. **4.**

We claim:

1. For use with a power disc brake cylinder having an open end with an inwardly-opening peripheral groove near said open end and spaced axially outwardly from said cylinder open end and partially obstructing access to said open end, an outboard shoe support bracket formed integrally with said cylinder, a piston for recip-

rocation in said cylinder and insertable through said open end, said piston being formed with an outwardly-opening peripheral groove near its proximal end, and a sealing gasket including an external peripheral bead at one end receivable in said first-named groove, and an internal peripheral bead at its other end receivable in said piston groove; the invention which consists of a pair of allochirally related bars, each having a handle portion and a distal portion, means pivotally connecting said bars together so that movement of said handle portions toward each other separates said distal portions, and each of said distal portions being part-circular and having a peripheral extent slightly less than 180° and being formed to provide an outwardly opening, peripherally coextensive groove for receiving said internal bead, means resiliently biasing said handle portions away from each other, and the inner surfaces of said distal portions, when separated to a predetermined degree, lying in a common circle having a diameter slightly exceeding the outer diameter of said piston whereby said piston may be axially entered through the orifice defined by said distal portions.

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