Feb. 7, 1939. A. SCHULTZ 2,146,195

LAP

Filed Jan. 17, 1938

Fig. 1

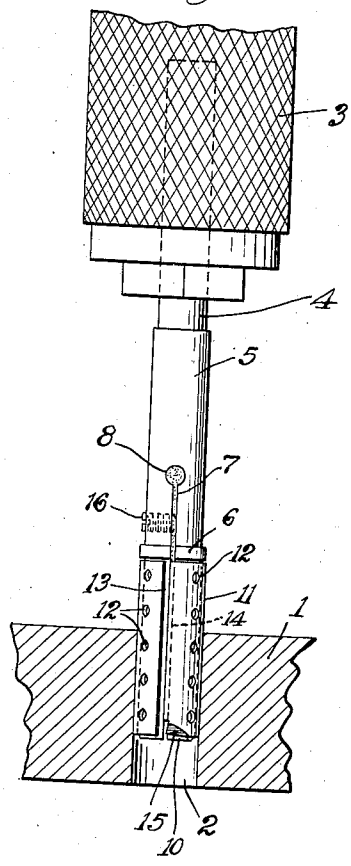
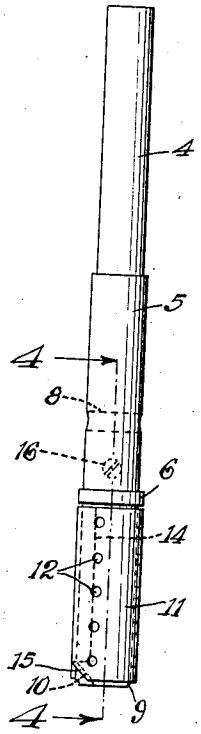


Fig. 2



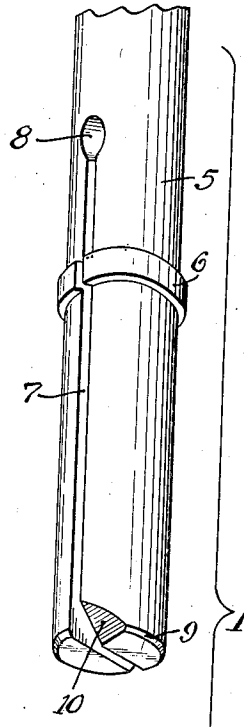


Fig. 3

Fig. 4

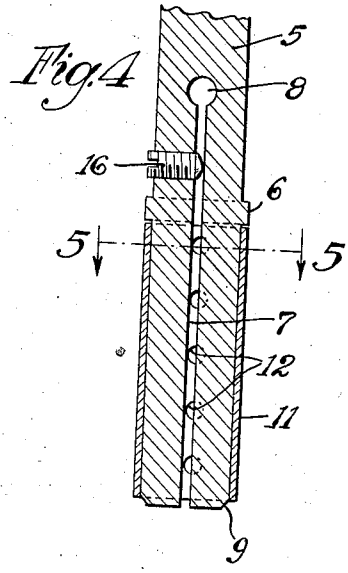
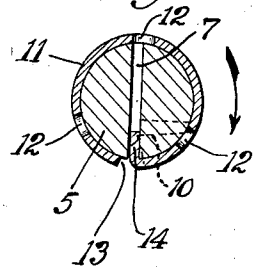
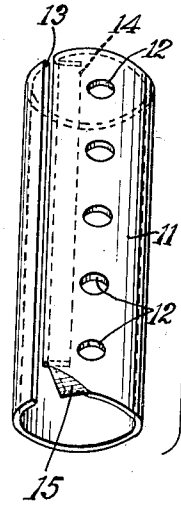


Fig. 5





Inventor
Albert Schultz
by Parker & Carter.
Attorneys.

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UNITED STATES PATENT OFFICE

2,146,195

LAP

Albert Schultz, Chicago, Ill., assignor to Boyar-Schultz Corporation, Chicago, Ill., a corporation of Illinois

Application January 17, 1938, Serial No. 185,293

5 Claims. (Cl. 51—184.1)

This invention relates to a lap and to a lap holder. It has for one object to provide a lap, the major portion of which is permanent and upon which a removable wearing portion may be positioned. Another object is to provide such an assembly in which both the permanent part and the removable part of the lap are shaped to make certain their proper assembly. Another object is to provide a lap and a lap support or holder in which the support is intended to be rotated in one direction and in which the lap and the support are so shaped that they can only be assembled in proper relation with respect to the direction of rotation of the holder. Other objects will appear from time to time in the course of the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawing, wherein—

Figure 1 is a side elevation of the lap and support in position in a work piece, which is shown in section.

Figure 2 is a side elevation of the lap and support alone. The parts being rotated through an angle of 90° from position shown in Figure 1.

Figure 3 is a composite figure illustrating on an enlarged scale the support and the lap proper in perspective.

Figure 4 is a cross-section on an enlarged scale taken at line 4, 4 of Figure 2.

Figure 5 is a transverse sectional detail taken at line 5, 5 of Figure 4.

Like parts are indicated by like characters throughout the specification and drawing.

1 is a work piece having a perforation 2. The lap is shown as in position for finishing or lapping the inner surface of the perforation 2.

3 is a tool holder of any desired design, arranged to receive the lap and the lap support removably and to rotate.

As shown the lap comprises a support member 4, which may or may not have a somewhat enlarged or thickened section 5. The support whether it comprises one or several diameters is preferably provided with a shoulder portion 6, against which the lap portion may be seated. The support is also provided with a slot 7 which at its inner end may be rounded as at 8. In general the slot may be shaped in any way desired. At its outer end the support may be beveled as at 9, and one corner of one-half of the support is cut away or sloped as at 10.

The lap proper comprises a sleeve 11 provided with one or more perforations 12 which may be arranged in any desired manner but as here shown are arranged in several rows. The sleeve is so shaped that a slot or open portion 13 remains along one side, and along that side the sleeve is provided with an inwardly bent edge 14 which as shown, particularly in Figure 5, fits into the slot 7. At its outer end or edge and on the side which carries the inbent portion 14, the sleeve is provided with an inwardly bent or inclined portion 15. The inclination of the portion being substantially the same as that of the cut away portion 10 on the support. Thus when the lap sleeve is positioned upon the lap support, the portion 15 rests against the surface 10. This portion also prevents putting the sleeve upon the support in any other position. If the sleeve were reversed end for end it could not be put upon the support because the member 15, projecting inwardly, would contact the support and prevent further movement.

A screw 16, may if desired, be positioned in one side of the support as shown in Figure 4. It is positioned in one-half of the support; extends into the slot 7 and may be rotated to bear against the other half of the support. In this manner it can be used to spread the two halves of the support if desired. It may also of course be backed off so that it does not spread the halves.

The use and operation of my invention are as follows:

In general the support or mandrel 4 is inserted in some sort of tool holder or means for holding and driving it. That is to say for rotating it. The removable sleeve is positioned on the mandrel as shown in the drawing and the presence of the inwardly bent portion 15 prevents the sleeve from being put on improperly.

As shown, in Figure 5 in particular, the direction of rotation of the mandrel is indicated by the arrow. It is important that the sleeve be so put on that the edge along which the flange 14 is positioned shall lead in rotation and that the free edge adjacent the open portion 13 shall trail. This arrangement has the tendency of causing the sleeve to embrace the mandrel closely. If rotation were in the opposite direction, or if the sleeve were inverted so that in any way the edge adjacent the open portion 13 were leading, the free edge would engage the work piece and would be spread or forced away from the mandrel, with the result that either improper lapping would occur or entirely improper functioning of the device would occur. Consequently it is important to make certain that the sleeve is so positioned on the mandrel that the edge which leads is the

one adjacent the flange or inbent portion 14. That result is accomplished by providing the inwardly bent portion 15, which since it projects inwardly into the sleeve, serves as a stop and prevents that end of the sleeve from being put on first. The other end must be put on first because of the member 15 and the latter when the sleeve is finally in position, in the particular form of the invention here shown, overlies the cut away portion 10 and is thus entirely out of the way.

With the sleeve in position upon the mandrel, lubricant and abrasive may be applied in any desired manner. It may be convenient to put lubricant or abrasive within the slot 7 and they flow downwardly and outwardly to the sleeve and are thus distributed about the mandrel, sleeve and the interior of the work piece. The entire sleeve may be covered with lubricant if desired and the lubricant may be carried about and distributed into the perforations 12 and elsewhere. A sleeve of the present design may be used with a modified mandrel and the invention is not limited to the exact details of the mandrel shown.

I claim:

1. In a lapping device, a driving and supporting member, a flexible metallic sleeve, having an inbent longitudinal flange thereon, said sleeve constituting an operating member removably mounted on said driving member, said driving member having a longitudinal passage formed therein, said flange adapted to extend into said passage removably to engage the driving member, said sleeve extending about the driving member, one longitudinal edge of the sleeve being free, an inbent portion on one end of said sleeve adapted, when the sleeve is in position on the supporting member, to contact it and to prevent improper mounting of the sleeve on said supporting member, and a depression in the outer end of said supporting member into which said inbent portion fits when the sleeve is in position on the support.

2. In a lapping device a drive, a supporting member generally elongated, said member being divided into parts by a slot formed through it and extending from one end longitudinally inward, the outer end of one of said parts being cut off and a removable metallic sleeve, slotted from end to end and provided with an inwardly bent longitudinal flange, adapted to enter said slot, when the sleeve is positioned upon the support, a portion of the outer end of said sleeve being bent inwardly, said inwardly bent portion having approximately the same inclination as the said cut off portion of said support.

3. In a lapping device, a rotatable mandrel, having a slot formed therein and extending inwardly from one end and dividing the mandrel into two sections, a member positioned in one of said sections and adapted to be moved into said slot to force the two sections apart, a flexible slotted sleeve formed with a longitudinal slot adapted to be removably mounted on said mandrel, said sleeve provided with an inbent longitudinal portion shorter than the sleeve itself which engages in the slot when the sleeve is on the mandrel, the proportion of the sleeve to the mandrel being such that it does not extend entirely about the mandrel, the leading edge of one of said mandrel sections being cut away, said sleeve provided with an inwardly bent end portion of substantially the same inclination and size as said cut away edge, said inwardly bent portion being adapted when the sleeve is in position on the mandrel to lie against said cut-away portion.

4. In combination in a lapping device a mandrel having a longitudinal slot extending from its outer end, the slot being enlarged at its inner end, a portion of the outer end of the mandrel being cut off adjoining said slot, and a lap adapted to be removably mounted on the mandrel, said lap conforming generally in shape to the mandrel and being slotted from end to end, an inbent tongue on said lap shorter than said lap and an inbent portion on said lap adapted, when the lap is in position on the mandrel, to over-lie such cut-off portion of the mandrel and to prevent improper positioning of the lap on the mandrel.

5. In combination in a lap a mandrel having a longitudinal slot formed in it extending from one end thereof and an enlargement at the inner end of the slot, an outwardly projecting shoulder in said mandrel intermediate the ends of the slot, the mandrel being otherwise smooth-sided, the mandrel having a portion of its end adjoining said slot cut off and providing thereby a surface angularly disposed with respect to the outer end of the mandrel, a lap removably positioned upon said mandrel, said lap being generally cylindrical in shape and formed of a single discontinuous piece, a tongue formed integrally with the lap at one edge and being inbent toward the center of said lapping, the tongue being shorter than the length of the lap, a portion of said lap of substantially the same area as the cut-off portion of said mandrel being inbent and adapted when the lap is in position on the mandrel to lie against said cut-off portion.

ALBERT SCHULTZ.