Sept. 29, 1953 W. H. ALEXANDER 2,653,375

TOOL

Filed March 16, 1951

Fig. 1.

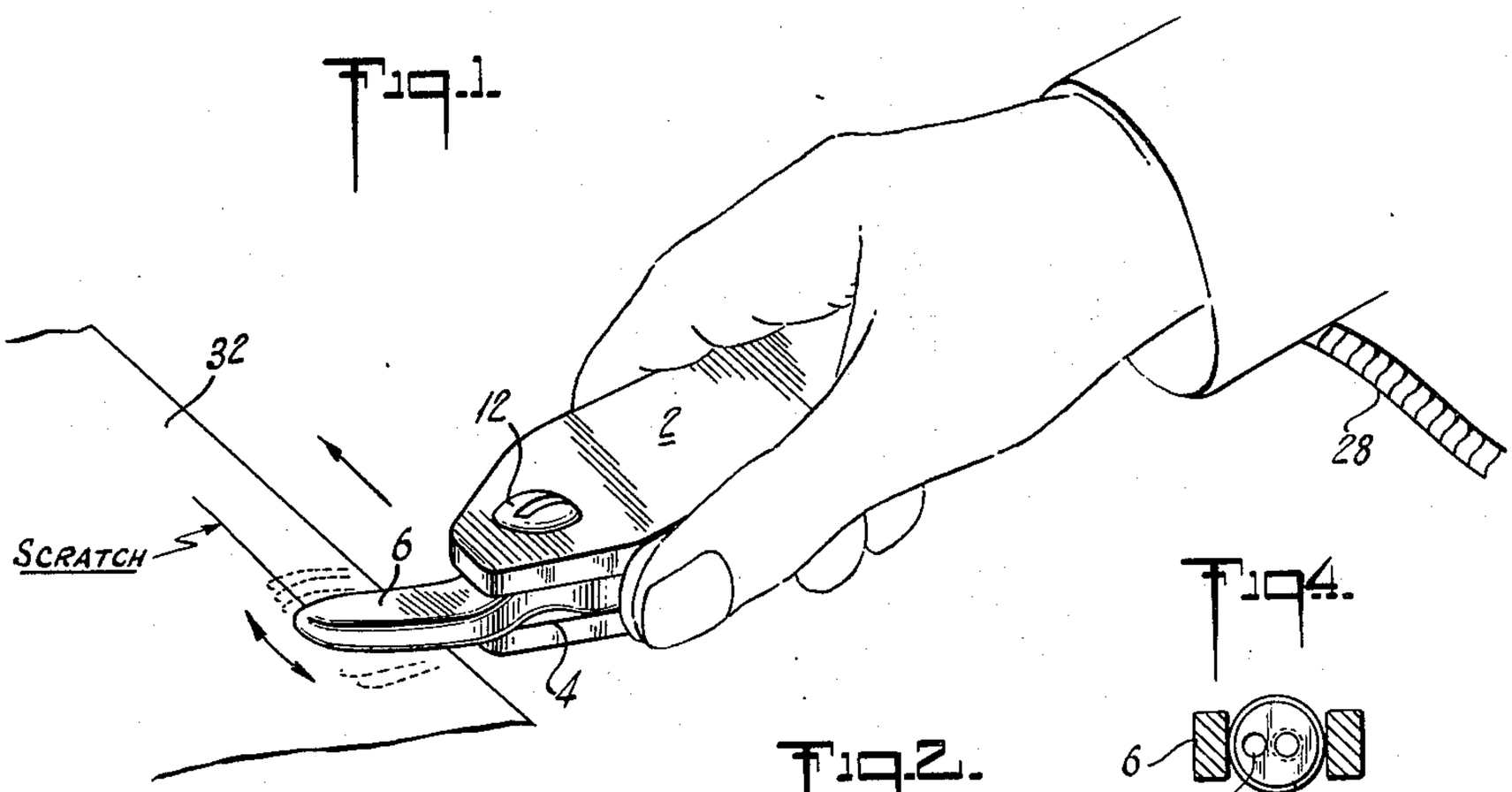


Fig. 4.

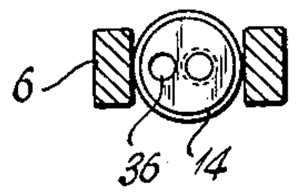


Fig. 2.

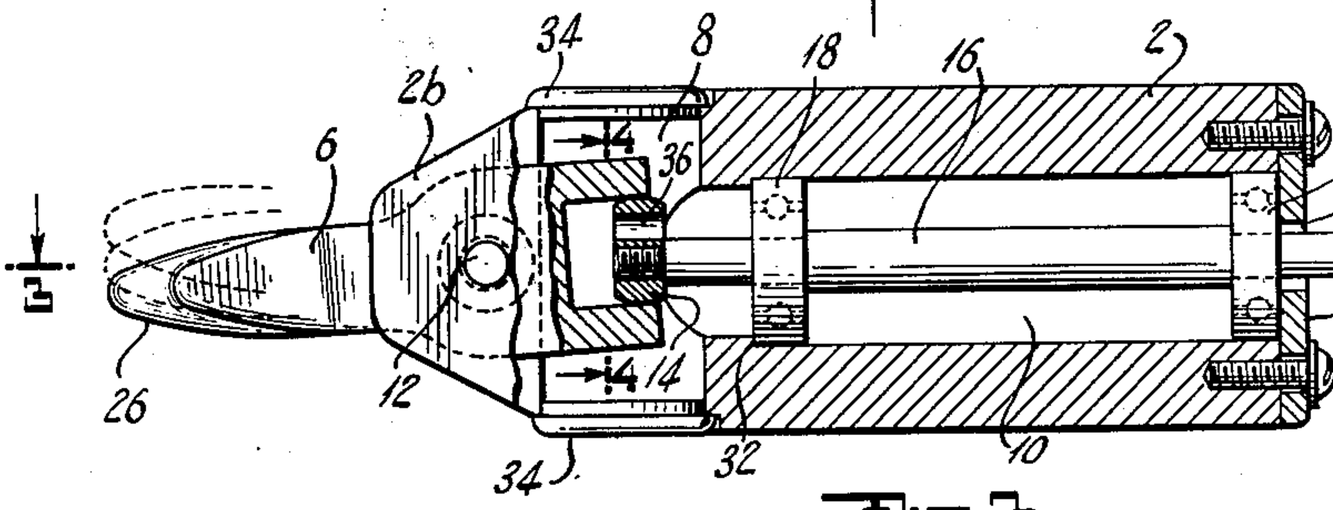


Fig. 3.

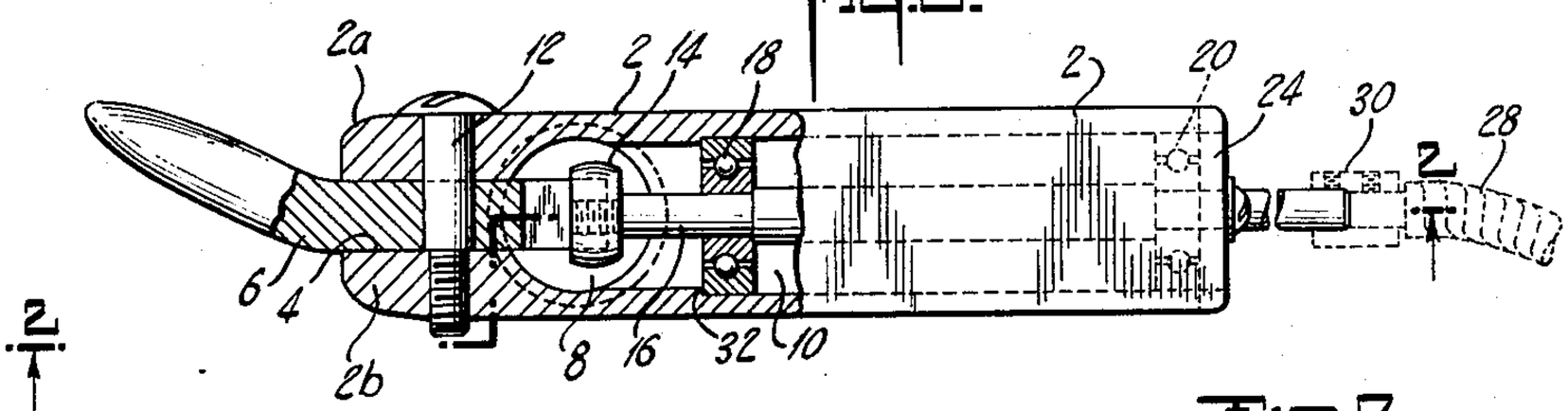


Fig. 5.

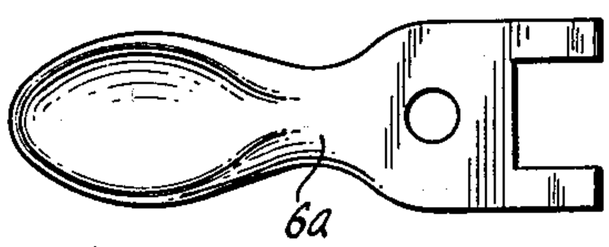


Fig. 7.

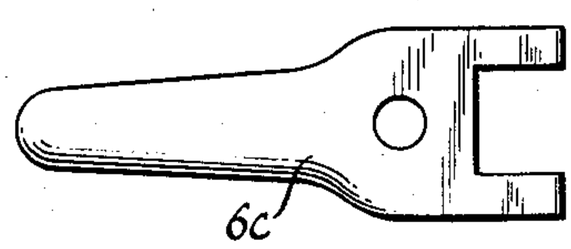
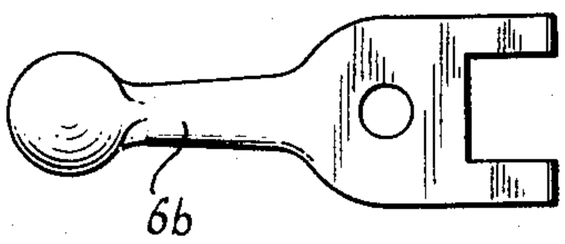


Fig. 6.



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2,653,375

TOOL

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3 Claims. (Cl. 29—90)

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The present invention relates to tools, more particularly to burnishing or polishing tools, and comprises a small portable power driven tool of this character which is of simple construction, may be readily manipulated by an operator, and is effective in operation. The new tool, while of general application, is of particular value in removing scratches or other imperfections from airplane wings or the like.

Briefly, the new tool comprises a vibratory member the operating end of which is preferably tongue-shaped and highly polished and the other end of which is bifurcated, and a rotatable cam or roller positioned between the furcations of the element for vibrating the same, the element being pivotally mounted within a holder and the cam being eccentrically mounted on a drive shaft adapted to be coupled to driving means therefor.

For a better understanding of the invention, reference may be had to the accompanying drawing, of which:

Fig. 1 is a perspective view showing a tool embodying the invention in use for removal of a scratch;

Fig. 2 is a longitudinal sectional view, partly in elevation, of the tool of Fig. 1, the view being taken on the line 2—2 of Fig. 3;

Fig. 3 is a longitudinal sectional view of the tool taken on the line 3—3 of Fig. 2;

Fig. 4 is a transverse sectional view of the tool of Fig. 1 taken on the line 4—4 of Fig. 2; and

Figs. 5, 6 and 7 are views illustrating alternative forms of work engaging elements.

The tool illustrated in the drawing includes a holder 2 of metal or the like which, in the particular embodiment of the invention illustrated in the drawing, is generally rectangular in cross-section, being formed from bar stock. One end of the holder 2 tapers in width and is provided with a transverse slot 4 for reception of a work engaging element 6. The slot 4 communicates with a transverse cylindrical passage or chamber 8 which in turn intercepts a longitudinal cylindrical chamber 10 extending from the chamber 8 to the other end of the holder. The tapered portions of the holder above and below the slot 4 are indicated in the drawing by the reference characters 2*a* and 2*b*, respectively. Extending through smooth bored holes in the portion 2*a* and in the element 6, and threaded into the portion 2*b*, is a pivot screw 12 for the element 6.

The element 6 extends into the chamber 8 and is cut away for a portion of its width to provide furcations which span a roller 14. Roller 14 has a threaded eccentric hole therein by means

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of which it is mounted on the threaded end of a shaft 16 journaled in bearings 18 and 20 in the chamber 10. The other end of the shaft 16 extends through a centrally disposed opening 22 in a cover plate 24 screw-threadedly mounted on the end of the holder.

The end of element 6 projecting from the holder is adapted for operative engagement with the work material to be smoothed or polished. In the embodiment of the invention illustrated in Figs. 1, 2 and 3, the operating end of the element 6 is bent up through a small angle from the plane of the part within the holder, and is generally tongue-shaped with rounded edges and tapering work engaging tip. The forward end of the element 6 is rounded and highly polished over a substantial area. In Fig. 2, in which the underside of the element is shown in elevation, the highly polished area thereof is indicated by the reference numeral 26.

Alternative shapes of work engaging elements adapted for mounting in the holder 2 are shown in Figs. 5, 6 and 7. The element 6*a* of Fig. 5 is spoon-shaped and highly polished at the edges and on the under surface of the bowl portion. The element 6*b* of Fig. 6 is formed with a highly polished ball at the work engaging end. In Fig. 7 is shown an element 6*c* having a straight slightly tapering work engaging end, the side edges of which are rounded and polished. The radius of curvature of the side edges of element 6*c* is less than that of the side edges of element 6 of the embodiment of the invention illustrated in Figs. 1 to 3, which in turn is less than the radius of the ball tip of element 6*b* of Fig. 6.

When the shaft 16 of the above described tool is rotated about its axis, as by means of a flexible drive shaft 28 connected thereto by a coupling 30, rapid vibration is imparted to the work engaging element by the eccentric rotation of the roller 14 between the furcations of the element. The polished under surface of the element may then be pressed against the surface to be smoothed and the tool moved laterally along the surface by the operator. In Fig. 1 the tool is shown as held in the hand of an operator with the under surface of the element 6 in engagement with a work surface 32 for removal of a scratch therein. Vibration of the element 6 is indicated in Fig. 1 by the outlines thereof in dotted lines and by the double-headed arrow. Translation of the tool by the operation for removal of the sratch is indicated by the single-headed arrow.

The tool may be readily assembled and disassembled. The shaft 16 is preferably turned down to a smaller diameter for a short length

at each end to provide shoulders thereon for abutment with the bearings 18 and 20 which may thus be slipped onto the shaft from opposite ends, bearing 18 being mounted on the shaft before threading of the roller 14 to the shaft. The shaft carrying the cam roller and bearing is then introduced into the chamber 10 and bearing 18 brought into engagement with a shoulder 32 formed in the wall of the chamber. The roller 14 is thereby introduced into the passage 8 in position for engagement with the furcations of the work engaging element, which latter may have been previously inserted into the slot 4 or may be inserted into the slot after introduction into the holder of the shaft and parts carried thereby. Preferably a lubricant such as grease is introduced into the chamber 8 for facilitating pivotal movement of the work engaging element and for reducing abrasion and wear of the inner walls of the furcations thereof and of the roller 14. The ends of chamber 8 are sealed by suitable compression caps 34. For dynamic stability the roller 14 preferably has a weight relieving hole 36 therein. The shaft, roller and the work engaging element are preferably all of hardened and drawn steel. The holder 2 may be of aluminimum or other light but strong material.

From the foregoing description it will be apparent that the invention provides a handy and efficient tool and one that can be economically manufactured and easily assembled. The convenient holder enclosing all of the parts except the vibrating end of the work engaging element permits the operator readily to present the polished surface of the element to the work piece to be burnished and to manipulate the tip thereon. The construction permits ready substitution of work engaging elements of different shape and the rugged construction of the parts insures long useful life of the tool. Obviously various changes in the particular construction illustrated and described could be made without departing from the spirit of the invention or the scope of the accompanying claims.

I claim:

1. A power driven burnishing tool comprising in combination a holder adapted to be held in the hand of an operator, said holder having a longitudinal cylindrical chamber therein extending from one end of the holder and communicating at its other end with a transverse slot formed in the other end of the holder, a rotatable shaft journaled in said chamber, a disk eccentrically mounted on said shaft for rotation thereby, an element bifurcated at one end and polished at its other end for vibratory engagement with a work piece to be burnished, and means for pivotally mounting said element in said slot with the furcations thereof embracing said disk with the polished end extending freely beyond the holder whereby rotation of said shaft causes said element to oscillate about its pivotal mounting, the part of said element extending from the holder being bent away from the plane of the part thereof within the holder, and being generally tongue-shaped with a tapering extremity highly polished over a substantial area, the edges and tip being rounded.

2. A power driven burnishing tool comprising in combination a holder adapted to be held in the hand of an operator, said holder having a longitudinal cylindrical chamber therein extending from one end of the holder and communicating at its other end with a transverse slot formed in the other end of the holder, a rotatable shaft journaled in said chamber, a disk eccentrically mounted on said shaft for rotation thereby, an element bifurcated at one end and polished at its other end for vibratory engagement with a work piece to be burnished, and means for pivotally mounting said element in said slot with the furcations thereof embracing said disk with the polished end extending freely beyond the holder whereby rotation of said shaft causes said element to oscillate about its pivotal mounting, the working end of said element being generally bowl-shaped.

3. A power driven burnishing tool comprising in combination a rigid walled holder adapted to be held in the hand of an operator, said holder being formed with intersecting transverse and longitudinal chambers and with a transverse slot at one end, said slot communicating with said transverse chamber and said longitudinal chamber extending from the other end of the holder into the transverse chamber, a rotatable shaft journaled in said longitudinal chamber and extending into said transverse chamber, a disk in said transverse chamber eccentrically mounted on said shaft for rotation thereby, an element bifurcated at one end and polished at its other end for vibratory engagement with the work-piece pivotally and removably mounted in said slot with the furcations thereof extending into said transverse chamber and embracing said disk, the polished end of the element extending freely beyond the end of the holder and removable closure members for the ends of said transverse chamber for permitting introduction of lubricant into the transverse chamber.

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