April 5, 1932. A. J. BRICKNER 1,852,834

CYLINDER LAP

Filed June 18, 1928

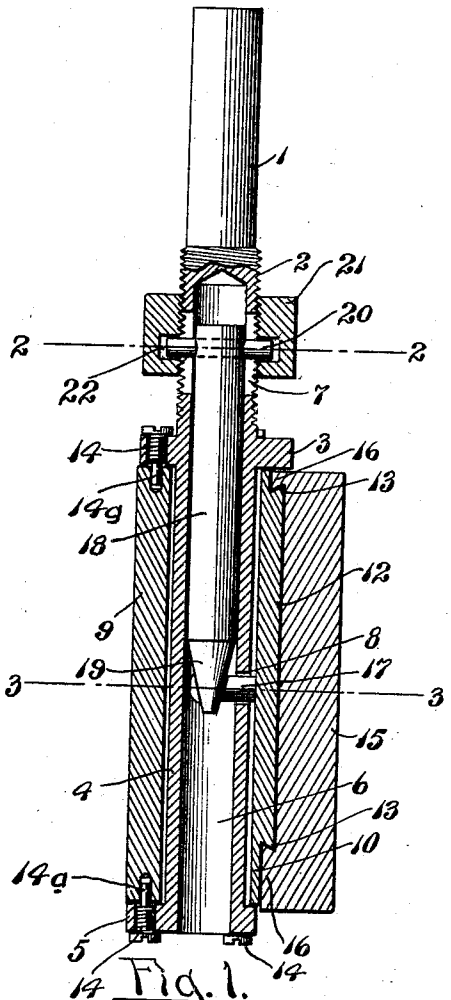

Fig. 1.

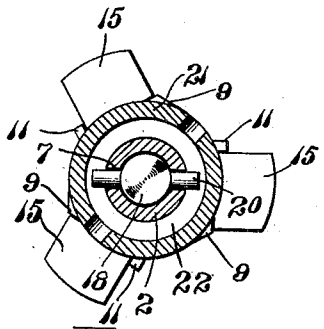

Fig. 2.

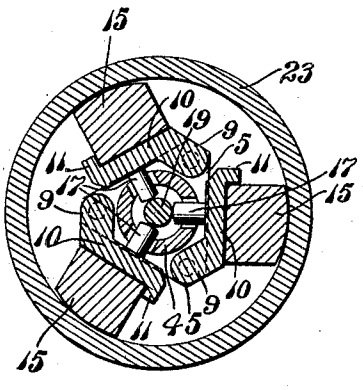

Fig. 3.

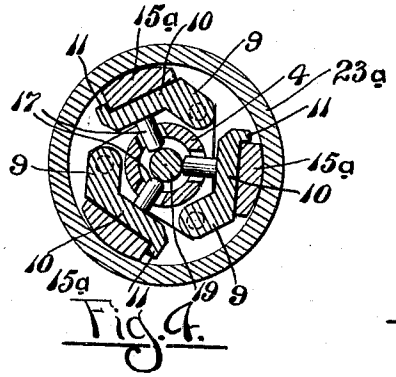

Fig. 4.

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UNITED STATES PATENT OFFICE

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CYLINDER LAP

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This invention relates to a cylinder lapping tool particularly designed for lapping and honing the inner walls of cylinders. It is an object and purpose of the present invention to provide a tool of the character stated which may be operated within a cylinder so as to remove the necessarily small amount of metal from the cylinder walls required to properly receive a piston to be fitted therein, and to finish the walls smoothly, evenly and uniformly, the tool being provided with easily operated means for spreading the parts which engage against the inner walls of the cylinder whenever it is desirable or necessary for the purpose of bringing the tool into engagement with the cylinder walls or for removing a greater amount of material from said walls. The invention consists in a novel organization for attaining the ends stated, as well as others not at this time specifically enumerated, but which will appear when understanding is had of the invention from the following description taken in connection with the accompanying drawings, in which,

Fig. 1 is a longitudinal vertical section through the cylinder lap of my invention.

Fig. 2 is a horizontal section substantially on the plane of line 2—2 of Fig. 1.

Fig. 3 is a similar horizontal section substantially on the plane of line 3—3 of Fig. 1, illustrating the tool as located within a cylinder, also shown in horizontal section, and

Fig. 4 is a section similar to that shown in Fig. 3, wherein the same tool is used in conjunction with a smaller diameter of cylinder.

Like reference characters refer to like parts in the different figures of the drawings.

In the construction a vertical spindle 1 is provided which may be connected with any suitable driving shaft. The upper end or shank of the spindle is solid. A distance below its upper end it is provided with an exteriorly threaded section 2 which, preferably, is threaded with a left-hand thread, at the lower end of which is an outwardly extending annular collar 3. The spindle below the collar 3 is of uniform diameter, as indicated at 4, until its lower end is reached where it is equipped with a plurality of radially extending lugs 5 all lying in the same horizontal plane and directly below the collar 3. From the lower end of the spindle to and nearly through the threaded section 2 thereof a cylindrical opening 6 is bored or otherwise provided and diametrically opposed slots 7 are cut through the sides of the threaded section 2 from the outer side thereof to the inner opening 6, as shown. Also the lower section 4 of the spindle, substantially midway between its ends, has a plurality of spaced apart openings 8 made through its sides which preferably lie in the same horizontal plane, the purpose of which will later appear.

Between the lower ends 5 and the upper collar 3 a plurality of lap carrying members 9 are pivotally mounted to turn about vertical axes, each of said members having a section 10 extending from the pivoted end portion 9 at an obtuse angle thereto and terminating at its free edge in a lip 11, as shown. The plurality of lap carrying members substantially surround the hollow portion 4 of the spindle.

Each of the sections 10 is thickened a short distance below its upper end and nearly to its lower end, as indicated at 12, the ends of the thickened portion being undercut to make dovetailed guides 13 at both the upper and lower ends of the thickened portions 12. The lap carrying members are pivotally mounted to turn about vertical axes between the ears 5 and the collar 3 by means of suitable screws 14 threaded therethrough and having pins 14*a* at their ends which are received in suitable sockets in the ends of the members 9. On the outer face of each of the sections 10 a lap member 15 of any suitable material is adapted to be detachably carried. The member 15 may be of steel, iron, brass or of stone of different degrees of hardness. It is cut away at its inner side leaving dovetailed guiding portions 16 at each end adapted to slide under the dovetailed guides 13 until an edge of the lap member 15 comes against a lip 11 on the lap carrying member. The outer surfaces of the members 15 are of curved form having a radius of curvature somewhat less than the radius of curvature

of the cylinder in which the tool is to be used. A horizontal pin 17 is permanently secured to each of the lap carrying members at the inner side of the section 10 thereof, and passes through an opening 8 into the opening 6 made lengthwise of the lower end portion of the spindle.

A cylindrical rod 18 is mounted in the opening 6 in the spindle for free movement lengthwise thereof, at its lower end having a downwardly tapered or conical shaped head, as indicated at 19, against which the inner ends of the pins 17 bear. A rod 20 passes horizontally through the slots 7. A nut 21 is threaded onto the threaded section 2 of the spindle and has a continuous annular groove 22 at its inner side into which the ends of the rod 20 extend. It is evident that by turning the nut 21 so as to move it back and forth on the threaded section 2 of the spindle the cylindrical rod 18 may be raised or lowered and the distance that the lap carrying members are moved outwardly away from the spindle portion 4 governed in this manner.

The lapping tool described may be introduced into a cylinder 23 with the outer surfaces of the lapping members 15 substantially in contact with the inner walls of the cylinder. Rotation of the tool in a clockwise direction (referring to Fig. 3) and with an operation of the nut 21 so as to move the members 15 farther outward, brings their outer surfaces against the inner walls of the cylinder to properly machine the same and hone the inner walls of said cylinder, removing small amounts of material until the exact desired size is reached. It is apparent, of course, with this tool that any of the abrasive materials, such as emery powder or the like, may be used in case the cylinder is of a metal requiring such materials. It is also apparent that with the spindle rotating in a clockwise direction, in order to move the lapping members 15 farther outwardly it is necessary merely to manually engage the nut 21 momentarily while the spindle is rotating holding it for a very short interval against rotation, whereupon the rod 18 will be moved downwardly a short distance and the lapping members 15 moved outwardly to properly engage the cylinder walls.

The detachable connection of the members 15 to the sections 10 of members 9 is desirable in order that lapping members of greater or less thickness may be applied to be used with cylinders of greater or less diameters. For instance in Fig. 4 the same tool is used in connection with a smaller diameter cylinder 23*a*, the only difference being that the thicker lapping members 15 are replaced by narrower ones 15*a*. The adjustment effected by the tapered head 19 engaging against the ends of the pins 17 is not one to take care of different diameters of cylinders but merely for entering the tool into a cylinder and adjusting it to fit the inner sides thereof, different diameters of cylinders being taken care of by means of different thicknesses of honing or lapping members 15 or 15*a*.

The construction described, while relatively simple, is very practical and efficient and has so proved in practice. Variations in detail of structure may be resorted to without departing from the invention which is defined in the appended claims and I, accordingly, consider myself entitled to all forms of structure coming within the scope of said claims.

I claim:

1. In a device of the class described, a spindle having an elongated axial opening therein, said spindle having an exteriorly threaded portion adjacent one end of said opening, and a vertical slot through a side thereof by said threaded portion, a plurality of lap carrying members pivotally mounted on and carried by said spindle at the outer sides thereof adjacent said threaded portion, said lap carrying members being mounted to swing about axes one located adjacent an edge of each of said members, a pin connected to each lap carrying member extending through said spindle to the interior opening therein, a rod having a tapered end located within said spindle adjacent the pins, the inner ends of the pins engaging against said tapered lower end, a nut threaded onto the threaded portion of said spindle having an annular groove at its inner side and a member extended from the rod through said slot in the spindle into the groove of said nut.

2. In a construction of the class described, a vertical spindle having an axial opening therein, said spindle having an exteriorly threaded portion and a vertical slot cut through said exteriorly threaded portion to the inner opening, a collar projected outwardly from said spindle at the lower end of the threaded portion, ears extending outwardly from the lower end of the spindle, a plurality of lap carrying members located vertically around the spindle between said collar and ears, means pivotally connecting the lap carrying members adjacent one edge thereof to said collar and ears, a pin extending inwardly from each of said lap carrying members through the spindle to the interior opening thereof, manually operable means mounted on the threaded portion to traverse the same, and means movably mounted within said spindle engaging with said pins at one end and having means at its opposite end passed through said slot to engage with said manually operable means whereby the lap carrying members may be adjusted about their vertical axes with respect to said spindle.

3. In a device of the class described, a ver-

tical spindle having an elongated axial opening therein, said spindle having an exteriorly threaded portion adjacent the upper end of said opening and a vertical slot through a side thereof through said threaded portion, a plurality of lap carrying members pivotally mounted on said spindle at the outer side thereof below said threaded portion, said lap carrying members being mounted to swing about vertical axes, a pin connected to each lap carrying member extending through said spindle to the interior opening therein, a rod having a tapered lower end located within said spindle above the pins, the inner ends of the pins engaging against said tapered lower end of the rod, a nut threaded onto the threaded portion of said spindle and means extending through said slot in the spindle and engageable with said rod and said nut for moving said rod by actuation of said nut.

In testimony whereof I affix my signature.

ARTHUR J. BRICKNER.