No. 635,346. Patented Oct. 24, 1899.

R. S. PAPPRILL.

TOOL FOR ABRASIVE PURPOSES.

(Application filed Feb. 8, 1899.)

(No Model.) 3 Sheets—Sheet 1.

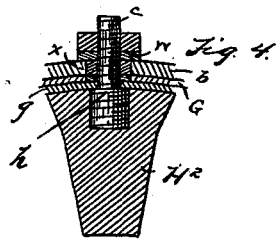

Fig. 4.

Fig. 1.

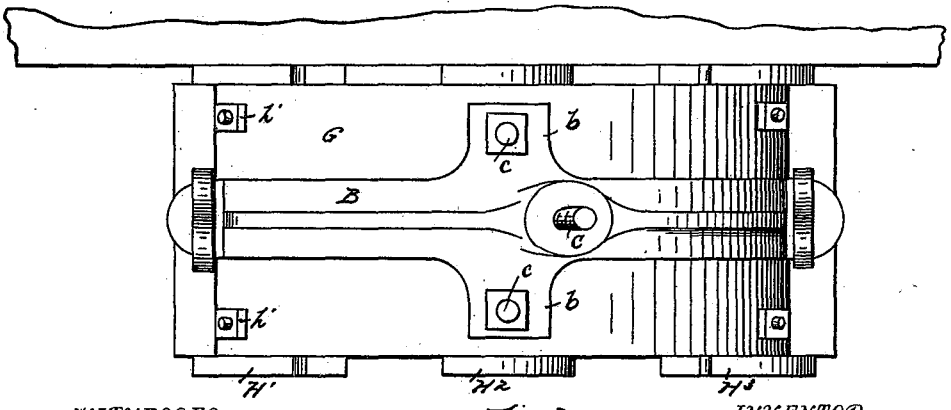

Fig. 2.

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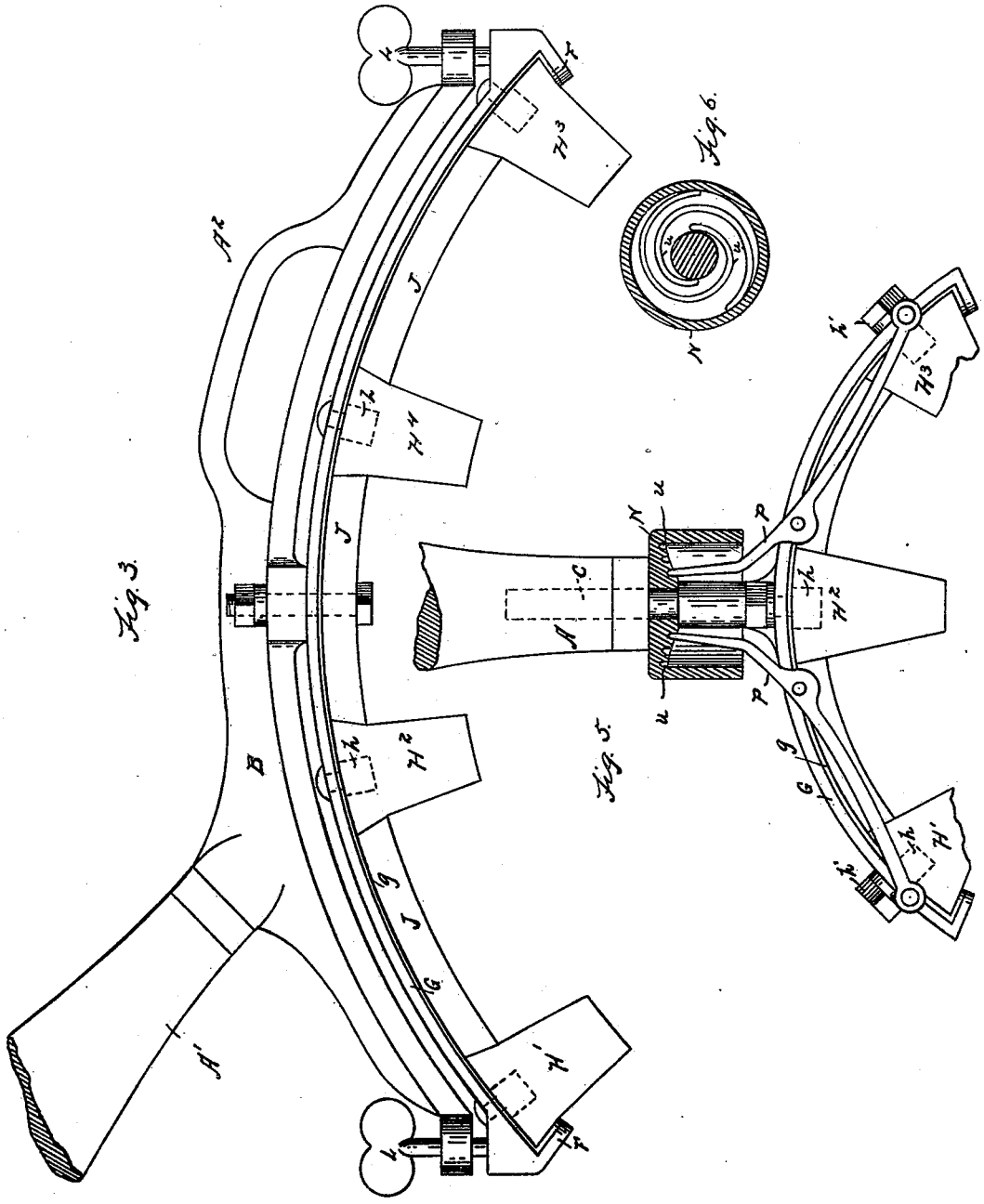

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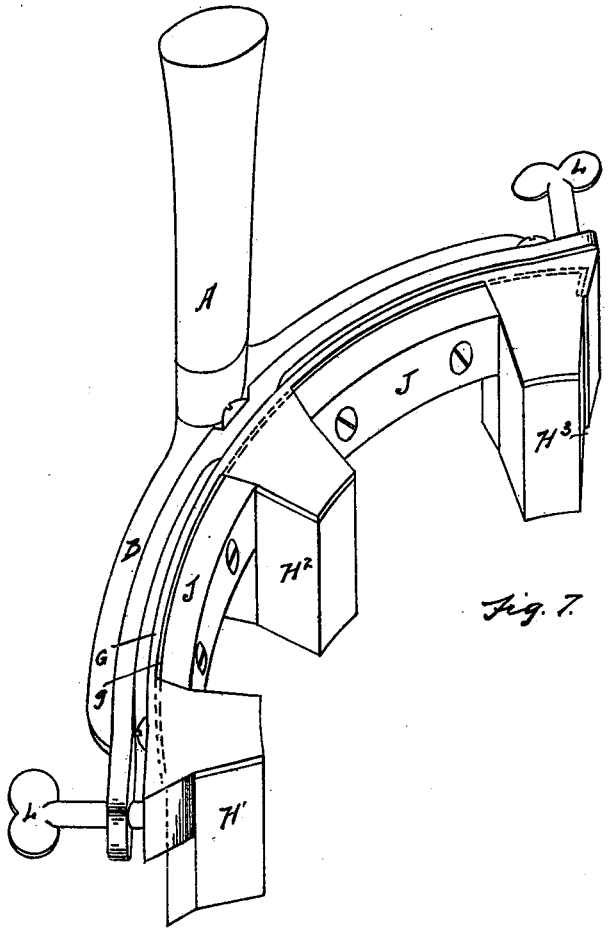

Fig. 7.

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UNITED STATES PATENT OFFICE.

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TOOL FOR ABRASIVE PURPOSES.

SPECIFICATION forming part of Letters Patent No. 635,346, dated October 24, 1899.

Application filed February 8, 1899. Serial No. 704,897. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH S. PAPPRILL, a subject of the Queen of Great Britain, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Tools for Abrasive Purposes; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to tools for grinding cylindrical and other surfaces, and has for its object a tool which may be used to grind or true up revolving cylindrical surfaces by employing the tool while the cylinder is rotating. It is especially useful in truing up and keeping true the commutators of motors and dynamos.

The commutators of motors and dynamos of the style now in common use throughout the country become through use and the action of the current irregular and out of true as cylinders or disk circles by wearing away of those parts of the commutator-segments that come under the abrading action, the brushes, and the tearing effect of sparking. The difficulty consists not only in the destruction of the copper segments of the commutator, but also in the embedding of small particles of copper in the insulating non-metallic material between the segments, thereby establishing a complete or partial short circuit between different segments composing the commutator. This difficulty is caused by embedding small particles of copper in the insulating non-metallic part of the commutator so closely that they eventually form a continuous metallic band across the insulating-space, allowing the flow of a current between two contiguous sections of the commutator. This trouble is so common that it becomes necessary to dress off the commutator quite frequently, and this is generally done by using an abrading material or tool—such as sandpaper, emery-paper, or a file—which is held against the surface of the commutator while it is in motion. In course of time commutators thus treated become more and more irregular and out of true, and it finally becomes necessary to remove the commutator and turn it off in a lathe. The tool which is the subject of this invention can be employed at any time while the commutator is running and without requiring other motive power applied to the motor or dynamo than that which is used to produce its ordinary motion, and the work of the tool is such that not only is the trouble spoken of removed, but the commutator continues truly cylindrical and need never be removed until so much has been cut away that it may be considered worn out.

In principle the tool consists of a number of abrading-blocks or grinding-blocks, which are arranged to be held with their grinding-faces in proper position to do the desired work. If the tool is used to true up a cylinder, the grinding-faces are held in the arc of a circle of which the center is at the center of the commutator or cylinder. The tool thus constructed can be employed in such a way that one abrading-block steadies another, and thus produces that accuracy in holding the tool up to its work which is necessary to produce the true cylindrical surface desired in the commutator.

In the drawings, Figure 1 is a side view of the tool, and in this figure the tool is shown as applied to the commutator. Fig. 2 is a plan view of the tool. The position of the commutator beneath the tool is indicated in this figure also. Fig. 3 is a side elevation of a tool of a larger size and having an arrangement for the use of both hands in holding it. Fig. 4 is a cross-section of one of the abrading-blocks. Fig. 5 is a side elevation, partly in section, and shows a means for changing the radius of the inner arc passing through the inner faces of the abrading-blocks that differs from the means for producing such adjustment shown in Figs. 1, 2, and 3. Fig. 6 is a cross-section at the line x x of Fig. 5. Fig. 7 shows a form of the tool in which the handle is arranged parallel with the long axis of the cutting-block.

The handle of the tool is indicated at A, and in the handle A is inserted a tang C of a fork B. At each end of the fork B is a screw-threaded hole, through which engages a winged screw L. Midway between the ends and at each side of the fork is a lug b, provided with a hole for the engagement there-

through of a holding-bolt *c*. The abrading-blocks are held to the fork mediately in the following way:

G indicates a strip of flexible material, not only flexible but resilient. The flexible strip G is bent to a curvature approximating to a curve concentric with the cylinder that the tool is to be employed upon. Along the inner face of the strip G the ends of the strip G are bent sharply inward, so that the terminals F lie approximately along radii of the circle in the arc of which the strip G is bent. The amount of the bend is not, however, important, provided only it is sufficient to produce the requisite holding-seat for one face of the abrading-block hereinafter referred to. On the inside of the curve of the strip G is placed a strip *g* of insulating material. A number of abrading-blocks are seated. The two outer abrading-blocks H′ and H³ are turned against the inturned terminals of the insulating-strip *g*. Another abrading-block is placed intermediate the extreme, (or there may be more than one intermediate block.) Each of the blocks H′, &c., is provided with a holding-screw *h*, partially embedded in it and having a projecting screw-threaded tang which engages through the strips G *g* and is held to the strips by a nut *h*′, which is run onto the projecting end of the screw *h*. The intermediate abrading-block (or blocks) is spaced from the end blocks by spacing-blocks J, of insulating material, and these spacing-blocks are held in place by small screws *k*, that pass through the strips G *g* into the blocks J. The blocks J nearly fill the space between the abrading-blocks H′, &c.; but they are, however, enough shorter than the space they are set into to allow the requisite variation or adjustment of curvature of the strips G *g*. At the end of the strip G are abutments against which the ends of the set-screws engage.

In the larger form of tool shown in Fig. 3 the handle A′ instead of being shown in the forks midway between their ends is at one side of the middle point, and at the other side of the middle point, between the ends of the forks, is a second handle A^2, as shown in the drawings. This second handle has the form of a loop or ear, and the grip part of the handle lies substantially parallel with the body of the prongs of the fork. The form or shape of either handle is not material either to the invention or to the usefulness of the tool.

In Fig. 5 a different means of adjusting the curvature to the holding-strips is shown. In the form of tool shown in this figure the pressure is produced by changing the position of the end of a lever which bears against the fixed part of the handle A and against a fixed point on the strip. Levers P P are secured by pins or joined connections to the strips at points that are approximately at equal distance at either side of the middle line. The free ends of the levers P engage in a scroll groove *u*, that is cut in the face of a rotatable washer N. The washer being on the tang of the tool, the rotation of the washer changes the position of the free ends of the lever P P and adjusts the strip G.

The abrading-blocks H′, &c., are composed of any suitable abrading material—such as corundum, emery, crushed quartz, or even sometimes sharp sand—and such material is generally a poor conductor of electricity, so that the insulating-strip *g* might be omitted and the tool still do its work. Such a tool without an insulating-strip would be just as efficient for abrading purposes as a tool which is provided with an insulating-strip; but the insulating-strip is interposed as a measure of precaution, and the bolt or screw *h*, one part of which is sunk into the abrading-block, should also be insulated from the part G by means of proper bushings and washers, as indicated at *w* and *x* in Fig. 4.

In using the tool selection is made of one that has a curvature approximately right for the cylindrical surface which is to be treated, and the curvature is adjusted by means of screws until the proper curvature is attained. The tool is held against the revolving commutator until the defects of the armature are cured. In the course of time the blocks wear away, as they are generally purposely made quite soft, and as they wear away and as the commutator-cylinder becomes smaller the tool is readjusted from time to time to meet the changed conditions.

What I claim is—

1. In a tool for grinding cylindrical and other surfaces, the combination of a plurality of abrading-blocks, and a flexible strip on which said abrading-blocks are mounted, substantially as described.

2. In a tool for grinding cylindrical and other surfaces, the combination of abrading-blocks, a flexible strip on which said abrading-blocks are held, means for holding the flexible strip and means for adjusting the curvature thereof, substantially as described.

3. In a tool for grinding cylindrical and other surfaces, the combination of abrading-blocks, spacing-blocks located between adjacent abrading-blocks, a flexible strip adapted to be bent, and means for producing a curvature of said strip, substantially as described.

4. In a tool for grinding cylindrical and other surfaces, the combination of a flexible strip, abrading-blocks held thereto, means for insulating the blocks, from the strip, and from each other, and means for adjusting the flexible strip to a desired curvature, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

RUDOLPH S. PAPPRILL.

Witnesses:
J. N. GOODRICH,
MARION A. REEVE.