April 23, 1940. E. W. HALL 2,198,282

ABRADING OR POLISHING TOOL

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Fig. 1.

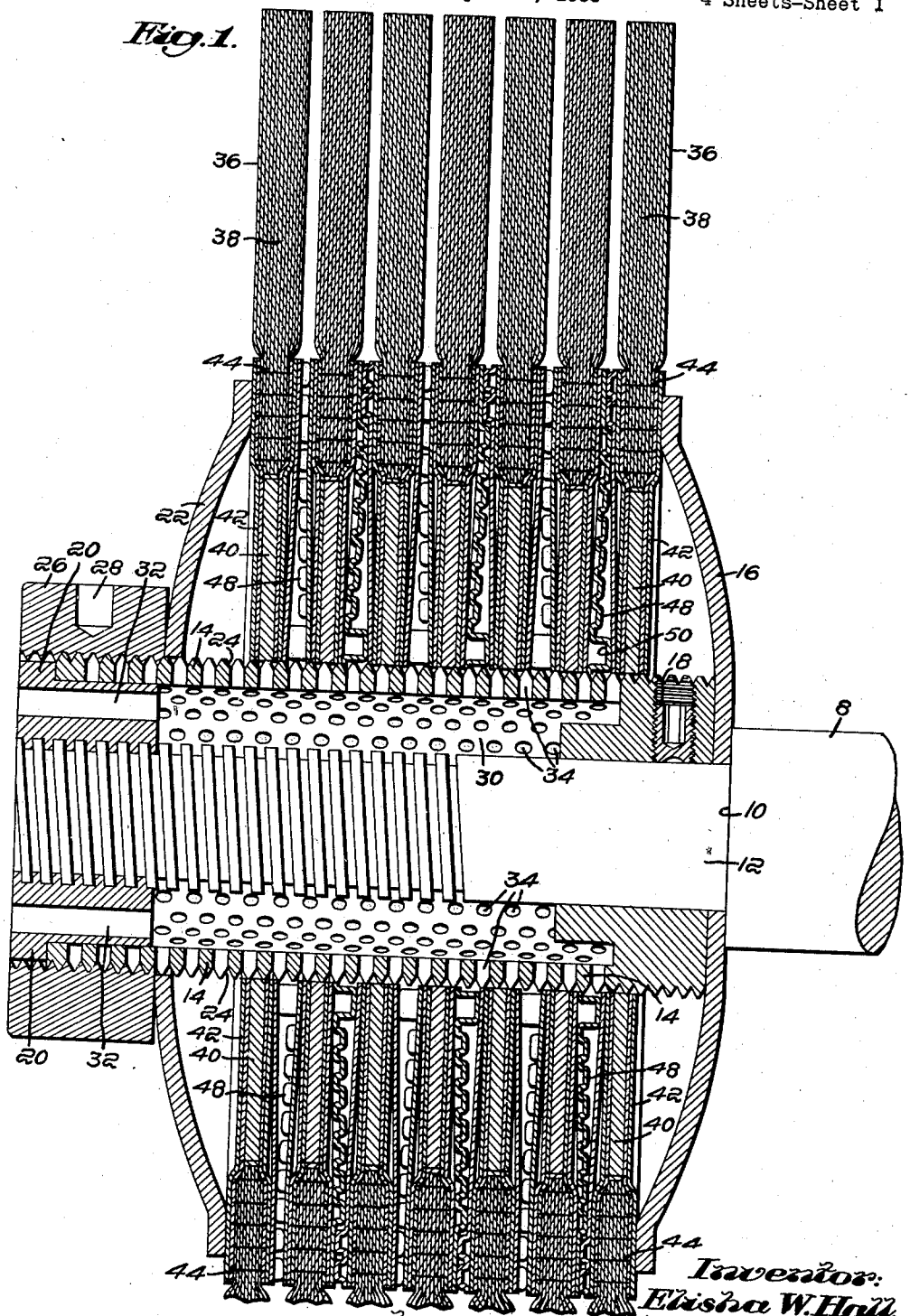

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Fig. 2.

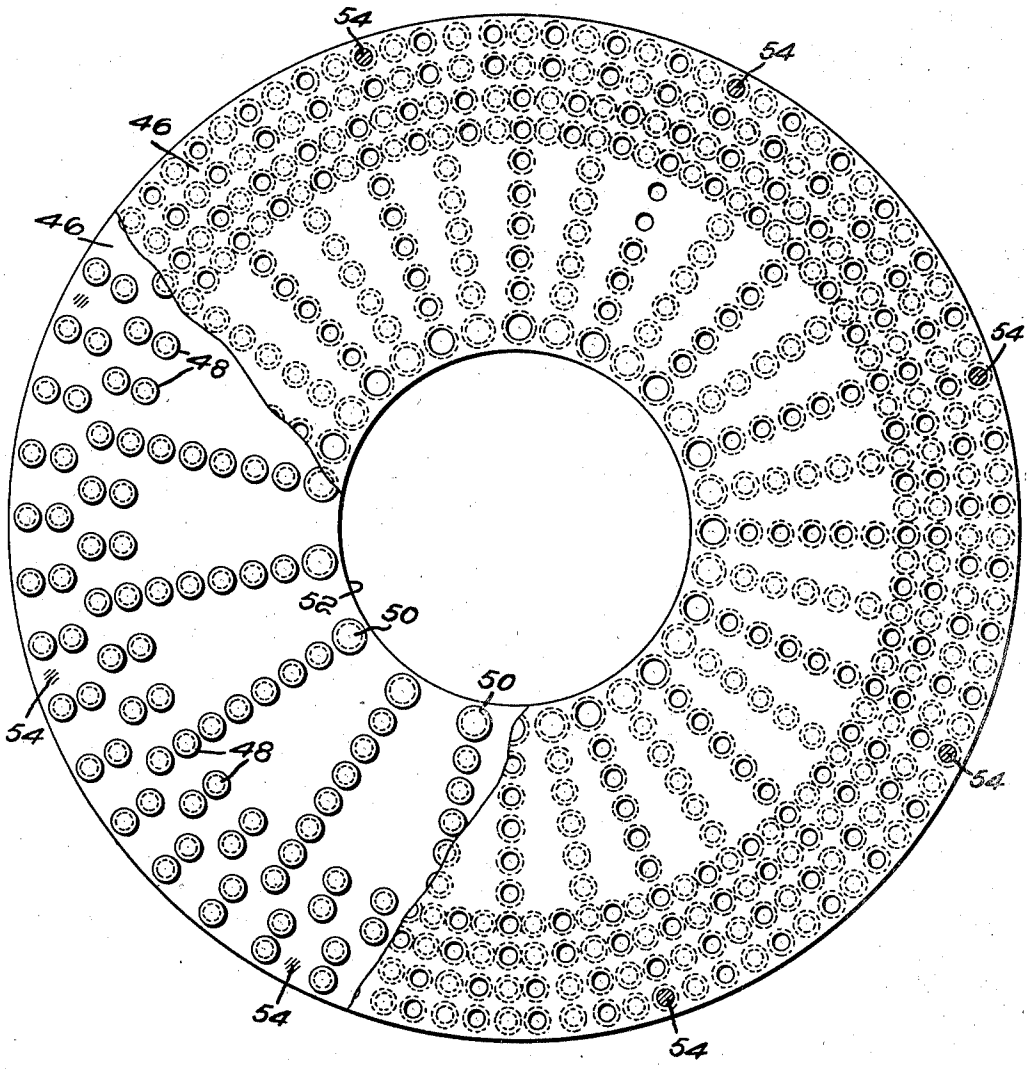

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Fig. 3.

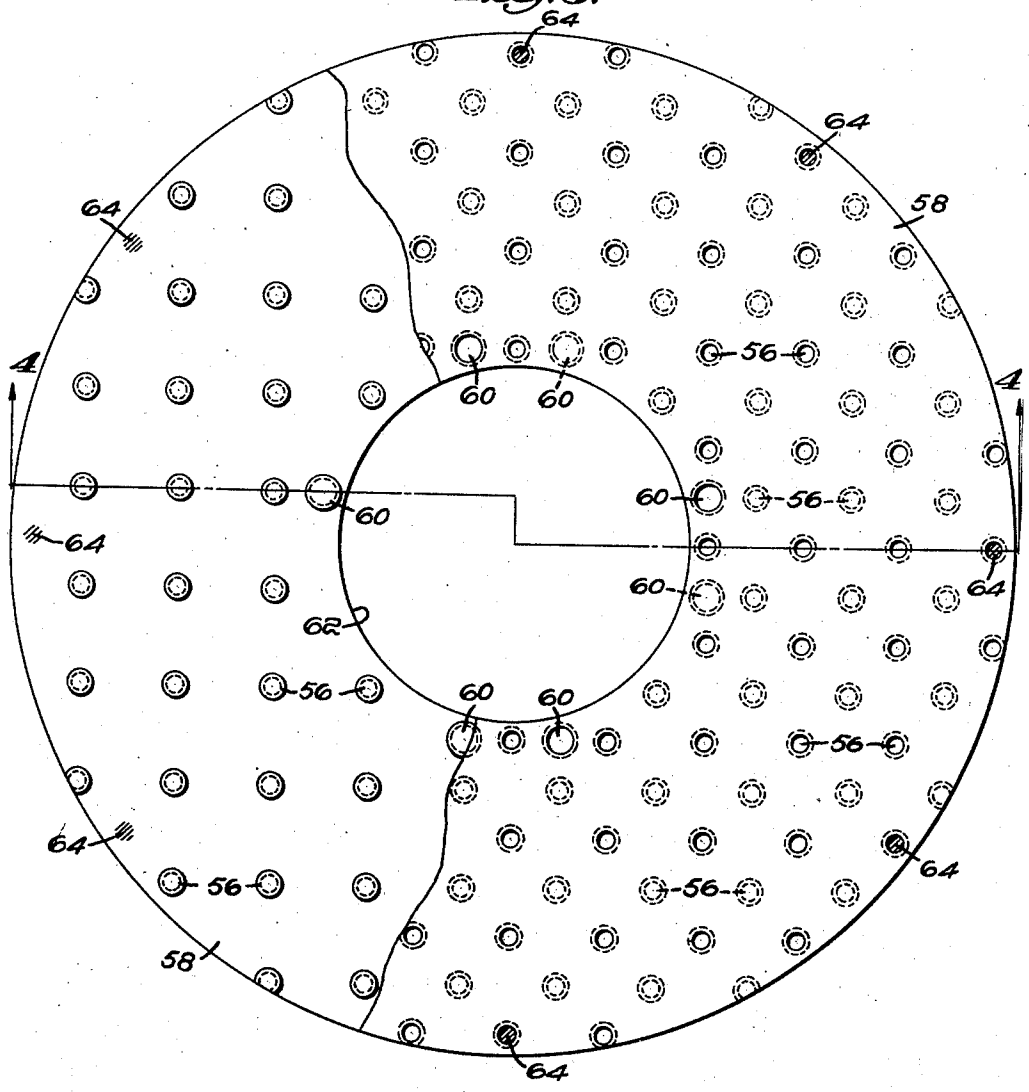

Fig. 4.

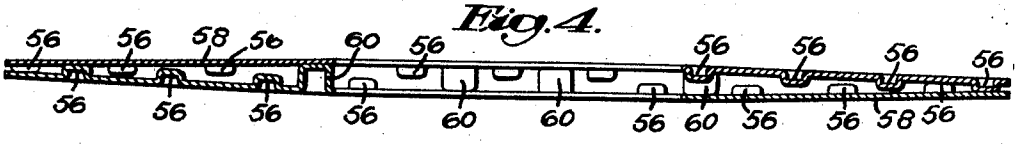

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Fig. 5.

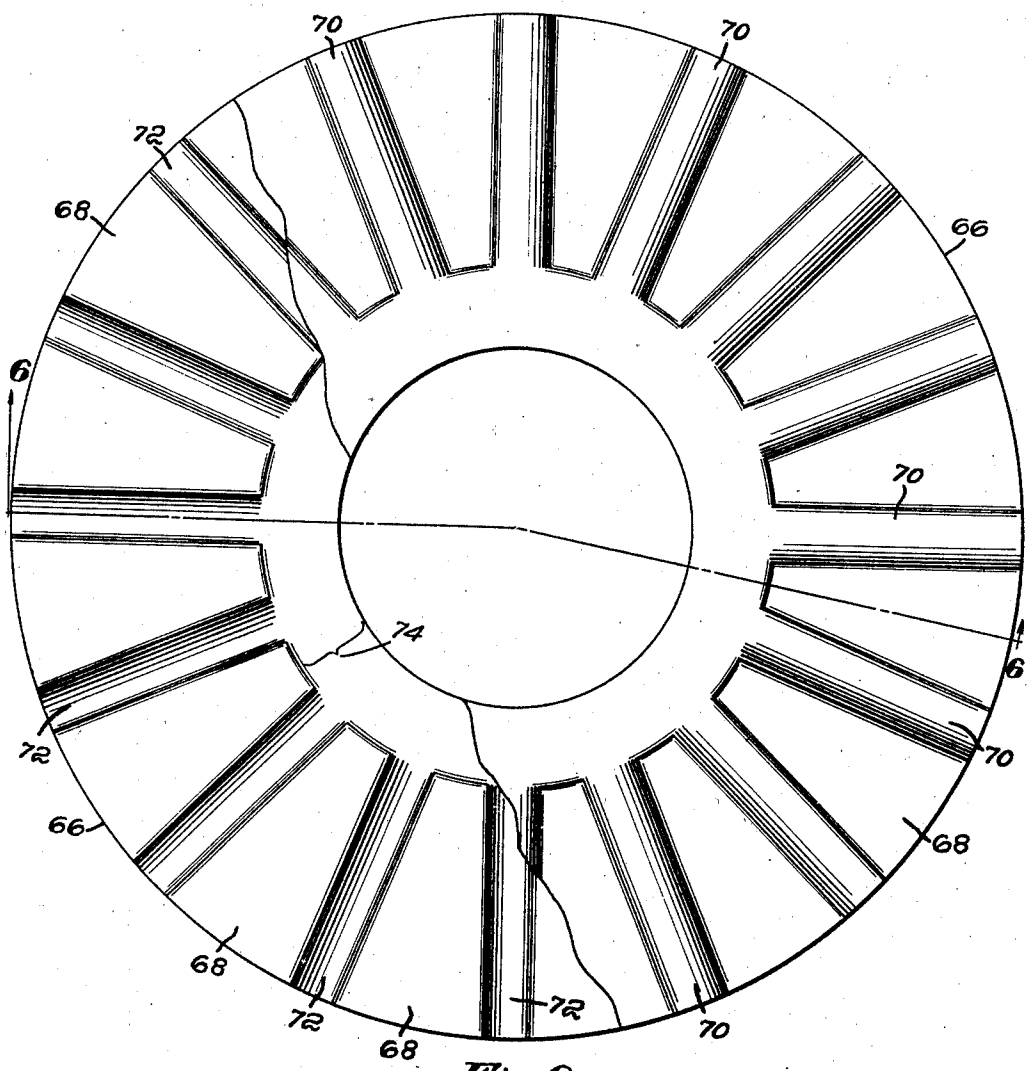
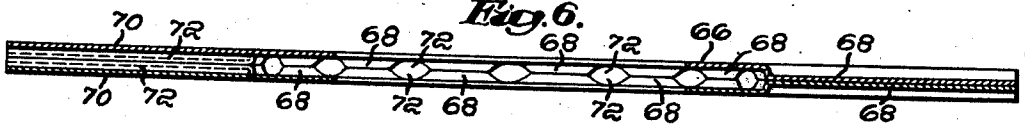


Fig. 6.



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UNITED STATES PATENT OFFICE

2,198,282

ABRADING OR POLISHING TOOL

Elisha W. Hall, Scituate, Mass.

Application April 8, 1938, Serial No. 200,888

1 Claim. (Cl. 51—193)

This invention relates to flexible, rotary cylinder tools intended for abrading and polishing, although it is possible that it might be applicable to brushing, scrubbing and general cleaning. Implements of this class are sometimes rotated at high speed, and when the tool is of large diameter so that the linear speed is high, considerable heat is generated and should be dissipated rapidly to avoid charring of the fabric buffing or polishing material. In such cases, internal cooling of the implement can be effected by conducting air into the implement as by a hollow shaft or by an appropriate hollow support secured to a solid shaft, the latter arrangement being shown herein by way of example.

In any case, air is delivered by the hollow body to spaces in or between buffing or polishing sections by centrifugal force, and is discharged at the periphery of the tool. Heretofore, it has been found difficult to maintain these spaces when great axial pressure is applied to the wheel sections to prevent them from turning with relation to one another and to the support to which they are secured.

The present invention is concerned with a tool of this class in which the maintenance of spaces between the sections is assured by spacers whose construction is such that it is practically impossible to reduce the spaces by the clamping pressure, even if the latter greatly exceeds that which is necessary to hold the sections securely.

The invention will best be understood by reference to the following description when taken in connection with the accompanying drawings illustrating several variations of the invention, while its scope will be pointed out more particularly in the appended claim.

In the drawings:

Fig. 1 is a central, longitudinal, sectional view of a tool embodying the invention;

Fig. 2 is an elevation of one of the spacers shown in section in Fig. 1;

Fig. 3 is an elevation of a second form of spacer;

Fig. 4 is a sectional view on line 4—4 of Fig. 3;

Fig. 5 is an elevation of a third form of spacer; and

Fig. 6 is a sectional view on line 6—6 of Fig. 5.

Referring to the drawings and to the embodiments of the invention illustrated therein by way of example, and having reference at first to Fig. 1, there is shown a tool comprising a shaft or spindle 8 having a shoulder 10 and a reduced portion 12, the latter being threaded as usual. As already indicated, sometimes the shaft itself is hollow and has one or more openings delivering air outwardly to the wheel sections. Sometimes the wheel structure itself is hollow and air is taken axially into the wheel structure and is delivered thence to the periphery. Sometimes, also, as in U. S. Letters Patent No. 2,094,650 issued to me October 5, 1937, the shaft or spindle itself is modified by the addition of a hollow sleeve forming no part of the wheel structure but constituting essentially a part of the shaft or spindle and always remaining attached thereto when once applied. The latter arrangement is the one illustrated herein by way of example.

The shaft or spindle is modified by the addition of a sleeve 14 which when slipped onto the reduced portion 12 and secured thereto becomes a part of the resulting spindle assembly. An inner clamping plate 16 is first slipped onto the reduced portion and placed against the shoulder 10, after which the sleeve follows and is appropriately secured in place, thus also securing the clamping plate in place. In the present example, there are two securing means, either of which may be employed to the exclusion of the other as in the aforesaid patent. One of these means is a set screw 18 and the other is a nut 20 threaded onto the reduced portion 12 and clamping the sleeve 14 against the inner clamping plate 16 and the latter against the shoulder 10. An outer clamping plate 22 is slipped onto the sleeve 14 and the latter is provided with a screw thread 24 to receive a nut 26 provided with spanner holes 28 by which the nut may be rotated to move the outer clamping plate 22 toward the inner clamping plate 16 to clamp the sectional wheel assembly hereinafter described.

The sleeve 14 presents a chamber 30 to which air is admitted by one or more longitudinal holes 32 in the nut 20. Air thus admitted to the chamber is discharged radially through a multiplicity of holes 34 provided in the sleeve 14. At the periphery of the sleeve these holes are connected by the screw thread 24 which is extended the entire length of the sleeve and thus insures delivery of air at every point throughout the length of the sleeve and thus to every part of the wheel assembly now to be described.

The wheel assembly comprises a plurality of wheel sections 36 of appropriate character, the type shown by way of example being composed of a plurality of laminations 38 of fabric about a hub 40, and two canvas anchor disks 42 secured as by adhesive to the hub and extending beyond the latter and overlapping the interposed plies of fabric to which the disks are secured as by

stitches 44. Preferably, the fabric plies are pleated to provide generally radial passages radially outward beyond the margins of the canvas anchor disks.

The wheel sections are spaced by novel spacers now to be described which utilize centrifugal force to conduct air from the spindle assembly between the wheel sections to the periphery of the wheel. The spacers may be of various forms, though they have one common characteristic, namely, that they are provided with internal passages and their construction is such that these passages are not closed by axial pressure applied to the wheel assembly by the clamping plates and nut.

In the form shown in Figs. 1 and 2, the spacer comprises two plates 46 each of which is provided with projections 48 directed toward the other. In this form the projections are very numerous and they are conveniently produced by extruding the sheet metal of which the plate is composed. The plates are so placed with relation to each other that the projections on one engage the other plate between the projections on the latter. Although the projections are sufficiently numerous to prevent collapse of the space between the plates, they are not so numerous but what ample space is left between them for the passage of air outwardly between the plates. In the example shown, there are additional and somewhat larger projections 50 about the central opening 52 and the plates are slightly dished (see Fig. 1) to provide a large entrance. To keep the plates properly registered, they are preferably secured to each other as by spot-welding at 54.

As a convenience in manufacture and to avoid the need of special tools, one for each size disk, to make the projections, sheet metal plates of large area may be prepared with projections 56 disposed as in Fig. 3 in any appropriate pattern or arrangement. Disks 58 can then be punched from the large plates, the disks placed face to face (see Fig. 4) with the projections on each facing toward the other, and with one set of projections in the spaces between the other set of projections. In this case also, larger projections 60 may be provided about the central opening 62, and in this case the plates may be secured to each other in proper registration by spot-welding as at 64.

In the form shown in Figs. 5 and 6, there are two disks 66, each of which is provided with projections 68 extending toward the other, and alternating with hollow ribs 70 presenting radial passages 72 (see Fig. 6) leading from an annular chamber 74 outwardly to the periphery. As shown, the disks 66 are assembled with the passages 72 of one registered with those of the other and, if desired, this arrangement may be preserved as by spot-welding the disks together, but in this case registration is not at all important and if desired the passages 72 of one may register with the projections 68 of the other. In fact, the depressions of one may alternate with the projections of the other.

When now the tool is in operation, air is drawn into the spindle assembly by way of the holes 32 and chamber 30 and it passes through the holes 34 into the screw thread 24, whence it is conducted between the disks of the separators and is discharged at the peripheries of the latter between the wheel sections 36 at a point radially outward beyond the peripheries of the clamping plates 32. Thus, it is apparent that the clamping pressure applied to the wheel assembly cannot reduce the amount of air passing therethrough.

Having thus described several embodiments of the invention but without limiting myself thereto, what I claim and desire by Letters Patent to secure is:

A spacing device for buffing wheel sections, the same comprising two walls, each having a plurality of protuberances projecting toward the other wall, the protuberances on one wall being disposed in spaces between the protuberances on the other wall.

ELISHA W. HALL.