April 23, 1935. C. E. STURGIS 1,998,562

ABRADING TOOL

Filed May 23, 1932

Fig. 1

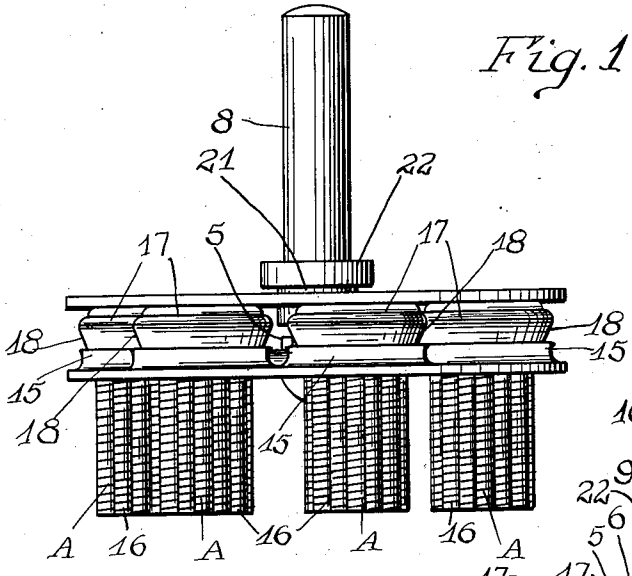


Fig. 2

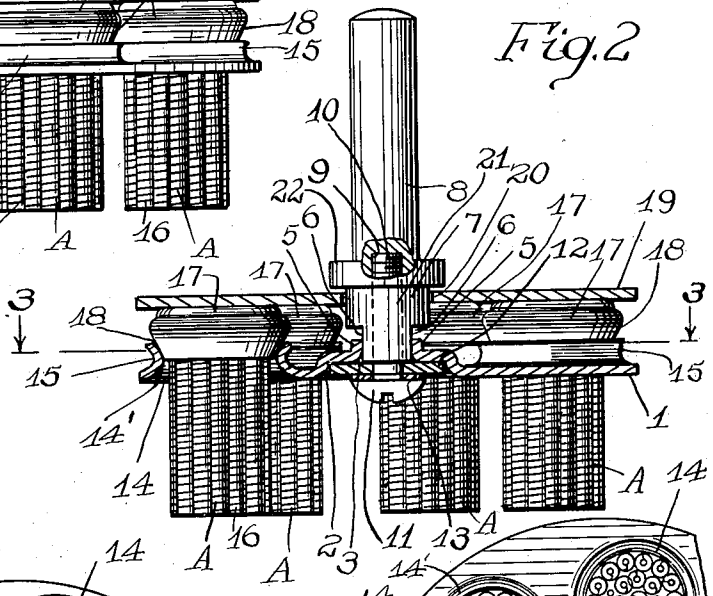
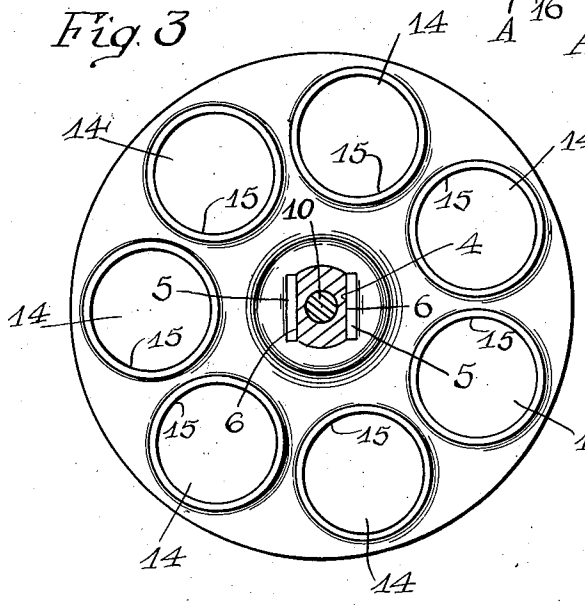


Fig. 3



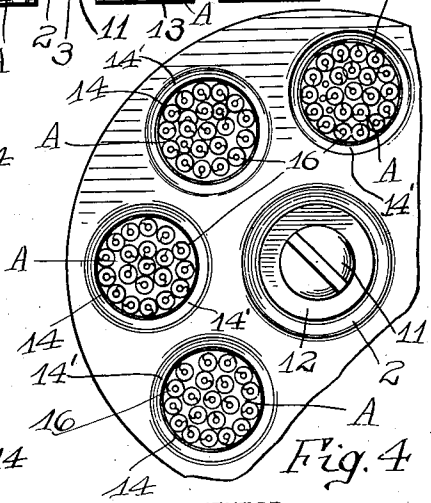


Fig. 4

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ABRADING TOOL

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8 Claims. (Cl. 15—198)

This invention relates to an abrading tool for cleaning and polishing purposes and is particularly adapted for piston heads, combustion heads or other parts of automobile or other engines.

One object of the invention is to provide an abrading and polishing tool embodying among other characteristics, considerable flexibility particularly as regards the manner or method of connecting the various parts together so as to obviate unnecessary wear and to reduce wear of one part on another to a minimum.

Another object of the invention resides in the provision of a metallic abrading tool wherein the abrading elements are mounted for a universal movement to prevent strains and wear on the tool incident to one part acting against another and to insure an effective cleaning or removal of paint, paper or foreign substances from bodies of articles or surfaces.

A still further object is to provide an abrading tool in which an adjustment may be readily effected to compensate for any unevenness of parts incident to wear or because of inaccuracies in measurements in the production of the various parts.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawing, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion, and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the accompanying drawing:

Figure 1 is a side elevation of the invention.

Figure 2 is a similar view partly in section.

Figure 3 is a sectional view on the line 3—3 of Figure 2, with the tuft units removed.

Figure 4 is a fragmentary inverted plan view of the disk brush head.

Referring now more particularly to the accompanying drawing, the reference character 1 indicates a rotary disk shaped brush head of relatively thin metal, preferably steel and having a central inwardly directed resilient depression 2 provided with a central perforation 3, elongated as at 4 from the sides of which extend parallel flanges 5 to provide for substantial flat faces to bear against oppositely disposed flat side faces 6 of the reduced inner end 7 of the stem 8 to which the brush head 1 is secured and whereby to prevent rotation of the brush head on the stem.

The stem 8 is provided at its inner end with a screw threaded socket 9 to take the screw threaded shank 10 of a screw bolt whose head 11 is adapted to lie within the aforesaid central depression 2 of the brush head 1. A washer 12 and a lock nut 13 are preferably arranged between the bolt head 11 and the bottom of the depression 2 to prevent accidental disconnection of the brush head from the stem 8.

The disk shaped brush head 1 is provided with an annularly arranged series of openings 14 surrounding the aforesaid central perforation 3 and the disk on its inner face has a series of annular shaped flanges, one surrounding each opening 14, providing a plurality of annular seats 15 about said openings 14.

A brush or abrading unit or tuft of bristles is indicated, generally, by the reference character A. Each tuft of bristles consists preferably of a plurality of relatively stiff, closely coiled, wire elements 16 preferably of equal length and which lie normally in parallelism throughout their lengths and which are connected together at their inner ends by a steel or other metal cap 17 having a tapering side wall 18. The cap may be secured on the group of bristles in any suitable manner.

The tufts of bristles A are adapted for a working fit in the openings 14 through which the tufts project. As illustrated, the tapered side walls 18 of the caps 17 are rotatably mounted on the annular seats 15 of the disk or head 1 on which seats the respective tufts may rotate.

A disk 19 of relatively thin metal, preferably steel, is disposed on the aforesaid stem 8, having a central perforation 20, embracing the cylindrical portion 21 of stem 8, adjacent a collar 22 integral with the stem 8. This disk has its perforation 20 of a size to permit of a free sliding movement of the same on the cylindrical portion 21 of the stem 8 and toward and away from the caps 17 of the brush units or tufts and by virtue of this free play of the disk 19 it may have rotative movement in either direction on the stem 8 and also has a slight wavering, floating or rocking movement so that as the brush head 1 is rotated, carrying the rotatable and slightly tiltable tufts of bristles, there is no undue frictional resistance of the tuft units against the disk 19, obviating undue wear either on the heads or caps of the bristles or on the disk and permitting free and easy rotation of the brush head as well as a free and easy rotation of the tufts independently of one another and independently of the rotative movement of the brush head 1 or disk 19 and per-

mitting also a slight individual bodily tilting or rocking movement of the tufts on their seats 5.

The aforesaid openings 14 are flared outwardly, as at 14', to permit of a slight bodily tilting or rocking movement of the tufts and by virtue of this outward flaring 14' of the openings 14 the outer coil bristles 15 of the brush units or tufts are permitted to yield and bend under pressure without the formation of a permanent bend or kink therein, the flared or rounded edge 14' permitting of considerable flare being given to the bristles depending upon the degree of pressure thereon and depending also upon the flexibility of the coiled bristles.

In the use of the present tool the length and flexibility of the bristles will depend upon the nature of the work to be done. In some instances, the bristles will be short and closely compacted and of a stiffness calculated to maintain the bristles in parallelism. Under certain conditions, the bristles will need to have resiliency and this may be acquired with the bristles of certain lengths and compacted close together or by varying the length of the bristles or varying the pitch or loose winding of coils the predetermined elasticity or resiliency of bristles may be obtained. This will all depend upon the nature of the work for the present tool to perform and it will be understood that there are many uses to which the tool may be put. Even labels may be removed from bottles or paper glued to various glass articles may be removed without scratching the glass and experience has taught that surfaces of metal may be likewise operated upon for removing paint or foreign accumulations therefrom without injury to the body material and upon removal of the paint or foreign accumulations the body material may be highly polished.

If, when assembling the various parts of the present tool, or if by virtue of wear of parts incident to use of the tool, or if the disks need to be further separated or if it be discovered that there are inaccuracies in lengths of tuft units A or depths of caps 17 of the bristles 16 or if for inaccuracies of other parts or because of other reasons an adjustment is necessary or advisable to prevent friction or for other reasons, it may be readily accomplished by a deepening of the depression 2 in any suitable manner or the depression 2 may be manipulated in any suitable manner to render it less shallow, thereby readily compensating for any such inaccuracies in the matter of variations of normal conditions. To this end the disk 1 has a certain amount of flexibility at its depression 2.

The construction and arrangement of all of the parts of the present tool is such that with the exception of the rigid connection of the disk head 1 with the stem 8, the movable relation of the other parts with relation to one another affords such flexibility of action between the parts as to prevent breakage and undue wear. The head 1 and the stem 8 may be connected together otherwise than as illustrated and described so far as the appended claims permit.

The tool for ordinary purposes is of light weight and is easily handled and readily stored or transported or shipped and in use it may be readily operated by any suitable power driving means (not shown) connected up in any suitable or well known manner with the stem 8.

It will be understood that the brush head 1 and disk 19 may be of a shape other than disk shape and that for certain purposes the brush units or tufts A, especially the bristles may be other than coiled wire bristles and that the bristles may indeed be composed of material other than metal, depending upon the nature of the work to be performed.

It may now be well appreciated that the abrading tool herein described and illustrated is composed of parts which may be readily assembled and easily disassembled so that worn or otherwise defective parts may be readily replaced.

What is claimed is:

1. A rotary abrading tool comprising a head provided with a central perforation and a plurality of openings surrounding the central perforation, a tuft of bristles extending through each of said openings and rotatably mounted therein, a stem having its outer end secured in said central perforation of the head for rotation with the head, a thin sheet metal member loosely mounted on the stem over the inner ends of said tufts of bristles, and a collar secured on the stem to maintain said sheet metal member relatively close to the inner ends of the tufts of bristles to prevent accidental inward displacement of the tufts of bristles and yet permit of rotation of the tufts of bristles independently of one another and independently of the rotative movement of the brush head.

2. A rotary abrading tool comprising a head, a plurality of tuft units rotatably mounted on the brush head and having inward sliding movement on said head, a stem to which the brush head is secured, a member loose on the stem and spaced from the brush head by the inner ends of the tuft units, and means to limit movement of the loose member outwardly on the stem so as to prevent accidental inward displacement of the tuft units and yet permit rotation of the tuft units independently of said member.

3. A rotary abrading tool comprising a head, a plurality of tuft units rotatably mounted on the brush head and having inward sliding movement on said head, a stem to which the brush head is secured, a member loose on the stem and spaced from the brush head by the inner ends of the tuft units, means on the stem to limit movement of the loose member outwardly on the stem away from the brush head, said tuft units being rotatable one independently of another and independently of the brush head and held against accidental inward displacement by said member.

4. An abrading tool comprising a head having a central depression and a perforation therein, a stem having connection with the head through said perforation, a plurality of tuft units rotatably mounted on the brush head and having inward sliding movement on the head, and a member rotatable on the stem and rotatively engageable with the inner ends of the tuft units to hold the latter against displacement inwardly of said head, the said depression being yieldable to permit deepening or shallowing of the same so as to adjust the space between the head and said rotatable member.

5. An abrading tool comprising a rotatable head, a stem rigidly connected at one end to the head, a plurality of tuft units rotatably carried by said rotatable head and having slight bodily longitudinal and lateral movement relative to said head, and means including a member loose on the stem and having movable engagement with the inner ends of the tufts to limit inward longitudinal bodily movement of the latter with relation to the head.

6. An abrading tool comprising a rotatable head, a stem fixedly connected to the head, a tuft unit having loose connection with the head for universal movement relative thereto and independently of rotation of the head, a member loose on the stem and rotatably engaging the inner end of the tuft unit and independently rotatable relative to the rotation of the head or the tuft unit, and means to limit the movement of said loose member outwardly of the stem.

7. An abrading tool comprising a rotatable head, a stem fixedly connected to the head, a tuft unit having loose connection with the head for universal movement relative thereto and independently of rotation of the head, a member loose on the stem and rotatably engaging the inner end of the tuft unit and independently rotatable relative to the rotation of the head or the tuft unit, means for limiting movement of the loose member outwardly on the stem, said loose member having slight play longitudinally of the stem between the inner end of the tuft unit and said last mentioned means and means for adjusting the fixed connection between the head and stem to compensate for wear or inaccuracies in the size of any of the said elements.

8. An abrading tool comprising a head having seats thereon, a plurality of tuft units mounted loosely in said seats for slidable, tiltable and rotatable movement in said seats, a member slidably, rotatably and tiltably mounted on said stem over the inner ends of the tuft units and normally resting thereon, and means connected with the stem adjacent said member to limit movement of said loose member outwardly along the stem away from the inner ends of the tuft units to thereby maintain the tuft units in position to return to normal seated rotatable position after a sliding or tilting movement.

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