This invention relates generally as indicated to a self-regulating brushing tool, and more particularly to an improved power driven rotary brush.

The brushing action of power driven brushes, especially wheel brushes, has been regulated in the past in various ways, including by embedding the brush bristle material in cellular elastomeric material in the manner disclosed, for example, in Stingley Patent 2,950,495. The relative spacing and positions of the individual bristles are thus controlled, and a relatively harsh brushing action may be obtained, particularly when quite hard brush bristle material is employed. On the other hand, the types of brushing operations for which such modified brushing tools have been adapted are rather limited since flexing of the bristles is so strongly controlled. When the bristles of an ordinary rotary brush engage a work surface, they, of course, flex in a line along the path of travel of the brush and it is such flexing which affords the true brushing action which is normally desired. At the same time, when the bristles extend substantially freely from the brush back, there is a tendency for the brush end to wander laterally of their normal path of travel when they engage small irregularities on the work surface and consequently, instead of quickly removing small projections from the work surface, the bristle ends may be laterally deflected therefrom to bring in still higher relief. This problem is encountered especially when a power driven wheel brush has a radius on an edge or corner of a metal or plastic article, for example, and something of a sawtooth effect, on a small scale, may actually be produced instead of the desired uniformly rounded edge.

It is accordingly an important object of this invention to provide a power driven wheel brush in which the flexing of the brush bristle material in use, while substantial, is nevertheless regulated and controlled sufficiently to permit the employment of very hard brush material, having a Knoop hardness of at least 600 and frequently a Knoop hardness of 700 and 800, without the vibration and concentrations of stress commonly encountered which tend quickly to cause long fracture of such hard brush materials with consequent early destruction of the brush.

Another object is to provide such brushes in which the flexing of the brush bristle material in use, while substantial, is nevertheless regulated and controlled sufficiently to permit the employment of very hard brush material, having a Knoop hardness of at least 600 and frequently a Knoop hardness of 700 and 800, without the vibration and concentrations of stress commonly encountered which tend quickly to cause long fracture of such hard brush materials with consequent early destruction of the brush.

Still another object is to provide such regulated brushing tool utilizing crimped brush bristle material such as crimped steel wire in a manner effective to inhibit substantial increase in the effective brush length due to partial straightening of the crimp under influence of centrifugal force and engagement with the work in use. Such increase in the effective brush length of individual crimped wire bristles in present-day commercially available power driven rotary wheel brushes has tended quickly to produce an uneven brush face, no matter how carefully the brush might previously have been trimmed, and those individual bristles protruding excessively beyond the general face of the brush have been subjected to excessive impact and pressure loads upon engagement with the work causing early long fracture of such bristles.

A further object is to provide a self-regulating brushing tool of the type indicated which will also be self-ventilating to a considerable extent to avoid overheating in use.

A still further object is to provide such brushing tool in which the individual bristles are afforded considerable, although limited, freedom of action, their relative movement being controlled to inhibit sawing of one bristle against another which in the past has tended importantly to contribute to early long fracture of such bristles, especially when employing crimped wire brush fill material.

Other objects of the invention will become apparent as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features herein-after fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:

FIG. 1 is an end elevation of a brush in accordance with the present invention employing irregular relatively large spots of elastomer.

FIG. 2 is a similar view of a brush in accordance with the present invention employing V-shape spots.

FIG. 3 is an end elevation of a further modification of the present invention employing a multitude of relatively small spots of elastomer.

FIG. 4 is an end elevation of still another modification of the present invention.

FIG. 5 is a transverse section taken substantially on the line 5—5 of FIG. 4.

FIG. 6 is a transverse section taken substantially on the line 6—6 of FIG. 4.

FIG. 7 is a fragmentary section taken substantially on the line 7—7 of FIG. 4.

FIG. 8 is an end elevation of a still further modification of the present invention employing islands or spots of elastomeric material within the brush bristle material.

FIG. 9 is an end elevation of a modification of the present invention similar to that shown in FIG. 8 employing somewhat smaller islands of elastomeric material.

FIG. 10 is an end elevation of yet another modification of the present invention.

FIG. 11 is an end elevation of a modification similar to that of FIG. 10 illustrating two annular rows of elastomeric islands or spots.

FIG. 12 is a schematic perspective view taken substantially on the line 12—12 of FIG. 11; and FIG. 13 is an enlarged diagrammatic illustration of the manner in which the spots of elastomer may group the bristles and how inter-group bristle support is thus obtained.

With the development of the power brushing art, there has arisen an increasing demand for precision rotary brushes adapted to be driven at extremely high speeds and having carefully trimmed and often ground brush faces adapted to produce predetermined specified effects upon a workplace. When using bristle fill material such as wires, plastic coated wires, or tough plastic filament, it has been conventional to crimp the filaments for a variety of reasons including the dampening effect achieved due to the interengagement of the filaments one with another along their length. This crimping of the brush bristle material has also been employed in an effort more uniformly to space the bristles at the brush face since radially extending fill material is naturally less dense at the brush face than adjacent the bristle-retaining back.

Although crimped brush bristle material thus has many advantages, it also has certain disadvantages including...
the fact that it tends to elongate due to centrifugal force, producing an uneven brush face concentrating work on particularly elongated bristles. The inclination of the brush tips is, of course, also irregular and certain bristle tips will gouge the work whereas others will merely drag or wipe across the work surface and the interengagement of the bristles may result in notching, especially in the case of wool which produces localized stress concentra-
tions in turn producing a substantial amount of long frac-
ture. Hard wire brush bristles are also very difficult to crisp properly with a constant amount of curvature and this affects the brushing face. With the present invention it then becomes possible to overcome many of the dis-
advantages of crimped wire brush material or alterna-
tively to utilize straight wire brush material or brush bristle material having a very shallow crimp.

Referring now to the FIG. 1 embodiment, there is illus-
trated a rotary brush comprising radially extending bristle fill material 1 which is secured at the inner end thereof to a hub 2 and extends radially outwardly to form a cylindrical brush face 3. The bristle fill material 1 may, for example, be wrapped about a retaining ring within the annular hub or brush back 2. Such hub generally includes side plates which are provided with shoulders to form a channel shape annular enclosure 4 in which the bristle fill material is secured as by wrapping about such annular retaining ring. A central aperture 5 through the brush forming the hub 2 so that the brush may be secured on a power driven arbor or the like. The side plates of the hub may extend radially inwardly from the channel enclosure 4 and be joined together as by rivets or spot-welding at a number of circumferentially spaced points indicated at 6. Thus, the brush bristle material 1 is secured to and extends radially outwardly of the hub 2 which is adapted to be placed upon a brushing lathe spindle for the desired work appli-
cation. Reference may be had to U.S. Patent 2,609,
539 for a typical rotary brush which may be employed in accordance with the present invention.

It is generally preferred that the channel-shape base 4 be packed as tightly as possible with fill material 1 to obtain the highest possible brush fill material density at the brush face 3. In view of the brush fill material being packed together tightly within the channel-shape portion 4 there will be little or no movement afforded individual bristle filaments within such channel during the brushing operation. The stress concentrations gen-
erally occur in an area extending radially outwardly next adjacent this tightly packed base portion 4 and adjacent the edges of the side plates of the hub 2. In this area the filaments are supported only by the other filaments in the brush bristle material body and are otherwise relatively freely flexible both circumferentially, or in a plane normal to the axis of rotation of the brush, and transversely, or in a plane including the axis of rota-
tion of the brush.

In order to control the amplitude and direction of flexure of the bristle fill material 1, regions or bodies 6 of elastomeric material may be embedded therein certain lon-
gitudinal portions only of groups of bristles of the brush bristle material body 1. In the FIG. 1 embodiment, there appears on the end face of the brush three such regions 6 shown at 7, 8, and 9. All of these regions are quite irregular in shape and extend from adjacent the channel-shape portion 4 of the hub 2 almost to the work face 3 of the brushing tool. The regions shown are also quite irregular in size and may include interior open areas as shown at 10 so that bristle material passing there-
through will be embedded at two longitudinally spaced areas. However, for example, bristle material passing through the spot 9 at the location 11 will be embedded at one longitudinal area thereof. Bristle material shown at 12 will pass between the spots 8 and 9 and not be directly supported by the elastomeric material at any longitudinal location. However, the bristle material in the area 12 will be supported indirectly by adjacent groups of bristle material which are themselves partially embedded within elastomeric material 14 and 15 may be intruded into the bristle fill material 1 from each of the end faces of the brush. There may, for example, be as many as nine such spots on each end face of the brush and the V-shape spots 15 on the op-
posite side of the brush may be slightly circumferentially offset from the V-shape spots 14. Again such spots may preferably be spaced both from the channel shape hub portion 4 and the working face 3 of the brush. Since the V-shape spots 14 on one side of the brush overlap the V-shape spots 15 on the other side of the brush circum-
ferentially of the brush, at least a portion of all the brush fill material transversely of the brush will be embedded in a body of elastomeric material. The V-shape spots serve not only to restrict the flexure of the bristles to dampen vibrations and thus lengthen the life of the fill material, but in this embodiment, they may serve to provide a tough integument for the end faces
of the brush to maintain the brush working face at the proper transverse thickness, as, for example, 1 inch. The bodies of elastomeric material need not extend transverse-ly completely through the body of fill material 4, but in any event it can be seen that the bristle flexure will be regulated and controlled to a varying degree about the periphery of the brush and the overall and general bristle could be obtained without being highly suitable for certain types of brushing operations.

In FIG. 3, a different arrangement of spots or bodies of elastomeric material is illustrated wherein the bristle fill material 1 has embedded therein many relatively small bodies or spots of elastomeric material with each spot 17 embedding one or more (e.g. twelve) bristle filaments. In the embodiment shown, the spots of elastomeric material may be randomly distributed throughout the fill material and the flexure of the bristles will not be greatly inhibited, but the spots will serve to reduce vibrations and bristle interactions which shorten the life of the fill material and thus the working life of the brush. Spots of elastomeric material embedding only a single filament, for example, will serve as a bumper to protect that single filament from engagement with adjacent filaments and the resulting saving action or nicks which create points of stress concentration and reduce filament life. Spots of elastomeric material 17 which embed more than single filament will, of course, serve the same function of reducing bristle flexure as the spots 7, 8, 9 and 10, 14 and 15 in the FIGS. 1 and 2 embodiments respectively, only to a lesser degree.

Thus, not only are some of the bristle wear advantages obtained as in an almost completely impregnated brush as shown in the aforementioned Stangley Patent No. 2,950,495, but such wear advantages are accomplished with perhaps as little as 15% of the amount of elastomeric material required completely to embed the bristle fill material. In addition to this advantage, then, the longer wear qualities of an impregnated brush while still permitting a very substantial degree of filament flexibility for the proper performance of many types of brushing operations.

In FIGS. 4 through 7, there is illustrated another form of brush in accordance with the present invention. The brush, including the fill material 1 and the hub 2, may be identical in form to that shown in the FIGS. 1 through 3 embodiments. The spots of elastomeric material 20 may be more strategically arranged than in the FIG 3 embodiment and are elongated in a circumferential direction, being spots on each end face of the brush in the twelve inch diameter brush illustrated. The spots 21 on the opposite end face of the brush may be circumferentially offset to overlap transversely the spots 20. As shown more clearly in FIGS. 6 and 7, such spots 20 and 21 may embed about half of the bristle fill material transversely of the brush. However, at the points of overlap shown at 22 in FIG. 5, such spots may join and the elastomeric material thus extends entirely transversely through the brush fill material 1 at such points so that the spots 20 and 21 may form in effect a continuous zig-zag body of elastomeric material extending entirely circumferentially of the brush. As seen in FIG. 5, the extent of filament flexure will be determined largely by the distance of the elastomeric body 22 from the working face 3 of the brush. Also, the lateral or transverse flexure of the bristle fill material will be substantially inhibited in the area as described above by the elastomeric body in the FIGS. 6 and 7 areas, will be free for substantial transverse flexure. Also, the circumferential extent of the spots 20 and 21 will tend to limit the degree of bristle flexure in the circumferential direction or in a plane normal to the axis of rotation of the brush. The unembodied, whiter as it were, areas in the areas 23 and 24 shown in FIGS. 6 and 7 will be surrounded by a substantially U-shape body or region of elastomeric material which has the effect of group-

ing the bristle fill material into individual tufts, each of which has a controlled flexure action. This strategic arrangement of the elastomeric material will, of course, reduce the vibrations and dampen the otherwise deleterious movements which shorten the life of the individual filaments and, especially in wires, cause long fractures.

The embodiments of the invention shown in FIGS. 8 and 9 are generally similar to the embodiment shown in FIG. 3. In FIG. 8, as in FIG. 9, brushes identical in form to those employed in the previous embodiments may be employed. Both the FIG. 8 and FIG. 9 embodiments employ spots or dots of elastomeric material intruded into the bristle fill material 1, and the spots of elastomeric material 26 in FIG. 8 may be intruded in a random fashion extending both circumferentially and radially of the brush. The spots 26 of elastomeric material will be substantially larger than the spots 17 in the FIG. 3 embodiment and, as an example, for a 12 inch diameter brush, such spots 26 may be approximately ½ inch in diameter. The spacing and distribution of the spots 26 may be such as to leave a substantial portion of the body 1 of bristle fill material extending between the hub 4 and the working face 3 untouched by any elastomeric material. However, the bodies of elastomeric material 26 will control the flexure of the bristles and substantially reduce the vibrations which cause bristle fracture and brush wear.

In FIG. 9, spots or dots of elastomeric material 27, while of a somewhat smaller size, may be randomly distributed circumferentially and radially throughout the body of brush fill material 1. It will be understood that the larger the bodies of elastomeric material employed and the larger the number of such bodies employed, the greater reduction in bristle flexibility. The distribution of the spots is of such circumferential uniformity, however, that the wheel will be balanced for high speed rotation.

The "polka-dot" arrangement of the bodies or spots of elastomeric material in the FIGS. 3, 8 and 9 embodiments also functions to tie certain groups of bristle filaments of various sizes together to restrict movement thereof and such groups or tufts of bristle filaments, thus restricted in movement, act as cushions for adjacent groups of bristle filaments. Accordingly, the size and spacing of the elastomeric spots can control the size and grouping of the tufted portions of the brush and thus the brushing action and flexure.

In FIGS. 10 and 11, the spots of elastomeric material may be arranged somewhat more strategically to accomplish a more particular brushing action such as the edge finishing of certain articles. In FIG. 10, the spots 29 of elastomeric material are arranged in an annular row 30 extending uniformly circumferentially about the brush spaced both from the working face 3 and the hub portion 4. The spots of elastomeric material 29 preferably extend entirely transversely through the body of bristle fill material so that the opposite end face of the brush will be identical in form to that shown in FIG. 10. As thus shown, the annular row of elastomeric spots may preferably be positioned approximately half way between the hub portion 4 and the working face 3. In FIG. 11, there is shown a brush wherein a similar bristle material flexure control is obtained by employing elastomeric spots 31 arranged in an annular row 32 and somewhat smaller elastomeric spots 33 radially aligned with respective spots 31 and arranged in a concentric annular row 34. In the FIG. 10 embodiment, each of the elastomeric spots 29 will produce a radially extending cluster or flap of bristle filaments tied together for interdependent movement by the respective spot 29. Similarly, in FIG. 11, each of the radially aligned spots 33 and 31 also form clusters of bristle filaments in a flap-like form as shown schematically in FIG. 12. Whereas a relatively few bristle filaments 35 are shown in FIG. 12, it will be understood that the number of filaments such as wires.
3,114,925

involved could, for example, be as high as 30 or 40 in such flap arrangement which would comprise a flap extending the nominal width of the brush which may, for example, be ½ inch. These flaps or clusters of bristle elements permit a high level of flexibility in the direction of the arrow which indicates a plane normal to the axis of the brush, but the elastomeric spots 51 and 53 substantially inhibit the bristle filaments from deflecting laterally or transversely of the brush as shown by the arrow 6 which indicates a plane which includes the axis of the brush. The group restraint which is then exerted on the bristle filaments to keep them from deflecting laterally keeps the filaments from assuming paths which would take them around surface high points rather than abrading such high points. The clusters or groups of wires generally have the function of maintaining the freedom of movement in the direction of the arrow 56 while the freedom of movement in the direction of the arrow 37 is limited to the degree required properly to do the brushing work. The size of the plastic or elastomeric material spots, their circumferential spacing, and their spacing from the hub portion 4 and the working face 3 are factors which will determine the amount of lateral flexibility and these can be so selected to obtain the desired flexibility for the particular working application.

In FIG. 13 there is an enlarged somewhat diagrammatic sketch showing how stress concentration occurs in straight crimped wire and hard lengthening brushes to cause breakdown of crimped wire fill material. The object here achieved is a brush having a very minor reduction in general bristle filament flexibility by providing spots of elastomeric material 39 which may, for example, be those of FIGS. 5, 6 or 7 with such spots being designed through the hardening operation to minimize bending and vibration beyond the point required properly to do the work. These spots also reduce lengthening, especially in crimped wire fill material, which lengthening not only accentuates sawing at points of contact such as 48, but also permits extra heavy loads to be applied to individual wires because of the excessive pressure developed due to their protrusion from the true brushing face 3. In FIG. 13 there are shown four randomly disposed spots of elastomeric material 39 identified as 41, 42, 43 and 44 for the purposes of the present illustration. The work face 3 of the brush comprises five groups of bristle filaments 51, 52, 53, 54 and 55. In the group 51 there is substantial control obtained of the crimped wire filaments 56 since in such group they will pass both through a portion of elastomeric spot 42 and elastomeric spot 43. In group 52 there is no direct control of the bristle filament elements, except the support obtained from groups 51 and 53. Group 53 which is embedded in the elastomeric spot 44 helps support group 52. Group 54 is partially tied in with group 51 and group 55 which is a relatively free group. Thus the elements of group 54 are embedded in the elastomeric spot 42 and group 55 which is a relatively free group. The free elements of the group 55 is supported between the spots 41 and 42. The overall brush will, however, have substantially its original long term flexibility. It is possible to control bending and lengthening of the crimped wire filaments without materially reducing flexibility and a strong bond between the elastomeric material and the wires can be employed to maintain the control so that even if the islands or spots of elastomer become separated or split apart, such elastomer will still adhere to the filaments and act as cushions to prevent excessive bending and lengthening. Broken wire filaments have actually been collected from brushes thus embedded with spots of elastomeric material and the filament length has been found to be approximately ⅓ the length of filaments broken from unsupported brushes.

While the present invention tends to overcome some of the disadvantages of crimped wire fill material, brushes employing hard straight wire bristles or wire bristles of rather shallow crimp have been found to perform longer and more controlled brushing work. It will, however, be understood that the present invention is applicable to any type of wire or bristle element, the illustrations showing only elastomer, horsehair, and plastic coated glass fibrous elements, such as disclosed, for example, in Peterson Patent 2,682,734.

Another type of brush bristle fill material that may be employed is a mixture of straight wire fill and high grade Tampico fiber as, for example, a fill material of a mixture of .008" diameter straight wire of approximately 700 Knoop hardness and a top grade Tampico and such mixture may be in the ratio of 2½:1 of wire to Tampico. A 12" diameter brush having a ¾" inside diameter may contain approximately 32 ounces of wire and 13 ounces of Tampico. Another fill material which may be employed is a combination of hard straight wire mixed with a more soft wire. However, hard straight wire bristles if employed in accordance with the present invention, and especially steel wire, will generally preferably have a Knoop hardness of at least 600. The Knoop hardness test is a U.S. Bureau of Standards test which is particularly suited to measure the hardness of fine fillments. In some cases, the fillments may have a hardness of at least 800 and stainless steel wire bristles may be employed coated with a thin outer plastic coating having bristles therein as, for example, in my copending application, "Brush Material," Serial No. 86,378 filed February 1, 1961.

As the elastomeric material to form the spots or dots of the present invention preference is had for polychloroprene or polyurethane. Other suitable examples are polychlorotrifluoroethylene and certain epoxy resins. It is also preferential to use fill material that is thermosoftened and cellular polyurethane or cellular polychloroprene has been found to be very effective. Specifically, the material employed to form the spots in the brush fill material may be Novac Chemical Company's polyurethane resin F-202. This base resin may be mixed with a silicone such as Dow Corning 200 at a rate of 1.89 grams per pound of resin which is approximately .4%. A deodorant for the polyurethane manufactured by Rodea Inc. called Alamskin D (RLT-483) may be added at the rate of three drops per pound of base resin and a colorant has been divided into the base resin and known known as polyurethane-cast organic dye, at the rate of 2.83 grams per pound of base resin, making a total of approximately .6% addition.

For a disclosure of a cellular neoprene or polychloroprene which may be employed in accordance with the present invention, reference may be had to the aforementioned Stingley Patent No. 2,950,495.

A primer may be placed on the bristle material prior to the intrusion of the elastomeric material to hold adhesively the elastomeric material to the bristle fill material. In this manner, the adhesive strength of the elastomeric material to the wire bristles or the like may be greater than the tear strength of the elastomeric material itself and should the islands or spots of elastomer separate between individual bristles, each bristle will still be provided with a protective coating. Since the spots or elastomeric islands do not thereupon disintegrate, may become several or many pieces, wire control can still be maintained. The protective coating will preclude nicks or scratches as those produced by the aforementioned sawing action and inhibit concentration of stresses along the bristle length. While polyurethane, which may be applied to the bristle material in liquid form, adheres strongly to metallic surfaces, nevertheless by previously using a primer superior results can be obtained. One example of a suitable primer or cement is a synthetic rubber and resin composition such as the composition known by the number of "Ty-PLY S" (Vanderbilt). The primer or cement may be applied by spraying, dipping, or painting the previously thoroughly cleaned brush mater-
rial and the plastic matrix material may be applied after the brush is properly dried. Reference may be had to my copending application, Serial No. 834,501 entitled "Abrading and Finishing Tool" for a disclosure of polyurethane compositions which may be employed for the preferred cellular elastomeric spots or islands of the present invention.

The application of the elastomeric material to the brush may preferably be accomplished after the brush has been completely assembled and even after the face plates are assembled. The elastomeric material as, for example, polyurethane, may be intruded into the body of bristle fill material in liquid form to produce the irregular or random spots which are foamed and then set. Pieces of neoprene having a blowing compound therein may be properly positioned in the brush fill material and subsequent curing of such neoprene will cause the formation of the foamed neoprene spots or islands of elastomer. Special molds clamping the annular brush sections adjacent the desired outer limits of the islands or spots of elastomer may also be employed. The clamping pressures exerted by the molds, by compacting the brush fill material I can thus fairly closely define the outer extent of the elastomeric spots although a desirable feathering out of the material from the spots may be achieved.

Examples of other processes that also may be employed include: natural rubber (if operating temperatures are not too high); silicone rubber; Hycar, which is a modified polymer of butadiene; and acrylonitrile; nylon (polymide resins); vinyl plastics which are vinyl polymers and copolymers; melamine resins which are melamine-formaldehyde reaction products; and polyurethane rubbers. Materials such as the polyurethane and silicone rubbers may be placed in spots on the finished brush and air nozzles producing air jets may be employed to drive the plastic material transversely into the brush material to the desired degree. Polyurethane rubber blown into a brush in this manner causes formation of heavy membrane-like "muscles" between brush wires. Various filler materials may be added to such rubbers so that they will have a tear strength less than the bonding strength to the wire and even though the spots of elastomer will be full of cracks and tears, such elastomer will yet adhere strongly to the wires providing the proper wire cushion and protective coating.

It can now be seen that an improved form of brush is provided enabling a substantially longer useful brush life. The partial impregnation of the bristle fill material with spots, dots, or islands of elastomeric material arranged in a random and as to size and distribution both as to the work again on the next revolution. The continued vibration not only influences the finish obtained on the work but also influences the life of the fill material. It can now be seen that by varying the size, arrangement, and amount of elastomeric impregnating material used, the flexure of the bristles can be controlled to the extent desired for a particular brushing action and even in those cases where only a minor reduction in flexibility is obtained, bending and vibration beyond the point required will be minimized, thus greatly increasing the brush life.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

1. The method of controlling bristle flexibility in rotary cylindrical brushes having a hub and radially extending brush bristle fill material, said method comprising the steps of embedding a portion of groups of individual bristles of the bristle material in a plurality of spots of elastomeric material said brush bristles of elastomeric material from said hub and the bristle working ends so that the circumferential extent of such bodies control the bristle flexure in a plane normal to the axis of rotation of said brush, and locating the transverse extent of such bodies to control the bristle flexure in planes including the axis of rotation of such brush.

2. A power driven rotary brush comprising a hub, radially projecting brush bristle material secured in said hub, and a plurality of randomly distributed spots of elastomeric material spaced outwardly of said hub embedding groups of individual bristles of said brush bristle material to control the flexure of said brush bristle material in operation.

3. A rotary brush comprising a hub, radially projecting brush bristle material secured in said hub, and a plurality of randomly distributed spots of elastomeric material spaced outwardly of said hub embedding groups of individual bristles of said brush bristle material to control the flexure of said brush bristle material in operation.

4. A rotary brush comprising a hub, brush bristle material secured to said hub and projecting outwardly to form a working face, and random size spots of elastomeric material spaced outwardly of said hub embedding groups of individual bristles of said brush bristle material to control the flexure of said brush bristle material in operation.

5. A rotary brushing tool comprising a base portion, densely packed bristle material extending radially outwardly therefrom, and spots of elastomeric material embedding groups of individual bristles interposed throughout such bristle material radially beyond said base portion, the size, distribution and density of said spots of elastomeric material controlling the flexure of said brush bristle material.

6. A tool as set forth in claim 5 wherein said elastomeric material is foamed polyurethane.

7. A tool as set forth in claim 5 wherein said elastomeric material is polyurethane rubber.

8. A tool as set forth in claim 5 wherein said elastomeric material is foamed polychloroprene.

9. A tool as set forth in claim 5 wherein said brush material is a wires having a Knoop hardness in excess of 600.

10. A rotary brush comprising a hub, brush bristle material secured to said hub and projecting outwardly to form a working face, an annular row of spots of elastomeric material concentric with the axis of said brush embedding certain portions only of said brush bristle material spaced both from said hub and working face to control the flexure of said brush bristle material in operation, each spot in said row embedding groups of filaments of said brush bristle material to form flat clusters of filaments extending substantially in planes including the axis of rotation of the brush.

11. A rotary brush as set forth in claim 10 including a further annular row of spots radially aligned with the spots of said first row, said further annular row being concentric with said first row.

12. A rotary brush comprising a hub, brush bristle material secured to said hub and projecting outwardly to form a working face, many spots of elastomeric material embedding certain portions only of said brush bristle material spaced both from said hub and working face to
control the flexure of said brush bristle material in operation, said spots extending circumferentially and radially in a random fashion throughout said brush bristle material.

13. A rotary brush as set forth in claim 12 wherein said brush bristle material is crimped wire.

14. A rotary brush comprising a hub, brush bristle material secured to said hub and projecting outwardly to form a working face, and at least one spot of elastomeric material embedding certain portions only of said brush bristle material spaced both from said hub and working face to control the flexure of said brush bristle material in operation, said one spot being a generally V-shape, with said spot being arranged to be bisected by a plane passing through the axis of rotation of said brush.

15. A rotary brush as set forth in claim 14 including an annular row of said V-shape spots, said row being concentric with the axis of rotation of said brush.

16. A rotary brush as set forth in claim 15 including a corresponding annular row of V-shape spots on the opposite end face of said brush extending part way into said brush bristle material, the spots of said corresponding row being slightly circumferentially offset to overlap spots in said first row.

17. A rotary brush comprising a hub, brush bristle material secured to said hub and projecting outwardly to form a working face, and at least one spot of elastomeric material embedding certain portions only of said brush bristle material spaced both from said hub and working face to control the flexure of said brush bristle material in operation, said spot being intruded into said brush bristle material from one end face of said brush, said spot extending only partially through said brush bristle material.

18. A rotary brush having brush bristles extending generally radially outwardly from a central hub portion, and spaced regions of elastomeric material intruded between said bristles in the respective end faces of said brush, said regions in one end face being circumferentially offset and yet overlapping said regions in the other end face of said brush.

19. A brush as set forth in claim 18 including regions of elastomeric material extending transversely through said brush bristles and joining at least some of said overlapping regions on the end faces of said brush.

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