Nov. 25, 1941. F. W. LIVERMONT 2,263,883

BUFFING DISK

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Fig. 1.

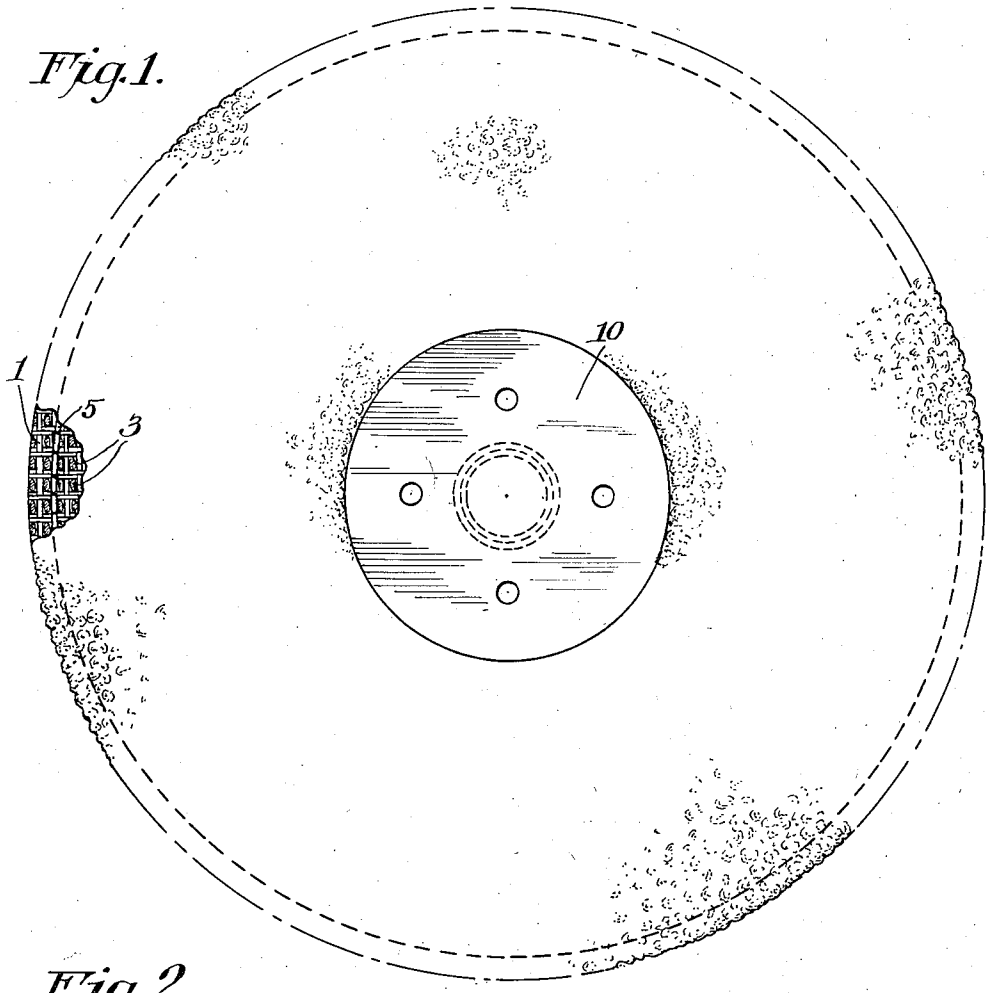
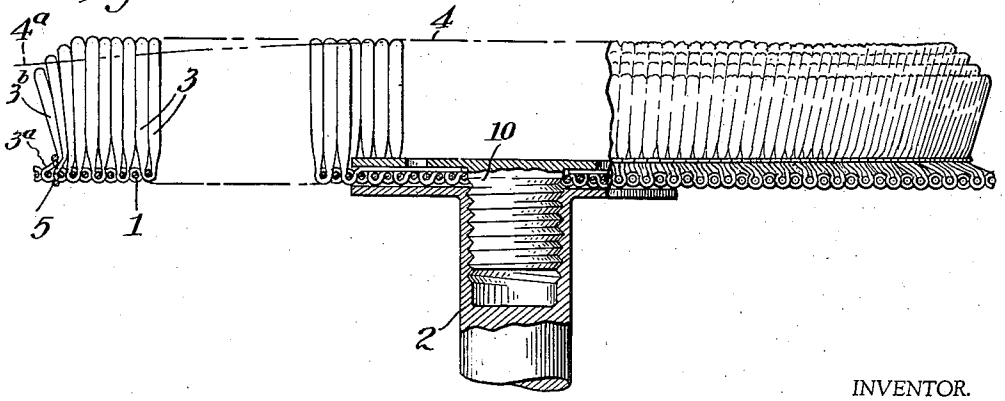



Fig. 2.




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Fig. 3.

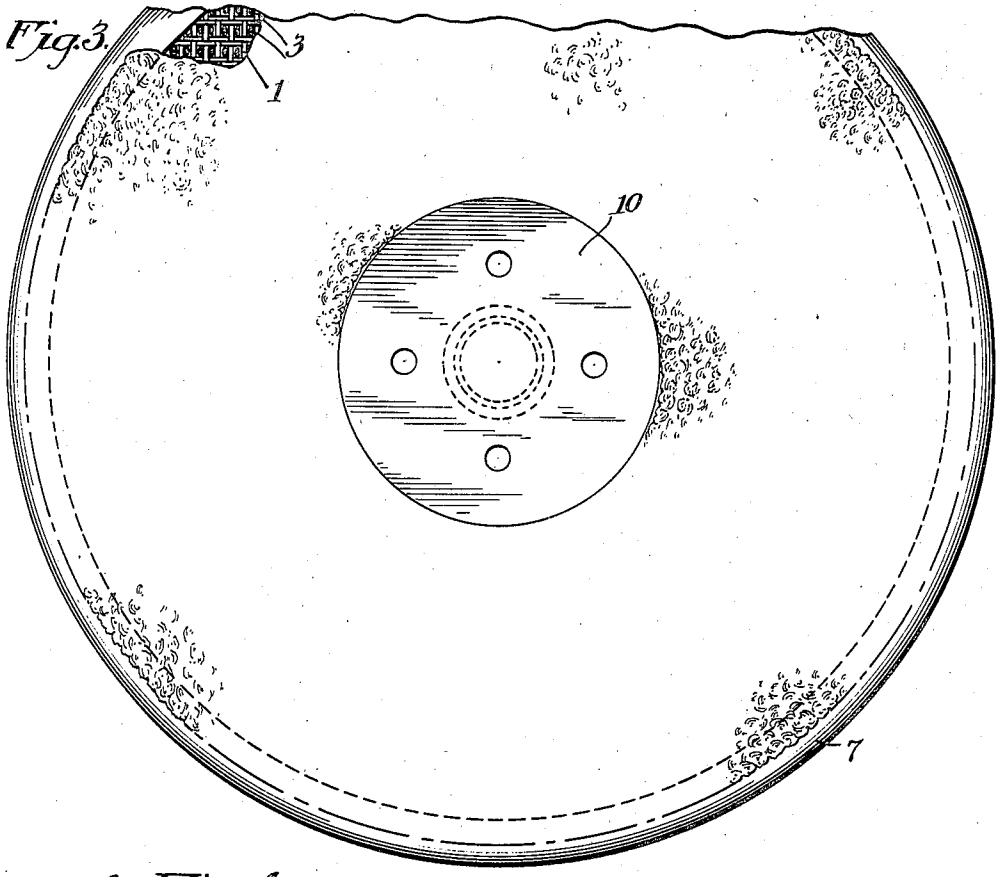
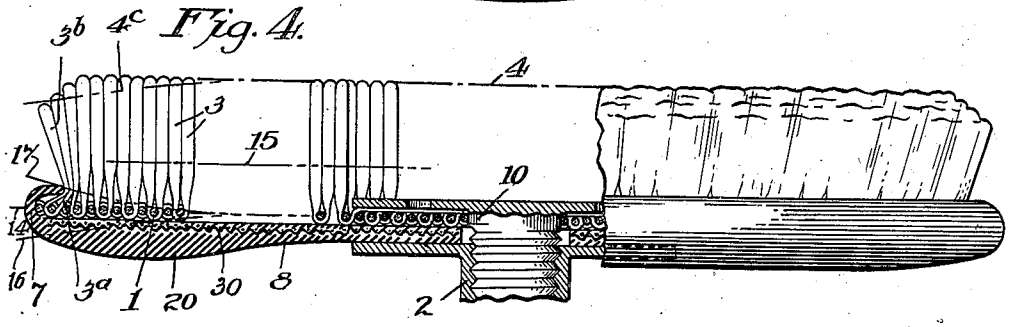



Fig. 4.




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## BUFFING DISK

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Application February 5, 1940, Serial No. 317,250

6 Claims. (Cl. 15—230)

This invention is a rotatable buffing disk having a pile face defining a surface adapted for buffing contact with the work.

It is an object of the invention to insure substantially uniform wear throughout the area of the pile face of the disk, for prolonging the usefulness of the buffing disk.

It is a further object of the invention to brace the strands of the pile against radially outward tilting responsive to centrifugal force generated by rotation of the disc. The surface defined by the outer ends of the strands is thus a substantially plane surface adapted for substantially uniform buffing contact and consequent uniform wear throughout its area.

It is a still further object of the invention to balance the disc for rotation in a plane perpendicular to its axis, for uniform buffing contact and consequent uniform wear throughout the area of the buffing surface which is defined by the pile.

Further objects of the invention will be readily understood from the following description of the accompanying drawings, in which:

Fig. 1 is a front elevation of the buffing disk.

Fig. 2 is a side elevation of the same, partly in axial section.

Fig. 3 is a front elevation of a buffing disk, showing a modified construction.

Fig. 4 is a side elevation of this modified construction, partly in axial section.

Buffing disks comprise a flexible backing 1 having a heavy pile face. The disk is detachably clamped at its axis on a spindle 2 as shown at 10, with the spindle and the disk adapted for rotation by means (not shown) which is preferably a power-driven hand tool whereby the operator may contact the work by the heavy pile face of the rapidly rotating disc. The flexible backing 1 is preferably a relatively heavy woven fabric, and the pile face comprises strands 3 which are looped through and project from the fabric backing so that the outer ends of the strands define the buffing surface.

The strands 3 are of uniform length so that when in normal position projecting perpendicularly from the backing 1, the buffing surface 4 which is defined by the outer ends of the strands is a plane surface parallel to the plane of the backing 1. When employing buffing disks as heretofore constructed, the strands 3 have been radially outwardly tilted responsive to centrifugal force generated by rapidly rotating the disk, with this distortion increasing toward the outer periphery of the disc. The buffing surface of the rotating disc has thus been distorted from the plane surface 4 to the curved surface 4a. Consequently, contact of the buffing surface with the work has resulted in greater wear at its radially inner portion than at its radially outer portion, and this uneven wear has appreciably shortened the period of usefulness of the buffing disc.

In the present invention, the strands 3 are braced against radially outward distortion responsive to centrifugal force, so that they remain substantially perpendicular to the backing 1, thereby maintaining their buffing surface in substantially the plane 4 for substantially uniform wear throughout the area of this buffing surface.

As an instance, and as shown at Figs. 1 and 2, the strands 3 which are adjacent the outer periphery of the backing 1 are bent down against the face of the backing and radially toward its axis, along relatively short portions of the inner ends of the strands where they first project from the backing, with the remainder of the length of these strands projecting outwardly from the face of the backing. The portions of the strands which are bent radially toward the axis of the backing are shown at 3a, and the portions of these strands which project outwardly from the face of the backing are shown at 3b.

The strands 3a—3b are secured in their bent position by stitching through the bent strands and the backing around the circumference of the buffing disk and in radially spaced relation from its periphery as shown at 5, so that the stitching extends through the bent strands at the junction of their portions 3a—3b. The stitching 5 is spaced a relatively short distance from the outer periphery of the buffing disk, so that the strands 3a—3b through which the stitching extends are only the last few of the looped strands which are adjacent the outer periphery of the buffing disk and so that the portions 3a of these bent strands are relatively short portions of the entire length of these strands.

By thus stitching the bent strands to the backing 1, they are transversely compressed at the junction of their portions 3a—3b; and this compression area forms a brace for the remaining strands 3 which project from the major portion of the area of the backing 1, thereby bracing the strands 3 against radially outward tilting responsive to centrifugal force generated by the rapidly rotating buffing disc.

This compression area of the strands 3a—3b is immediately adjacent the outer face of the backing 1, so that the strands 3 are radially

braced adjacent their inner ends while their outer ends are free of transverse compression and thus form a usual yieldable buffing surface 4 in appreciable longitudinally spaced relation from the compression area of the strands 3a—3b. The buffing surface being thus longitudinally spaced from the compression area, is adapted for usual yieldable buffing contact with the work without the compression area producing such a non-yielding peripheral portion of the buffing surface as would ring the buffed area of the work.

By bracing the strands 3 against radial distortion, they project substantially perpendicularly from the backing 1 and the buffing surface which they form is thus a substantially plane surface 4 which is parallel to the backing 1, rather than a curved surface 4a such as would result if the strands 3 were not braced against radial distortion. The buffing surface, being a plane surface, is thus adapted for substantially uniform wear throughout its area, for prolonging the period of usefulness of the buffing disk.

This buffing surface is coextensive with the area of the backing 1 except as this buffing area is reduced by the area occupied by the strands 3b, but the area occupied by these strands is so small in comparison with the area defined by the strands 3, as to be negligible when considering the effective area of the buffing disk.

At Figs. 3 and 4, a modified construction is shown. In this instance, the bent strands 3a—3b are held in place not by stitching such as previously described, but by a clamping annulus which overlies the portions 3a of these strands for clamping them against the backing 1, with the portions 3b of the strands curving around the inner periphery of the clamping annulus and then projecting outwardly from the backing 1, thereby forming a compression area at the junction of the portions 3a—3b of the strands for bracing the strands 3 against radial distortion as previously described.

The clamping annulus may be a channeled peripheral portion 7 of a disk 8 which overlies the rear face of the backing 1 and is clamped at its axis to the spindle 2 by the same clamping means 10 which holds the buffing disk in place. The clamping annulus 7 fits over the periphery of the buffing disk and extends radially inwardly substantially the same distance as that previously described in connection with the stitching 5, whereby the same relatively few outer peripheral rows of the strands of the buffing disk are bent as shown at 3a—3b for radially bracing the major portion of the strands which are shown at 3.

The disk 8, together with its channeled clamping annulus 7, may be of a somewhat flexible material permitting desired flexing of the backing 1, but is of such limited flexibility that the annulus 7 maintains desired clamping engagement with the portions 3a of the strands 3a—3b. For this purpose, the disk 8 and its clamping annulus 7 may be an integral structure of relatively hard rubber.

The clamping means 10 longitudinally compresses the pile of the buffing disk at its axis so as to clamp the disk to the spindle 2 with the plane of clamping engagement in susbtantially the normal plane of the backing 1 as indicated at 14 (Fig. 4). The plane of the center of gravity of the rotating disk, longitudinally of its axis, is therefore offset relative to the plane 14 as indicated for example at 15, due to the weight of the pile which projects from only one face of the backing 1.

When the flexible buffing disk is rotated, there is consequently tendency toward distortion of the outer peripheral portion of the disk due to the plane 15 seeking alinement with the plane 14, thereby tending to curve the backing 1 as shown at 16 and thus tending to curve the buffing surface as shown at 4c. When such curvature of the buffing surface occurs, it results in non-uniform buffing contact throughout its area, whether or not the means previously described has been employed for insuring a buffing surface which is parallel to the backing 1; and such non-uniform buffing contact causes uneven wear of the pile face of the buffing disk, and thus shortens the period of usefulness of the disk.

To prevent this distortion of the buffing disk, it may be balanced so that even though the weight of its projecting pile is at only one face of the disk, the plane of its center of gravity, longitudinally of the axis of rotation, is in alinement with the plane of the clamping engagement between the disk and its spindle.

As an instance, counterweight is provided at that face of the backing 1 which is opposite its projecting pile, so as to balance the projecting pile and thus place the center of gravity, longitudinally of the axis of rotation, in the normal plane of the backing 1, i. e. in the plane of clamping engagement between the buffing disk and its spindle.

This counterweight at the rear face of the backing 1 may be provided in various ways, the construction which is illustrated at Figs. 3 and 4 showing a preferred means. In this construction, the counterweight is provided by the disk 8 which overlies the rear face of the buffing disk. The major portion of the counterweight is preferably toward the outer periphery of the rotatable structure where there is the greatest tendency toward curvature of the buffing disk; and as an instance the rear face of the disk 8 is curved so that it has a gradually bulging thickness 20 toward its outer periphery, with this bulging thickness in turn gradually merging into the thickness of the channeled annulus 7.

The counterweight is such that the center of gravity of the entire rotating structure, longitudinally of its axis of rotation, approximately coincides with the plane 14, i. e. the normal plane of the backing 1. Consequently, when the buffing disk is rotated there is no tendency of its backing 1 to distort from its normal plane 14, and the buffing surface of the disk thus defines the parallel plane 4 and is thus adapted for uniform buffing contact and consequent uniform wear throughout its area.

In addition or in lieu of counterweighting the disk 8 for insuring rotation of the buffing disk with its backing 1 in a plane perpendicular to the axis of rotation, the disk 8 may be arranged so that when rotated it tends to distort by curving at its outer periphery toward the plane 15 as shown at 17 (Fig. 4), with this tendency just sufficient to counteract any tendency (as previously described) of the backing 1 to curve in the opposite direction as shown at 16. These tendencies thus oppose one another for maintaining the backing 1 in the plane 14, thereby maintaining the buffing surface in the plane 4 for uniform wear throughout its area.

As an instance and as shown at Fig. 4, the rubber disk 8 may be reinforced in a plane adjacent that face of the disk which engages the backing 1, in spaced relation from its rear face which defines its thickened portion 20. This reinforce-

ment is shown as fabric reinforcement 30. When the structure is rotated, that portion of the disc 8 which is adjacent its face which engages the backing 1 is thus held against radial stretch by the reinforcement 30, while the rear portion of the disk, i. e. its thickened portion 20, is subject to radial stretch responsive to centrifugal force, thereby tending to curve the disk 8 as shown at 17. But this tendency is opposed by the tendency of the backing 1 to curve as shown at 16, as will result from the plane 15 seeking alinement with the plane 14. These tendencies thus counteract one another, so as to maintain the backing 1 in the plane 14.

I claim:

1. In a rotatable buffing disk, a backing having a pile projecting from its face and forming a buffing surface transverse to the axis of rotation, and means for counterweighting that face of the backing which is opposite its projecting pile, so that the center of gravity of the disk, longitudinally of its axis of rotation, is in the plane of the backing.

2. In a rotatable buffing disk, a backing having a pile projecting from its face and forming a buffing surface transverse to the axis of rotation, and an auxiliary disc fixed for rotation with the buffing disc and counterweighting that face of the backing which is opposite its projecting pile, so that the center of gravity of the dependently rotatable disks, longitudinally of the axis of rotation, is in the plane of the backing of the buffing disk.

3. In a rotatable buffing disk, a backing having a pile projecting from its face and forming a buffing surface transverse to the axis of rotation, that portion of the pile which is adjacent the outer periphery of the backing being bent toward the axis of the disk and then projecting outwardly from the face of the backing, an auxiliary disk adapted to overlie the face of the backing which is opposite its projecting pile, and a clamping annulus at the periphery of the auxiliary disk adapted to engage the periphery of the buffing disk for clamping said portion of the pile to the backing at the junction of its bent and outwardly projecting portions, for bracing the remainder of the pile against radial distortion responsive to rotation of the disk, so as to maintain the buffing surface in a plane substantially perpendicular to the axis of rotation for uniform wear throughout its area, the auxiliary disc being fixed for rotation with the buffing disc and counterweighting that face of the backing which is opposite its projecting pile, so that the center of gravity of the dependently rotatable disks, longitudinally of the axis of rotation, is in the plane of the backing of the buffing disk.

4. In a rotatable buffing disk, a backing having a pile projecting from its face and forming a buffing surface transverse to the axis of rotation, an auxiliary disk adapted to overlie that face of the backing which is opposite its projecting pile, the auxiliary disk being adapted for radial stretch responsive to centrifugal force, and means for reinforcing and preventing radial stretch of that portion of the auxiliary disk which is proximate the backing of the buffing disc, whereby radial stretch of the remaining portion of the auxiliary disk tends to curve the outer periphery of the auxiliary disk toward the backing of the buffing disc.

5. In a rotatable buffing disk, a backing having a pile projecting from its face and forming a buffing surface transverse to the axis of rotation, that portion of the pile which is adjacent the outer periphery of the backing being bent toward the axis of the disk and then projecting outwardly from the face of the backing, an auxiliary disk adapted to overlie the face of the backing which is opposite its projecting pile, a clamping annulus at the periphery of the auxiliary disk adapted to engage the periphery of the buffing disk for clamping said portion of the pile to the backing at the junction of its bent and outwardly projecting portions, for bracing the remainder of the pile against radial distortion responsive to rotation of the disc, so as to maintain the buffing surface in a plane substantially parallel to the backing of the buffing disk, the auxiliary disk being adapted for radial stretch responsive to centrifugal force, and means for reinforcing and preventing radial stretch of that portion of the auxiliary disk which is proximate the backing of the buffing disk, whereby radial stretch of the remaining portion of the auxiliary disc tends to curve the outer periphery of the auxiliary disk toward the backing of the buffing disk.

6. In a rotatable buffing disk, a backing having a pile projecting from its face and forming a buffing surface transverse to the axis of rotation, that portion of the pile which is adjacent the outer periphery of the backing being bent toward the axis of the disk and then projecting outwardly from the face of the backing, an auxiliary disk adapted to overlie the face of the backing which is opposite its projecting pile, a clamping annulus at the periphery of the auxiliary disk adapted to engage the periphery of the buffing disk for clamping said portion of the pile to the backing at the junction of its bent and outwardly projecting portions, for bracing the remainder of the pile against radial distortion responsive to rotation of the disc, so as to maintain the buffing surface in a plane substantially parallel to the backing of the buffing disc, the auxiliary disc being fixed for rotation with the buffing disc and counterweighting that face of the backing which is opposite its projecting pile, so that the center of gravity of the dependently rotatable disks, longitudinally of the axis of rotation, is shifted toward the plane of the backing of the buffing disk, the auxiliary disk being adapted for radial stretch responsive to centrifugal force, and means for reinforcing and preventing radial stretch of that portion of the auxiliary disk which is proximate the backing of the buffing disk, whereby radial stretch of the remaining portion of the auxiliary disc tends to curve the outer periphery of the auxiliary disc toward the backing of the buffing disc.

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