

Aug. 11, 1953

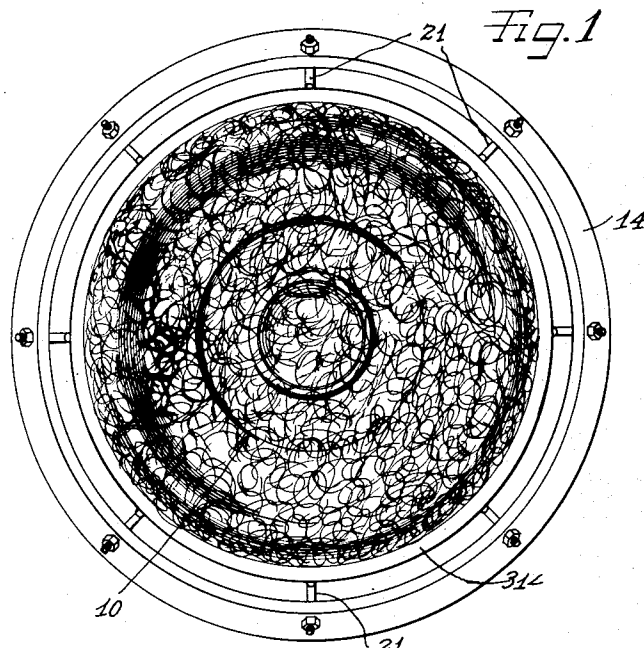
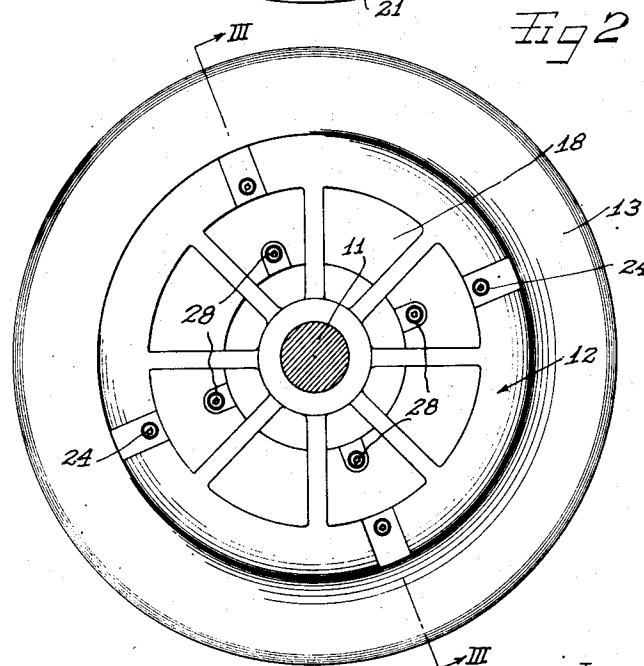
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2,648,178

SURFACE-TREATING WHEEL

Filed Oct. 14, 1950

4 Sheets-Sheet 1



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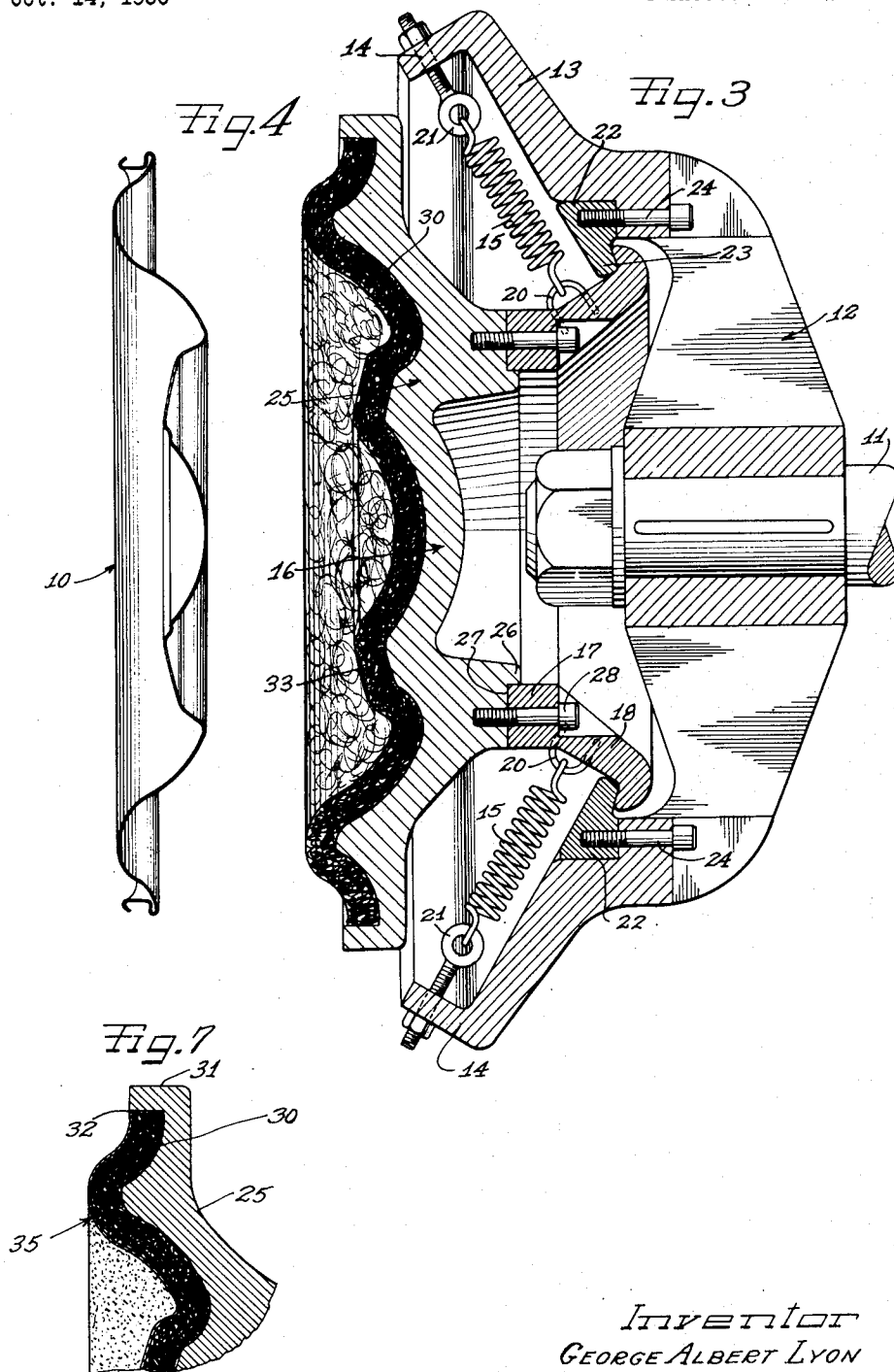
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SURFACE-TREATING WHEEL

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4 Sheets-Sheet 2



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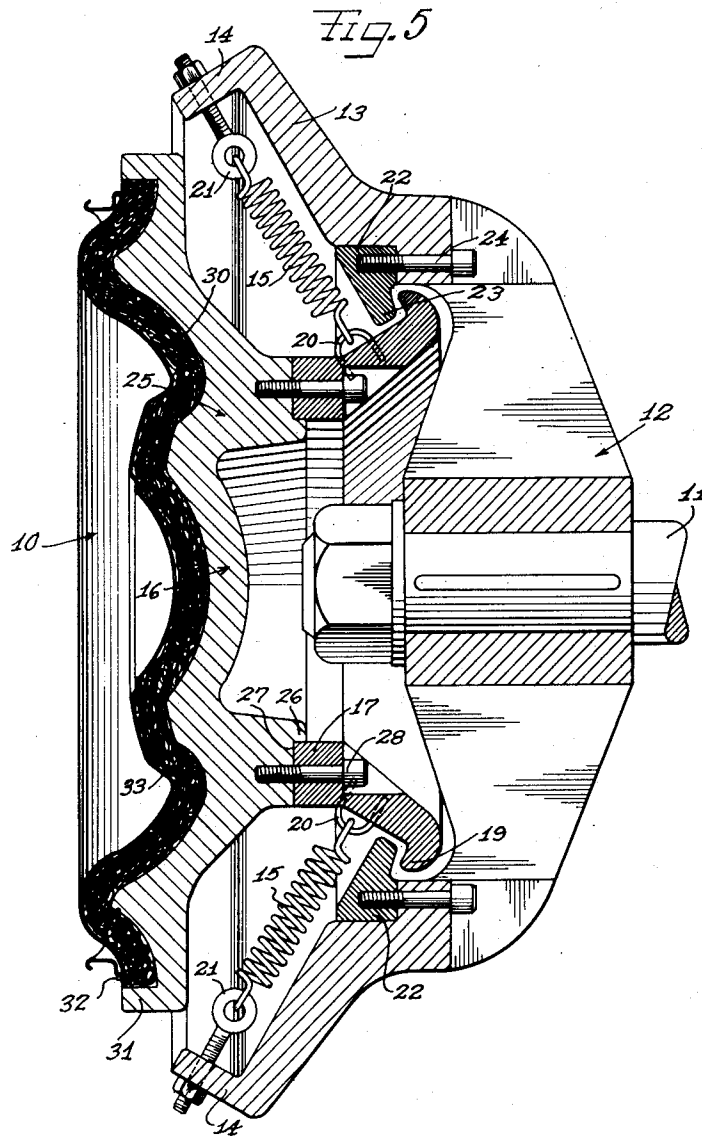
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SURFACE-TREATING WHEEL

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4 Sheets-Sheet 3



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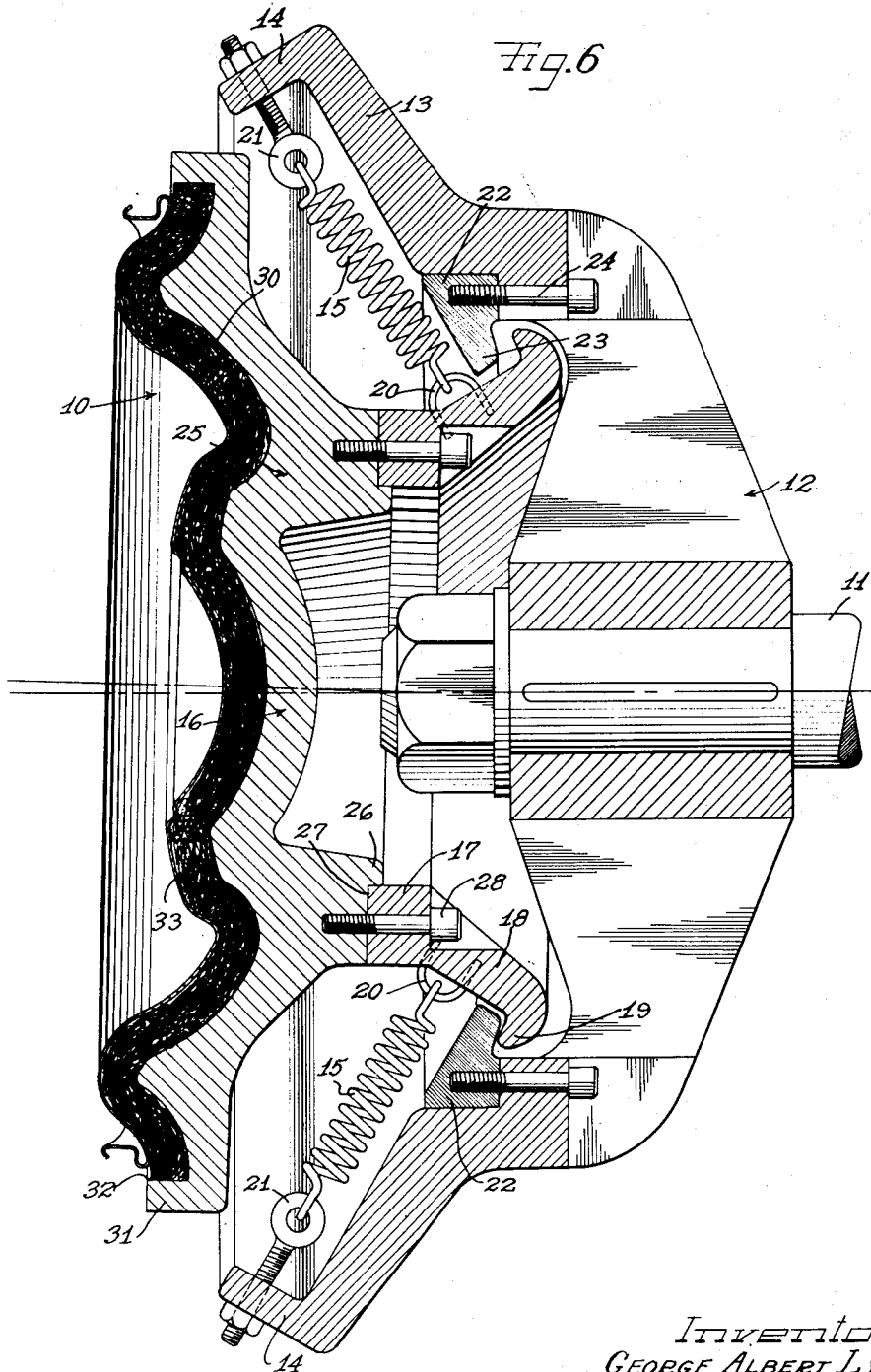
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SURFACE-TREATING WHEEL

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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SURFACE-TREATING WHEEL

George Albert Lyon, Detroit, Mich.

Application October 14, 1950, Serial No. 190,149

7 Claims. (Cl. 51—195)

1

This invention relates to an abrading or polishing wheel and more particularly to a wheel especially adapted for polishing irregular or curved surfaces of a circular object, but it will be understood that this invention applies equally as well to abrading or any other surface-treating or similar operation.

An object of this invention is to provide a polishing wheel which, if the work is out of alignment therewith, automatically adjusts itself to the work as the same is moved into the polishing wheel.

Another object of this invention is to provide a polishing wheel having a polishing element which cannot only move universally but can move in lateral directions relative to its axis of rotation.

Yet another object of this invention is to provide a polishing wheel of the foregoing characteristics which will more effectively polish all of the indentations in an irregular or curved surface undergoing treatment.

In accordance with the general features of this invention there is provided in a polishing wheel a driven member, a polishing head and spring means floatingly suspending said head on said member and establishing a drive connection therebetween; the spring means constituting the sole connection between the head and member and being yieldable upon misalignment axially of the head with respect to the member when work is pressed against the head in a polishing operation.

Another feature relates to shouldered abutments between the head and member of the polishing wheel for limiting cocking and relative lateral movement as between these parts.

Still another feature relates to providing the polishing head with a shouldered portion telescoping the driven member and providing the driven member with an abutment overlapping radially inward the shouldered portion for preventing relative displacement of the head axially outward of the member.

Yet another feature of the invention relates to providing the polishing head with a predetermined curvature in a lateral direction on an outer surface thereof and covering the face by a layer of buffing material.

Another and further feature of the invention relates to providing the periphery of the polishing head with a circumferential flange defining a pocket for the outer periphery of the buffing material carried by the head.

Other objects and features of this invention

2

will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate a single embodiment thereof, and in which:

Figure 1 is a front view of my novel polishing wheel;

Figure 2 is a rear view of the polishing wheel;

Figure 3 is a vertical cross-sectional view taken on the line III—III of Figure 2;

Figure 4 is a cross-sectional view through an article to be buffed in the form of a circular automobile wheel cover;

Figure 5 is a cross-sectional view similar to Figure 3 showing the polishing head depressed axially rearwardly when the wheel cover is pressed against the same in the polishing or buffing operation;

Figure 6 is an enlarged cross-sectional view similar to Figure 5 showing how the polishing head of the wheel can be cocked against the resiliency of the springs when there is axial misalignment of the workpiece and the polishing wheel; and

Figure 7 is a fragmentary sectional view through a portion of the polishing head of my wheel showing a modification wherein the layer of buffing material is coated with emery.

As shown on the drawings:

The reference character 10 designates generally a circular wheel cover which is the subject of an invention of my own but which here constitutes the object to be polished or buffed. It is well known in the automobile art that such covers with a highly lustrous outer surface are very desirable. Particularly is this true where the wheel disc is made of stainless steel or has a chrome or nickel finish.

This wheel disc or piece of work may be supported upon any suitable support for pressing it against the polishing wheel of my invention which is best shown in Figure 6 where the workpiece 10 is shown in actual engagement with the polishing wheel.

Now while I propose to use my device as a polishing wheel, it is, of course, to be understood that depending upon the character of the abrading surface of this wheel, it may be used either for polishing or buffing. In the forms I have shown herein, the material employed, which I will discuss hereinafter, is for polishing. However, a softer, fluffier type of material could be employed if it were desired to use the wheel for buffing purposes.

The reference character 11 designates any suitable rotary driving shaft, which may be motivated

3

by any means (not shown), to drive the driven member 12 of my polishing wheel. This driven member 12 is of a spoke formation, as best shown in Figures 2 and 6, and is suitably splined and secured to the shaft 11.

Inclined radially and axially forward from the main body of member 12 is a dished portion 13 having on its outer periphery an inturned annular flange 14, at right angles to portion 13 (Figure 6). Positioned between this flange and polishing head, designated by the reference character 16, are a plurality of generally radial tension springs 15. The inner ends of these springs are attached to and cooperate with a shouldered annular element 17 which includes an inclined portion 18 terminating in a hook-shaped shoulder 19. The portion 18 has secured to it a plurality of U-shaped fastening elements 20 to each of which is attached an inner end of the spring 15. Each of the springs 15 has an outer end secured in an eye element 21 adjustably bolted to the flange 14. Thus the springs 15 establish a driving connection between member 12 and head 16.

Now it will be perceived from Figure 6 that the polishing head 16 for the most part telescopes the dished outer face of the driven member 12 and that its innermost shouldered element 17 is located adjacent the bottom of the opening in the driven member.

The hook-like or dog portion 19 is overlapped by an annular abutment ring 22; the end 23 of which is shaped to fit radially over the hook or dog 19. In this manner the head has its inner end pocketed in an undercut pocket in member 12 defined partly by ring 22. The abutment ring 22 is detachably held in a recessed portion of the driven member 12 by means of cap screws 24. It is to be appreciated that in order to apply or remove the polishing head 16 from member 12, the ring 22 must be first detached from the member 12 by the removal of the cap screws. Once the polishing head 16 is in position, with the abutment ring 22 properly seated and attached to member 12, this abutment ring will limit the extent to which the polishing head 16 can move axially inside of the member 12. Moreover, as best shown in Figure 3, when the wheel is not in use, the spaced drive springs 15 will hold the hook 19 of the polishing head against portion 23 of the abutment ring 22.

The polishing head 16 includes a main body 25 having an outer face 30 cut generally to conform with the cross-sectional curvature of the surface of cover or disc 10. In addition, this body 25 of the head has an inner shouldered portion 26 which defines a seat 27 for the shoulder ring 17 which is held on the seat by detachable cap screws 28.

It should be noted that any suitable number of springs may be used consistent with the resilient pressure desired and that likewise the cap screws 24 and 28 may be of any suitable number sufficient to hold the respective rings 22 and 17 on their respective seats.

The body 25 of the polishing head 16 has an annular peripheral flange 31 at right angles to the general plane of the body and which defines a pocket at 32 for the peripheral edge of a layer of abrading or polishing material 33 seated on the face 30 of the head 16. This material may be of any suitable character such, for example, as felt or rubber and may, as best shown in Figure 7, be provided with an outer coating 35 of a composition of emery or the like.

As noted before, Figure 3 shows the relative

4

position of the driven member 12 and the polishing head 16 when the wheel is not in use. In this position the resilient force of the springs 15 pulls the shouldered ring 17 tightly against the abutment ring 22, thus holding the polishing head 16 centrally of and against the driven member.

Upon the application of the disc or part 10, to be polished, to the surface 35 of the abrading material, the polishing head 16 is moved axially or telescoped further into the member 12, as best shown in Figure 5. Now, if the carrier for the disc 10 is perfectly aligned axially with the axis of shaft 11, the polishing head 16 will not be cocked, but will assume substantially the position shown in Figure 5 during the polishing or abrading operation.

However, should the axis of the part 10 being polished be misaligned with the axis of shaft 11, or in other words the axis of the driven member 12 of the polishing wheel, then the polishing head 16 can cock to a limited extent relative to the driven member 12, as shown in Figure 6. Here again it will be appreciated that the extent of cocking will be limited by reason of the juxtaposition of the overlapping rings 17 and 22. This overlapping is of such character that the polishing head 16 can, in addition to cocking, also move laterally to a limited extent.

Thus, the drive springs suspending the polishing head on the driven member not only permits of a limited universal movement of the polishing head, but in addition, permits of a limited amount of lateral movement in directions at substantially right angles to the axis of the wheel. I find in actual practice that this floating arrangement is very desirable in that it enables the article being polished to perfectly nest in the polishing face of the head, thus insuring uniform polishing of the entire irregular or tortuous surface of article 10. Needless to say, the more tortuous the surface of article 10 is, the greater is the necessity for movement of the head relative to the driven member if the article is to be concentrically nested inside the polishing head. This means that the spring suspension for the polishing head must respond to even the slightest variation if a true and accurate nesting of the article in the face of the polishing head is to be effected.

Once the article 10 is nested in the outer face of the polishing head 16, a very accurate and uniform polishing of the entire outer surface of the article 10 can be effected.

Tension of the springs 15 can, readily, be varied by adjusting the eye screws 21 which, of course, must be so adjusted that uniform force is applied all around the periphery of the polishing head and whereby it may be truly centered in the driven member prior to the putting of the polishing head into use.

The spoke arrangement of driven member 12 permits air currents to circulate through the driven member and over the inner surface of the polishing head for purposes of cooling. If it is so desired, the cooling effect may be supplemented by jets of liquid (not shown) applied through the center of the driven member in a manner well-known in this art.

While I have described that the actual layer of polishing material may be of felt or rubber composition suitably impregnated with emery, it is to be understood that other well-known forms of abrading material may be used with equal advantage, depending upon the character of abrading or polishing operation desired.

It will be understood that modifications and

variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In a surface-treating machine, a driven member, a surface-treating head and spring means floatingly suspending said head on said member and establishing a driving connection therebetween, said spring means constituting the sole connection between said head and member and being yieldable upon misalignment axially of said head with respect to said member when work is pressed against said head in a surface-treating operation, said head having a shouldered portion telescoping said member and said member having an abutment overlapping radially inwardly said shouldered portion for preventing relative displacement of said head axially outward with respect to said member.

2. In a surface-treating machine, a driven member, a surface-treating head having an inner portion disposed in spaced relation within said driven member, and spring means floatingly suspending said head on said member and establishing a driving connection therebetween, said spring means constituting the sole connection between said head and member and being yieldable upon misalignment axially of said head with respect to said member when work is pressed against said head in a surface-treating operation, said spring means comprising spaced generally radial springs inclined from an outer portion of said member toward and fastened to said inner portion of said head.

3. In a surface-treating machine, a driven member, a surface-treating head, and spring means floatingly suspending said head on said member and establishing a driving connection therebetween, said spring means constituting the sole driving connection between said head and member and being yieldable upon misalignment axially of said head with respect to said member when work is pressed against said head in a surface-treating operation, said spring means comprising spaced generally radial springs inclined from an outer portion of said member toward and fastened to an inner portion of said head in telescoping relation with said member, said outer portion of said member comprising an annular flange around said head and said inner portion of said head being formed into a shouldered portion, said flange having an annular extension overlapping the axially outer side of said shouldered portion for limiting axial movement of said head.

4. In a surface-treating machine, a driven member, a surface-treating head, and spring means floatingly suspending said head on said member and establishing a driving connection therebetween, said spring means constituting the sole driving connection between said head and member and being yieldable upon misalignment axially of said head with respect to said member when work is pressed against said head in a surface-treating operation, said spring means comprising spaced generally radial springs inclined from an outer portion of said member toward and fastened to an inner portion of said head in telescoping relation with said member, said outer portion of said member comprising an annular flange around said head and said inner portion of said head being formed into a shouldered portion, said flange having an annular extension

overlapping the axially outer side of said shouldered portion for limiting axial movement of said head, said extension being detachable when it is desired to remove said head from telescoping relation with said member.

5. In a surface-treating machine, a driven member, a surface-treating head, and spring means floatingly suspending said head on said member and establishing a driving connection therebetween, said spring means constituting the sole driving connection between said head and member and being yieldable upon misalignment axially of said head with respect to said member when work is pressed against said head in a surface-treating operation, said spring means comprising spaced generally radial springs inclined from an outer portion of said member toward and fastened to an inner portion of said head in telescoping relation with said member, said outer portion of said member comprising an annular flange around said head and said inner portion of said head being formed into a shouldered portion, said flange having an annular extension overlapping the axially outer side of said shouldered portion for limiting axial movement of said head, said shouldered portion including a turned portion axially behind said extension.

6. In a surface-treating machine, a driven member, a surface-treating head and spring means floatingly suspending said head on said member and establishing a driving connection therebetween, said spring means constituting the sole driving connection between said head and member and being yieldable upon misalignment axially of said head with respect to said member when work is pressed against said head in a surface-treating operation, said head having a portion movable in spaced relation within said driven member and said member having an integral annular undercut radial pocket and radially projecting means on the inner end of said head extending into said undercut pocket but spaced from the walls thereof so that said inner end of said head can be rocked under spring pressure in said pocket in the adjusting of the head to the work.

7. In a surface-treating machine including a driven member and a surface-treating head, a plurality of circumferentially spaced spring means disposed between said head and said member and acting radially against each other with each normally under stress for resiliently urging said head toward a centered position relative to said member, said member and head having portions held in yieldable overlapping relation in a generally radial direction by said spring means for limiting radial, axial and angular displacement of said head and alignment therewith with work to be surface-treated.

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