June 27, 1933. A. ERIKSSON-JONS 1,915,495

SURFACE TREATING MACHINE

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Fig. 1.

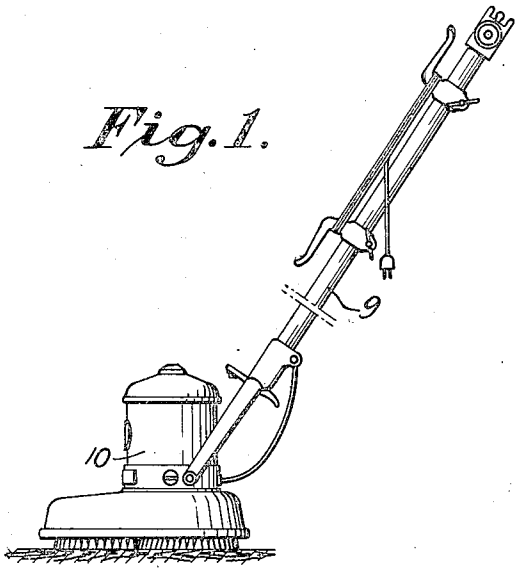


Fig. 3.

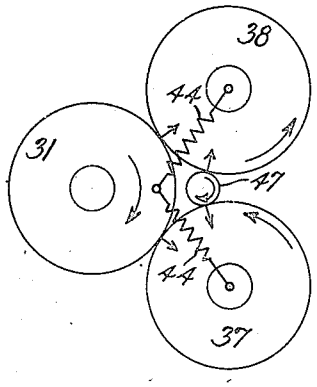
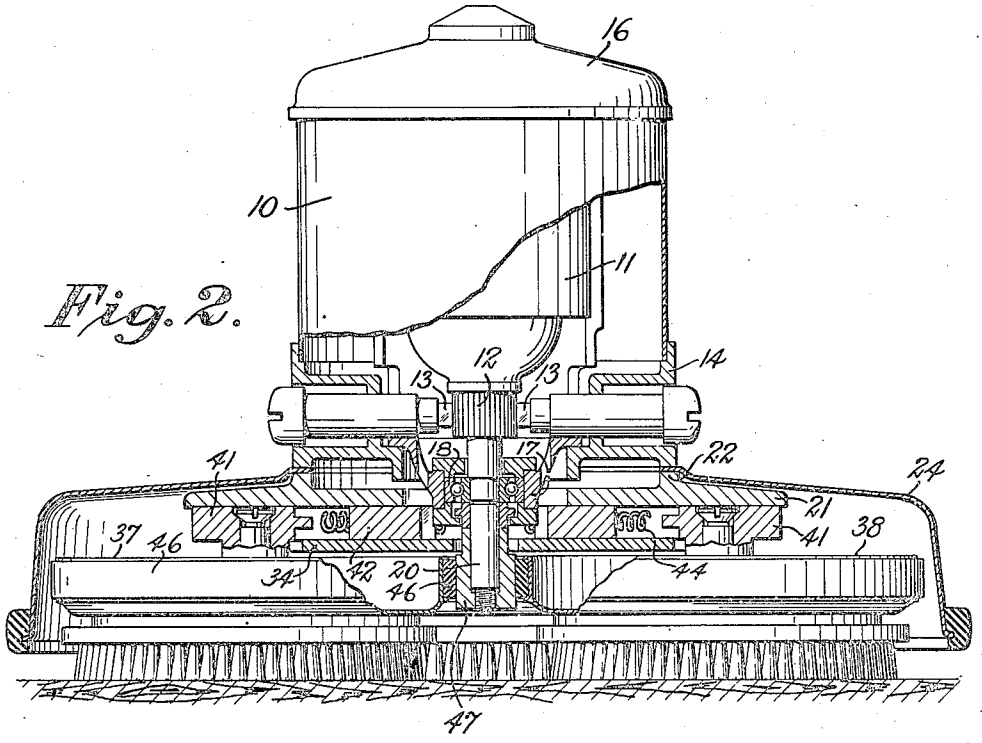


Fig. 2.



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Fig. 4.

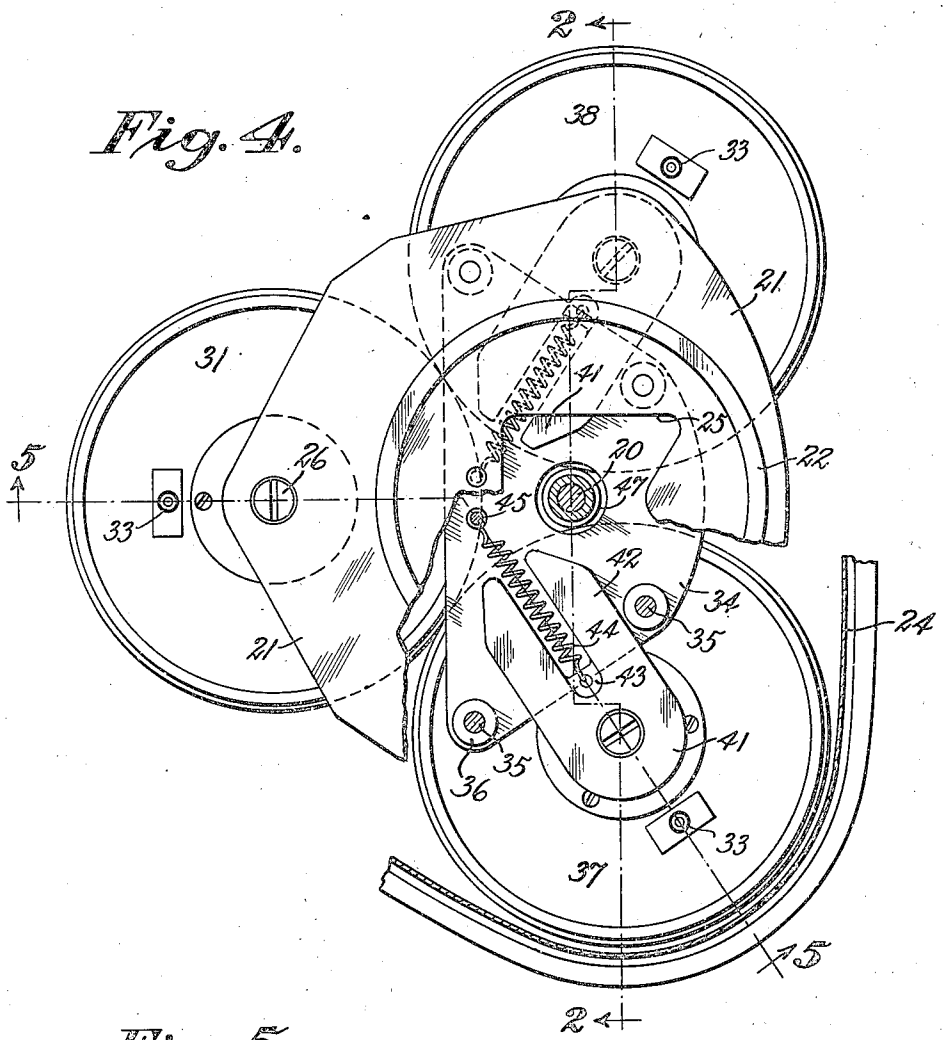
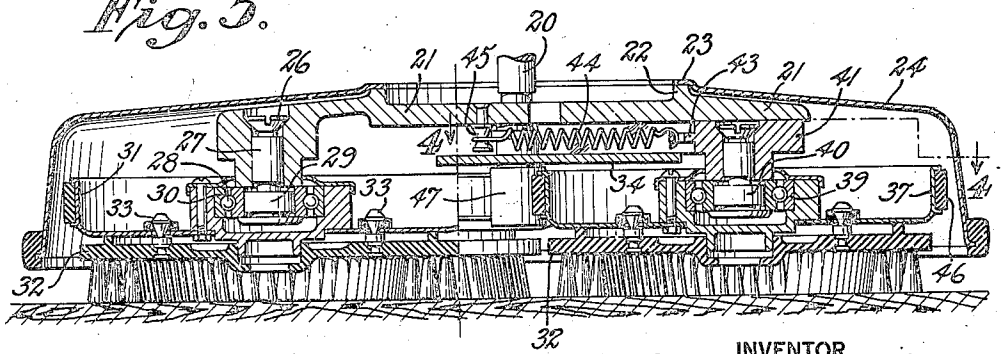


Fig. 5.



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Fig. 6.

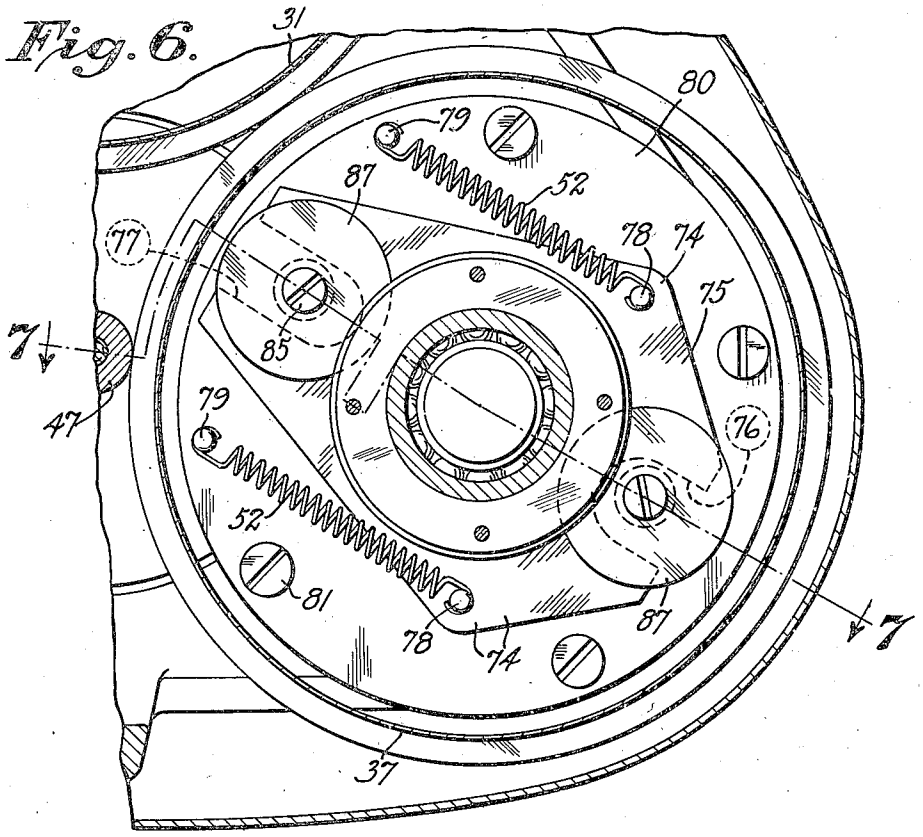
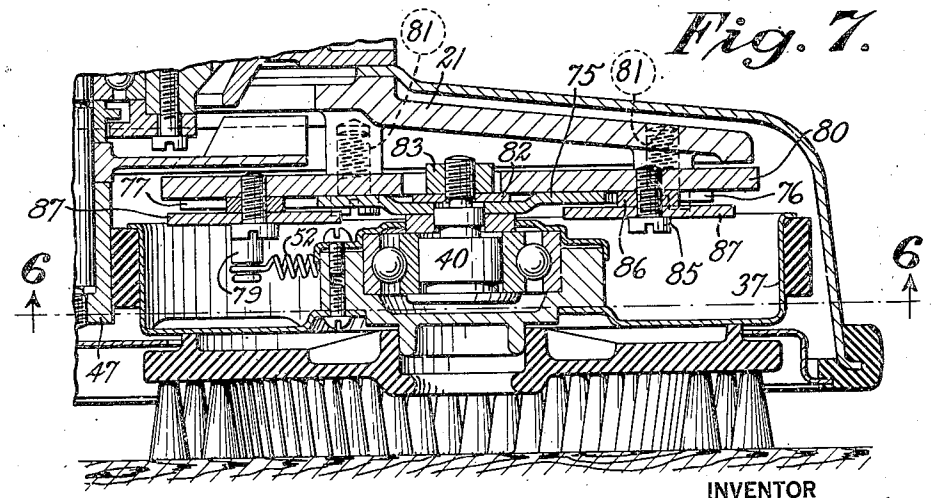


Fig. 7.



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UNITED STATES PATENT OFFICE

ANDERS ERIKSSON-JONS, OF STOCKHOLM, SWEDEN, ASSIGNOR TO INVENTIA PATENT-VERWERTUNGS-GESELLSCHAFT, OF SCHAFFHAUSEN, SWITZERLAND, A CORPORATION OF SWITZERLAND

SURFACE TREATING MACHINE

Application filed October 15, 1931, Serial No. 568,980, and in Germany October 29, 1930.

My invention relates to floor polishers and like machines for treating surfaces of various kinds. More particularly the invention relates to surface treating machines such as floor polishers having a plurality, and preferably three, rotatable elements contacting the surface to be treated. Still more particularly my invention relates to the means for translating power from the power source, such as the electric motor, to the driven members.

The nature of my invention structurally and the advantage thereof will become apparent from a consideration of the following description taken in conjunction with the accompanying drawings forming a part of this specification and whereof:

Fig. 1 is a side elevational view of a three-disc floor polisher embodying the invention;

Fig. 2 is a front elevational view, partly in section, of the machine shown in Fig. 1;

Fig. 3 is a schematic plan view of the driving and driven members of the machine shown in Figs. 1 and 2;

Fig. 4 is in part a top plan view of the machine of Fig. 1 with the motor and casing removed and is, in part, taken on the line 4—4 of Fig. 5;

Fig. 5 is a partial vertical section taken on the line 5—5 of Fig. 4;

Fig. 6 is a bottom plan view of a modified structure and is taken on the line 6—6 of Fig. 7; and

Fig. 7 is a vertical section taken on the line 7—7 of Fig. 6.

Referring more particularly to Figs. 1-5, the floor polisher includes a casing 10 enclosing a motor 11. The usual commutator 12 and brush elements 13 are provided. The motor is disposed on a vertical shaft 20. The casing 10 includes a lower ring shaped member 14 in which the brush elements are mounted. A cap 16 is provided for the casing 10 and the various casing parts may be secured together in any suitable manner.

Below the casing 10 is a frame plate 21 constituting the major part of the frame work of the apparatus. Frame plate 21 is provided with an upstanding flange 22. This flange 22 is circular and serves as a seat for the ring 14 of the motor casing, there being interposed between flange 22 and ring member 14 an inturned edge 23 of a hood 24 which extends laterally from the casing 10, below the same, and constitutes a covering for the driven surface contacting members. The frame plate 21 and the ring 14 may be secured together in any desired manner as by bolts or rivets, provided the under side of frame plate 21 is left as a smooth surface, at least for certain portions thereof, for reasons presently to be explained. In frame plate 21 and within flange 22 is an aperture 25 within which is positioned the lower part of motor shaft 20 and a lower bearing assembly 18 supporting the lower end of the motor shaft. The ball bearing assembly is carried by a depending separate member 17 which rests on ring 14.

Secured to frame plate 21 at 26 is a fixed support 27 having a ball bearing 28 comprising an inner fixed member 29 and an outer rotatable member 30. The outer rotatable member is secured to a carrier or implement disc 31 which is consequently mounted so that it can rotate but which does not have radial movement. This disc is termed a carrier or implement disc because it, so to speak, carries the brush disc or other implement 32. Brush disc 32 is detachably secured to carrier disc 31 by means such as snap spring arrangements 33 of the type shown in copending application Serial No. 286,663 filed June 19, 1928 by Axel Olof Engberg et al., now Pat. No. 1,901,497, granted March 14, 1933. Implement disc 31 may be said to be fixed or stationary relative to the framework since it rotates on a fixed axis.

Below and parallel to frame plate 21 is what may be termed a guide plate. Guide plate 34 has an upper smooth surface which is disposed a given distance from and parallel to the under smooth surface of frame plate 21. This disposition of the parts is maintained by rivets or bolts 35 surrounded by spacers 36. These spacers 36 are advantageously made of rubber and serve as abutments or stops limiting the movement of floating supports for other implement discs presently to be described.

The machine includes two implement discs

37 and 38 besides the fixed disc 31. Implement discs 37 and 38 are similar as to construction and as to mounting and I will therefore describe one of them, it being understood that the other is similar but disposed differently. Carrier disc 37 carries or has removably attached thereto a brush disc 32 similar to that previously described in connection with the carrier disc 31. The brush discs are alike and are interchangeably mountable on the carrier discs. Carrier disc 37 is likewise rotatable, being mounted on a bearing 39, the outer race being secured to the carrier disc and the inner race being secured to a bearing spindle 40. Bearing spindle 40 is secured to the outer end of a yoke or U-shaped member 41.

Yoke 41 has side arms or fingers 42 which have upper and lower smooth bearing surfaces. These bearing surfaces of yoke 41 are parallel and are spaced apart substantially the same distance as the distance between the lower bearing surface of plate member 21 and the upper bearing surface of guide plate 34. The fingers 42, as shown in Fig. 4, are positioned between the members 21 and 34 and the yoke member 41 is of a width less than the distance between the two adjacent abutments 36 whereby the mounting for this disc 37 is floating in the sense that the axis of the disc is capable of having undirected movement in a horizontal plane as well as rotational movement. The mounting however, preferably does not have vertical movement. Vertical movement would be possible since the weight of the apparatus is carried down through the brushes or other surface treating members to the floor and there is a reactionary thrust upwards of the yokes 41 against the under surface of the frame plate 21. It is preferred that there be a minimum of play between the top and bottom surfaces of member 41 and the bearing surfaces of parts 21 and 34 respectively.

Each yoke 41 has a projection 43 with a hole therein in which one end of a tension spring 44 is secured or hooked. The other end of each tension spring 44 is secured to or hooked onto the framework as by being hooked around a pin 45 attached to frame plate 21. The arms or fingers 42 of the yokes 41 have parallel inner sides, and are rounded off at their ends to serve as guides for the springs 44 while preventing catching of the springs on the yokes.

Each carrier disc has a circumferential smooth surfaced tire, hoop or ring 46 the outer surface of which is a cylindrical contact surface. Surrounding the lower end of shaft 20 and secured thereto is a cylindrical member 47 which, as one example, may be made of steel. I term this member the driving member. It will be understood that this member may be one piece with the shaft 20. The springs 44 are so positioned that they draw the discs 37 and 38 each against the driving member 47 on the one hand and disc 31 on the other hand. Referring to Fig. 3, it will be seen that if the driving member 47 rotates in a clockwise direction, discs 37 and 38 are both driven in counter-clockwise direction, whereas disc 31 is driven in clockwise direction. This provides the advantage that one of the discs is rotated in opposite direction to the other disc. Consequently the brushes or other tools can be shifted so that they operate first in one direction and then in the other direction. This increases the life of brushes. Again referring to Fig. 3, it will be seen that each spring 44 is arranged in a line which bi-sects the angle formed by those radii of the movable disc to which the respective spring is attached which extend to the points of contact with the driving member 47 and the fixed disc 31 respectively. The spring 44 must obviously be strong enough to provide sufficient contact between the rotating members to drive the carrier discs from the driving member 47. It will be seen that the axes of the discs 37 and 38 are parallel to the axis of disc 31 but have relative movement thereto and relative movement to each other within the limits determined by the strength of springs 44 and the abutments formed by the spacers 36. It will be evident that the driving member drives discs 37 and 38 directly and that disc 31 is indirectly driven through the discs 37 and 38. Discs 37 and 38 are therefore intermediately disposed discs with respect to the driving member and the fixed disc.

Under certain circumstances it may be advisable to provide the driving member 47 with a friction surface of rubber and one or more of the carrier discs with steel rims or all the rims may be of metal or other material. I believe, however, that the best results are obtained by using a metal driving member and tires of rubber, leather or similar material for the discs. The floor polisher has a handle 9 for guiding the same.

Referring now to Figs. 6 and 7, these figures show a modified mounting for the brush discs 37 and 38. Instead of the yoke shaped member 41, this arrangement includes a plate 75 having U-shaped slots 76 and 77 formed in the ends thereof. The member 75 is widened bi-laterally as indicated at 74 and supporting studs or pins 78 are secured to the extended portions to serve as anchors for a pair of springs 52. These springs are secured to or hooked around similar studs 79 secured to a plate 80 which may be substantially coextensive with the disc member, and which is secured to the frame plate 21 by suitable means such as screws or bolts 81. The plate or disc 75 is slightly dished at the center and apertured to receive the bearing spindle 40. A washer 82 provides a gripping member for

the nut which secures the bearing spindle 41 in position on the plate 75. The splate 80 is suitably apertured to receive the nut 83 and the upper end of the bearing spindle. Round plates 87 are secured to plate 80 by screws 85 being separated therefrom by washers 86. The washers 86 are of considerably less outer diameter than the width of the slots 76 and 77. The slotted ends of member 75 have movement between the upper surfaces of plates 87 and the lower surface of plate 80, the movement thereof being limited by the relative size of the slots 76 and 77 and the washers 86 respectively. The springs 52 pull the plate 75 and therefore the carrier disc 37 into contact with the driving member 47 and the stationary carrier disc 31.

The construction shown in Figs. 6 and 7 permits considerable oscillatory movement of the carrier disc. This modified construction may be of particular use in certain forms of work where a large degree of freedom is desirable for the polishing or cleaning members.

In the surface treating machine above described, the floating discs can automatically adjust themselves with respect to the driving member independently of the relation to other driven discs. It will be seen that good friction contact is obtained at all times with a decidedly simple construction. A great advantage afforded by the invention is that the gear ratio between the driving motor and the driven discs can be high. This is advantageous for operation and has not been possible with floor polishers previously known. Furthermore, silent power transmission is possible. Furthermore, the advantages of the three-disc floor polisher are obtained in the interchangeability of the brush members and the overlap of areas contacted by the respective brush elements.

While I have described a preferred means for carrying out the invention, it will be understood that the invention is adaptable to embodiment in a variety of structures and I am not to be limited to any particular structure except as defined by the appended claims taken in connection with the state of the prior art.

What I claim is:

1. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a second implement disc, means for rotatably mounting said second implement disc on a floating vertical axis, and means for retaining said second implement disc in driving relation with said driving member and said first implement disc so that the second implement disc is directly driven by the driving member and in turn rotates the first implement disc.

2. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a second implement disc, means for rotatably mounting said second implement disc on a floating vertical axis, and tension means for retaining said second implement disc in driving relation with said driving member and said first implement disc so that the second implement disc is directly driven by the driving member and in turn rotates the first implement disc.

3. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a second implement disc, means for rotatably mounting said second implement disc on a floating vertical axis, and elastic means for urging said second implement disc into frictional engagement with said driving member and said first implement disc so that the second implement disc is directly driven by the driving member and in turn rotates the first implement disc.

4. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a second implement disc, means comprising a slotted member and guide means therefor for rotatably mounting said second implement disc on a floating vertical axis, and tension means for retaining said second implement disc in driving relation with said driving member and said first implement disc so that the second implement disc is directly driven by the driving member and in turn rotates the first implement disc.

5. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a second implement disc, means comprising a yoke and guide means therefor for rotatably mounting said second implement disc on a floating vertical axis, and tension means acting on said yoke for retaining said second implement disc in driving relation with said driving member and said first implement disc so that the second implement disc is directly driven by the driving member and in turn rotates the first implement disc.

6. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a second implement disc, means

for rotatably mounting said second implement disc on a floating vertical axis, and means for retaining said second implement disc in circumferential contact with said driving member and said first implement disc so that the second implement disc is directly driven by the driving member and in turn rotates the first implement disc.

7. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a plurality of intermediately disposed rotatable discs and means for retaining each of said intermediately disposed discs in frictional driving contact with said driving member and said first implement disc whereby the driving member and said first implement disc are rotated in the same given direction and the intermediately disposed discs are rotated in the same direction with respect to each other but oppositely with respect to the driving member and first implement disc.

8. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a plurality of intermediately disposed discs, means for rotatably mounting said intermediately disposed discs on floating vertical axes, and means for retaining each of said intermediately disposed discs in frictional driving relation with said driving member and said first implement disc whereby the driving member and said first implement disc are rotated in the same given direction and the intermediately disposed discs are rotated in the same direction with respect to each other but oppositely with respect to the driving member and first implement disc.

9. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member of a fixed vertical axis, a plurality of intermediately disposed discs, means for rotatably mounting said intermediately disposed discs on floating vertical axes, and resilient means for retaining each of said intermediately disposed discs in circumferential frictional contact with said driving member and said first implement disc whereby the driving member and said first implement disc are rotated in the same given direction and the intermediately disposed discs are rotated in the same direction with respect to each other but oppositely with respect to the driving member and first implement disc.

10. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a plurality of intermediately disposed discs, means for rotatably mounting said intermediately disposed discs on floating vertical axes, and tension springs for urging each of said intermediately disposed discs into frictional contact with said driving member and said first implement disc whereby the driving member and said first implement disc are rotated in the same given direction and the intermediately disposed discs are rotated in the same direction with respect to each other but oppositely with respect to the driving member and first implement disc.

11. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a plurality of intermediately disposed discs, means comprising spaced guide plates and members guided therebetween for rotatably mounting said intermediately disposed discs on floating vertical axes, and tension springs for retaining each of said intermediately disposed discs into direct frictional contact with said driving member and said first implement disc whereby the driving member and said first implement disc are rotated in the same given direction and the intermediately disposed discs are rotated in the same direction with respect to each other but oppositely with respect to the driving member and first implement disc.

12. In a machine of the character set forth, a first implement disc, means for rotatably mounting said disc on a fixed vertical axis, a driving member, means for rotatably mounting said driving member on a fixed vertical axis, a plurality of intermediately disposed rotatable discs and means for retaining each of said intermediately disposed discs in frictional driving relation with said driving member and said first implement disc whereby the driving member and said first implement disc are rotated in the same given direction and the intermediately disposed discs are rotated in the same direction with respect to each other but oppositely with respect to the driving member and first implement disc, each of said retaining means comprising spring means acting in a line between the radii from the center of the respective intermediately disposed discs to the points of contact thereof with the driving member and said first implement disc respectively.

13. In a machine of the character set forth, a framework, a first implement disc, means for rotatably mounting said disc in said framework on a fixed vertical axis, a driving member, means for rotatably mounting said driving member in said frame-

work on a fixed vertical axis, a pluralty of intermediately disposed rotatable discs, means for mounting said intermediately disposed discs in said framework on floating vertical axes comprising spaced members and supporting means guided thereby, and means for retaining each of said intermediately disposed discs in frictional driving relation with said driving member and said first implement disc whereby the driving member and said first implement disc are rotated in the same given direction and the intermediately disposed discs are rotated in the same direction with respect to each other but oppositely with respect to the driving member and first implement disc, each of said retaining means comprising a spring acting in a line between the radii from the center of the respective intermediately disposed discs to the points of contact thereof with the driving member and said first implement disc respectively.

14. A surface treating machine comprising a framework, a driving member mounted on said framework to rotate about a fixed vertical axis, means for rotating said driving member, a first implement disc mounted on said framework to rotate about a fixed vertical axis, a second implement disc rotatably mounted on a floating vertical axis, means for supporting said floating axis on said framework so that the former may have undirected movement in a horizontal plane, and means for urging said second implement disc into frictional engagement with said driving member and said first implement disc.

15. A surface treating machine comprising a framework, a driving member mounted on said framework to rotate about a fixed vertical axis, means for rotating said driving member, a first implement disc mounted on said framework to rotate about a fixed vertical axis, a second implement disc rotatably mounted on a floating vertical axis, means for supporting said floating axis on said framework so that the former may have undirected movement in a horizontal plane, and tension means for urging said second implement disc into frictional engagement with said driving member and said first implement disc.

16. A surface treating machine comprising a framework, a driving member mounted on said framework to rotate about a fixed vertical axis, means for rotating said driving member, a first implement disc mounted on said framework to rotate about a fixed vertical axis, a second implement disc rotatably mounted on a floating vertical axis, means for supporting said floating axis on said framework so that the former may have undirected movement in a horizontal plane, and elastic means for urging said second implement disc into frictional engagement with said driving member and said first implement disc.

17. A surface treating machine comprising a framework, a driving member mounted on said framework to rotate about a fixed vertical axis, means for rotating said driving member, a first implement disc mounted on said framework to rotate about a fixed vertical axis, a second implement disc rotatably mounted on a floating vertical axis, means for supporting said floating axis on said framework so that the former may have undirected movement in a horizontal plane while being restrained from movement in a vertical direction, and means for urging said second implement disc into frictional engagement with said driving member and said first implement disc.

In testimony whereof I hereunto affix my signature.

ANDERS ERIKSSON-JONS.