F. P. HUYCK.

SURFACING AND POLISHING MACHINE.

APPLICATION FILED OCT. 9, 1912.

1,086,368. Patented Feb. 10, 1914.

2 SHEETS—SHEET 1.

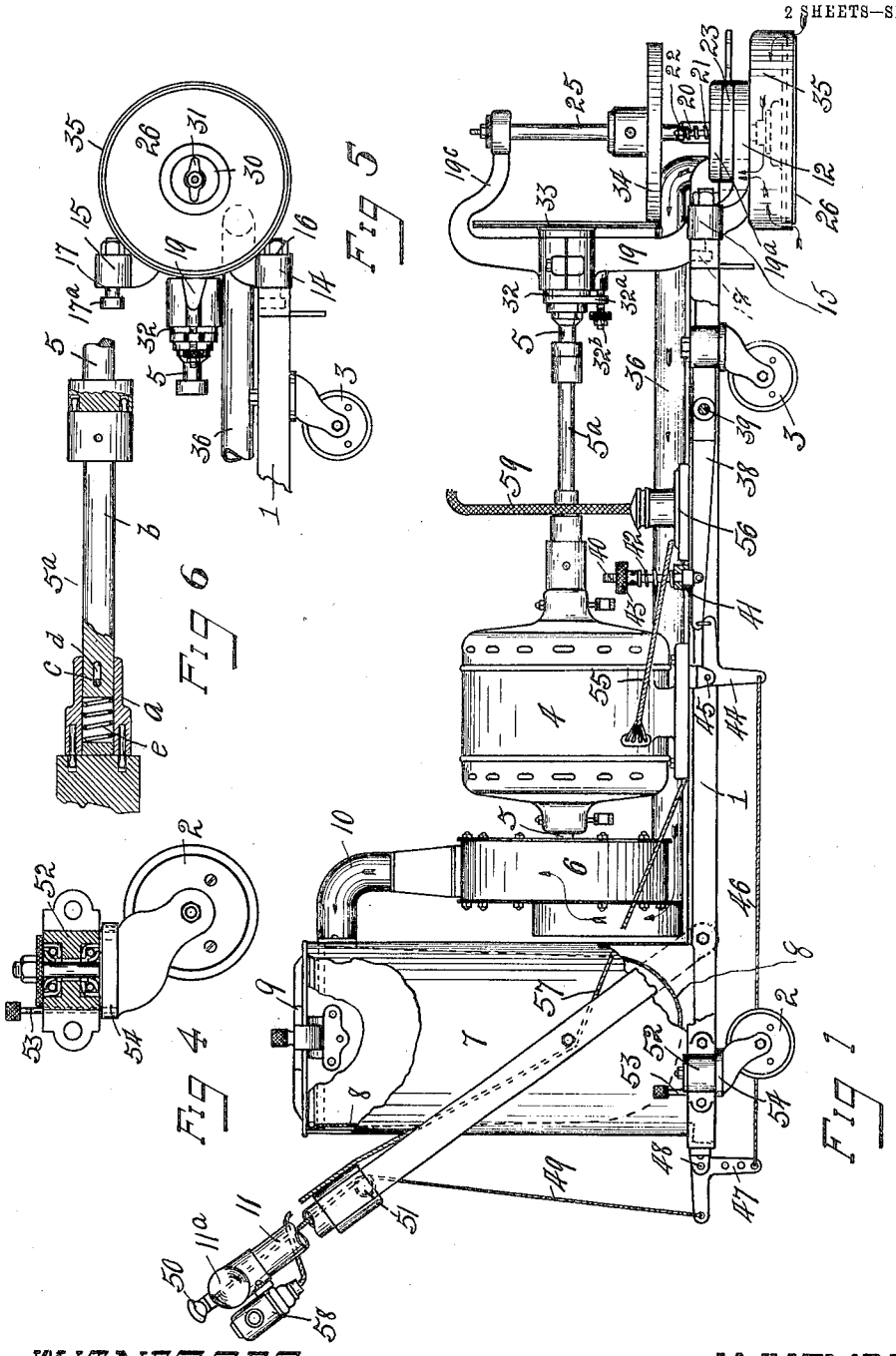


FIG 5

FIG 6

FIG 4

FIG 1

WITNESSES

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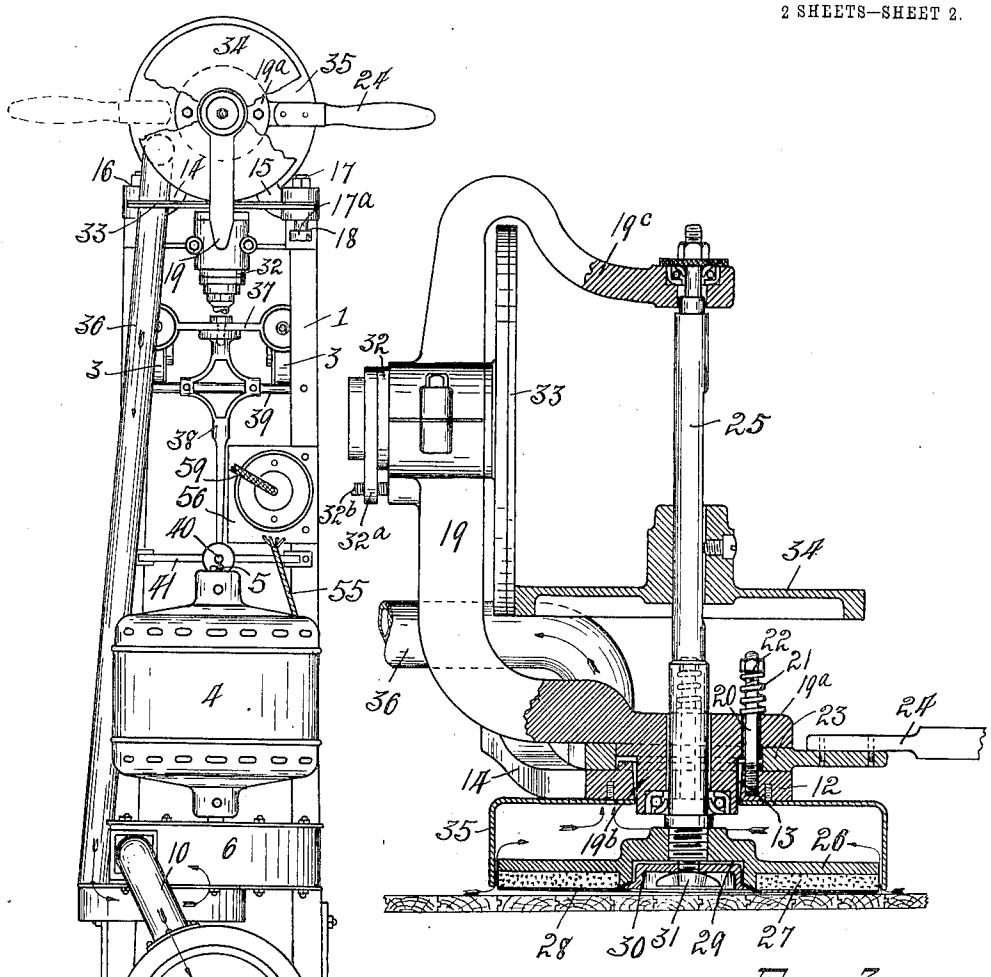


Fig 2

Fig 3

WITNESSES

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UNITED STATES PATENT OFFICE.

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SURFACING AND POLISHING MACHINE.

1,086,368. Specification of Letters Patent. Patented Feb. 10, 1914.

Application filed October 9, 1912. Serial No. 724,695.

To all whom it may concern:

Be it known that I, FRANCIS P. HUYCK, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Surfacing and Polishing Machine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates particularly to floor surfacing and polishing machines, but is not restricted to such use as it, and the different novel features thereof, may be used in other connections for which they may be adapted or appropriate.

The primary object of my invention is the provision of a hand machine of this character, which is simple, strong and durable in its construction, inexpensive of manufacture, and capable of being efficiently used both as a sander and a polisher of floors, the floor contacting medium being changed to suit the work to be performed, and also of being easily adapted for use as a vacuum cleaner, thus enhancing the practicability and commercial value of apparatus of this class.

A further object of my invention is the provision, in a machine of this character, of a rotary surfacing or polishing medium, which is adapted to have contact with a floor or surface to be acted on at substantially one side only of its axis of rotation, primarily for the purpose of preventing the forming of rings or sand marks in a sanded surface, and which is adjustable to change its point of contact with the floor relative to such turning axis, as desired, to enable the floor to be acted on at one side or the other of the surfacing medium axis.

A further object of my invention is the provision in combination with the main frame or carriage of a machine of the character described, of a relatively tiltable frame, which carries the surfacing or polishing medium and enables said medium to be swung to convenient position for changing its surfacing or polishing portion.

A further object of my invention is the provision in a machine of this character, of improved means which normally acts to maintain the surfacing or polishing medium free from contact with the surface over which it is operating and is manually adjustable in an easy and simple manner, from the operator's end of the machine, to lower said medium into contact with such surface and to cause it to bear with a desired pressure thereon, as the nature of the work may require.

Further objects and advantages of the invention will be apparent from the following detailed description.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying the invention, with parts broken away. Fig. 2 is a top plan view thereof, with parts broken away. Fig. 3 is an enlarged side elevation of the front portion of the machine with parts in section. Fig. 4 is an enlarged detail, partly in section, of one of the rear casters. Fig. 5 is a side elevation of the front end portion of the machine frame and parts carried thereby, with the surfacing medium and its carrying and drive parts tilted to inoperative position relative to the frame, and Fig. 6 is a detail partly in section of the removable motor shaft section.

Referring to the drawings, 1 designates the truck or carriage frame of the machine, which, in the present instance, is of elongated rectangular form and is supported at its rear end at each side thereof by a caster 2, and near its forward end by a pair of laterally spaced casters 3, which latter are mounted for vertical movements relative to the frame 1, as hereinafter described.

A motor 4, preferably of the electric type, is mounted on the frame 1 near its center, with its shaft 5 extending longitudinally of the frame and carrying, at the rear of the motor, a suction fan (not shown) which is disposed within a case 6 that is mounted on the frame. A tank or receptacle 7 for receiving a dust-collecting bag 8 is mounted on the rear end of the frame 1 and has its bottom open and its top closed by a lid 9. A pipe 10 connects the interior of the fan case 6 and tank, whereby the dust and dirt

which is drawn into the fan case is discharged therefrom into the bag 8 with which its outlet end communicates.

A handle 11 extends upward and rearward from the rear end of the frame, being forked at its lower end to enable it to straddle the tank 7 and be fixed thereto and also to the opposite sides of the frame. The upper end of the handle is shown as being provided with a cross-bar 11^a.

Disposed in advance of the forward end of the frame 1 is a table or yoke supporting member 12, which is provided with a centrally disposed vertical opening 13 and has frame attaching arms 14 and 15 extending rearward therefrom, with the former pivoting to the adjacent side of the forward end of the frame 1, as at 16, to permit the table to have vertical swinging movements laterally of the frame. The other arm 15 carries at its free or rear end a bolt member 17, which is disposed longitudinally of the frame and has its rear end headed, as at 17^a, and adapted to seat into a T-socket 18 in the adjacent side of the forward end of the frame, with the end of the arm 15 abutting against the frame end, when the table is in horizontal or operative position, as best shown in Fig. 2.

The forwardly projecting arm 19^a at the lower end of an upright bearing head or yoke 19 is mounted on the table 12 and has a boss 19^b projecting downward therefrom into the opening 13 of the table. The head is held yieldingly seated upon the table by bolts or pins 20, which project upward from the table through registering openings in the arm 19^a, and are encircled above said arm by coiled expansion springs 21, which have their lower ends thrust against the arm and their upper ends thrust against tension adjusting nuts 22 on the bolts. To facilitate a relative tilting adjustment of the table 12 and bearing-head 19, for the purpose hereinafter described, a tapered or wedge-form of ring 23 is interposed between the adjacent seating surfaces of the respective parts around the opening 13, and is rotatably adjustable relative to such parts to change the direction of inclination of the head 19, as desired. A handle 24 projects radially from preferably the narrow side of the ring 23 to facilitate an adjustment thereof.

The upper end of the bearing-head 19 is provided with a forwardly projecting arm 19^c, and in alining bearings in this arm and the arm 19^a is mounted a vertical shaft 25, which is held against vertical movements relative thereto by suitable bearing means therein. The lower end of the shaft 25 projects below the table 12 and carries a rotary disk-form of head 26 in spaced relation to said table. This head has its bottom surface preferably provided with an annular concentric facing of cork, felt or other yieldable substance 27, and the outer side of this is intended to be covered with sandpaper, polishing cloth or other surfacing or polishing medium 28, as the nature of the work to be performed may require. The head 26 is provided centrally on its bottom with a socket 29 having a beveled marginal edge to which the inner edge of a ring of sandpaper, of suitable size to cover the substance 27, is clamped by the marginal flange of a clamping cup or plate 30, which is inserted into said socket over a reduced end portion of the shaft 25 and held in clamping position by a winged-nut 31 on said shaft portion.

The working face of the head 26 or the portion thereof which is covered by the sandpaper is of slightly beveled or conical form to require the head axis to be tilted slightly from a true vertical position or perpendicular with respect to the surface over which it is operating to place such beveled portion in flat radial contact with said surface at one side of the head axis. The bevel of the working face of the head 26 is substantially the same as the taper or relative inclination of the opposite faces of the cam ring 23, so that the portion of the head which is below the reduced or thin side of the ring will have contact with the floor or other subjacent surface with the radii of the floor contacting surface of the head in substantially parallel relation with the floor surface, as shown in Fig. 3. It follows from this that it is only necessary to rotatably adjust the ring 23 relative to the table 12 to angularly adjust the floor contacting portion of the sanding or polishing head relative to its axis, and as the handle 24 projects from the thinnest side of the ring it will always stand over the operative side of the head, thus indicating at what point the work is being performed.

It is found in practice that the contacting of the head 26 at one side only of its axis with the surface over which it is operating is a very important feature in the performance of smooth surfacing work and in the elimination of circular sand marks in the sanded surface, the forming of which sand marks is one of the principal objections to the use of the ordinary types of rotary disk surfacing machines. With my machine the radially disposed edge portions of the disk surface move gradually into and out of rotary contact with the floor surface, so that any rough surfaces which are made by the central part of the contacting segmental portion of the surfacing head will be wiped out and smoothed by the gradually receding end portions thereof.

The forward end of the motor shaft 5 is journaled in an alining bearing 32 in the upright portion of the bearing head or yoke 19 and is in driving connection with the

shaft 25 through the medium of a pair of coacting friction disks 33 and 34, the latter of which is mounted for axial adjustment on the shaft 25 and has its periphery in contact with the outer face of the drive disk 33. The shaft 5 is shouldered against both ends of the bearing 32 and the latter is axially shiftable to change the driving pressure of one disk against the other. To effect such adjustment the bearing 32 is provided without the yoke 19 with a lateral extension 32^a and an adjusting screw 32^b is threaded through this and rotatably anchored in the yoke. The shaft yields longitudinally, as hereinafter described, to permit such adjustment.

In order to enable the bearing-head or yoke 19 to be swung laterally to reclining position with the table 12 on its pivot 16, the motor shaft 5 is provided with a removable section 5^a, which has its ends in universal-joint connection with the respective end portions of the shaft to permit a flexing thereof to suit the inclination of the head 19 relative to a vertical as it is adjusted relative to the table 12 by a turning of the cam ring 23. The shaft section 5^a (Fig. 6) comprises socket and plunger parts *a* and *b*, respectively, which are permitted to have limited relative reciprocatory movements by the provision in the socket of a pin *c*, which works in a slot *d* in the plunger. A coiled compression spring *e* is interposed between the socket end of the plunger and the base of the socket to yieldingly retain the parts in extended relation. The ends of the section 5^a have removable pin and socket connection with the respective end portions of the shaft. To remove the shaft section 5^a from the shaft it is only necessary to shorten such section against the tension of the spring *e* to disconnect one of the shaft joints and then to swing the disjointed end of the section laterally.

35 designates a hood, which is attached to the under side of the table 12 and extends outward and downward therefrom around the periphery of the sanding or polishing head 26 in slightly spaced relation thereto and adjacent to the lower edge thereof, thus providing a narrow annular inlet space around the head. The hood forms a chamber above the head 26, which has communication through a conduit 36 with the inlet opening to the fan-case 6, thus enabling a suction to be created in said chamber and through the inlet space around the sanding-head 26 to draw all dust and dirt from around the edge of the head into said chamber and thence into the fan-case from whence it is forced into the dust-collecting bag 8.

To facilitate a raising and lowering of the front end of the truck frame 1 to move the sanding or polishing head 26 into or out of contact with the surface over which it is operating, the front pair of casters 3 are carried at the opposite ends of a cross-bar 37, which is pivoted at its center for vertical rocking movements to the forward end of a lever 38 that extends longitudinally of the frame 1, substantially midway between the side beams thereof, and is carried for vertical rocking movements by a shaft 39, the ends of which are attached to the opposite side beams of the frame 1. The rear arm of the lever 38, which arm is preferably longer than the arm thereof to which the cross-bar 37 is attached, has a pin or bolt member 40 attached thereto near its rear end and extending upward through a registering aperture in a cross-bar 41, the ends of which bar are rigidly supported by the frame sides. A coiled compression spring 42 is mounted on the pin 40 between the top side of the bar and an adjusting nut 43, which is threaded onto the outer end of the pin, and serves to yieldingly hold the rear end of the lever 38 elevated. It is thus apparent that the forward end of the truck frame 1 normally stands in position to support the sanding or polishing head 26 free from contact with a flat subjacent surface.

To enable the operator to effect a rocking of the lever 38 against the tension of the spring 42, from his position at the rear of the machine, the rear end of said lever is connected to the forwardly projecting arm of a bell-crank lever 44, which is pivoted beneath the truck frame, as at 45, and has its downwardly extending arm connected by a cable or other suitable connecting member 46 to the downwardly extending arm of a bell-crank lever 47, which is pivoted to the rear end of the frame, as at 48, and has its rearwardly extending arm connected by a cable 49 to one end of a hand-lever 50, that is mounted on the outer side of the cross-bar 11^a of the handle 11. The control lever 50 is disposed longitudinally of the handle cross-bar 11^a with its inner end terminating adjacent to the center of said bar and attached to the cable 49, which extends therefrom down through a portion of the handle 11, which is preferably of tubular form, over a sheave 51 on said handle, and thence down to the bell-crank lever 47. This form of control means for the raising and lowering movements of the working head 26 relative to the subjacent surface enables the operator to control to a nicety the pressure of such head on the surface over which it is going.

Each of the rear casters 2 has its forked head preferably mounted in a bearing 52, which is carried by the adjacent side of the frame 1, and such bearing is provided with a pin 53, which may be inserted into any one of a series of apertures provided in a subsequent flange portion 54 of the caster fork to lock the caster fork in any desired position relative to the frame. If desired,

the pin may be withdrawn from engagement with the fork to permit a free horizontal turning of the caster.

The motor 4 has a multiple wire lead 55 extending to a socket member 56 on the frame and connecting through a cord 57 with a switch 58 on the outer end portion of the handle 11. A cord 59 may lead from the socket member 56 to any suitable source of electrical supply.

The operation of my machine is as follows: The motor 4, being in electrical connection with a source of electrical supply, causes a driving of the suction fan within the case 6 and also a driving of the sanding or polishing head shaft 25 through the medium of the friction disks 33 and 34, which are relatively adjusted to cause a driving of the shaft 25 and its head 26 at the desired speed. If the machine is to be used for surfacing purposes the rotary head 26 is faced with sand paper or other suitable abrading means, which is secured thereto, in the present instance, by the clamping action of the clamping-cup or plate 30, against the inner edge portion of the working surface of said head, and the cam or wedge ring 23 is turned relative to the table 12 and bearing yoke 19 to tilt the rotary head and its carrying parts as it may be desired to surface the subjacent floor at one side or the other of the head axis. When the operator presses the control lever 50 to effect a lowering of the rotary head, a segmental portion only of the working surface thereof has contact with the floor with the end edges of such portion gradually moving into and out of engagement therewith so that any rough surfaces which are made by the central or more deeply cutting portion of such segmental working part are smoothed, thus preventing the leaving of sand marks or circles in the treated surface. The revoluble adjustment of the segmental working portion of the head around its axis, which is accomplished by a turning of the ring 23, enables surfacing or polishing work to be done close to walls and also lengthwise of the grain of floor boards. For instance if the machine is being worked longitudinally of the floor boards the ring 23 is adjusted so that the cutting or abrading action will be lengthwise of the grain of the boards instead of crosswise, which latter would be the case if the working segmental portion of the head were disposed at the front or rear of its axis. Any dust and dirt which is occasioned by the abrading or sanding action of the head is drawn into the interior of the hood 35 through the annular space formed thereby around the periphery of the abrading-head and is then delivered to the dust-collecting bag 8 by the action of the suction-fan. If the machine is to be used for floor polishing purposes the disks 33 and 34 are preferably relatively adjusted so as to drive the rotary head 26 at a slower speed than when being used for surfacing purposes, thus preventing the heating and consequent burning of the wax on the floor surface, which would be caused by a rapid driving of the head.

It is evident that I have provided a surfacing and polishing machine which is simple and easy to operate and which entirely prevents the making of rings or sand marks in the floor being surfaced, as in the case of the rotary types of surfacing machines heretofore used.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is,—

1. In a machine of the class described, a rotary surfacing head, and means for effecting and maintaining an orbital adjustment of the head axis to cause the head to have contact at different sides of its axis with a subjacent surface.

2. In a machine of the class described, a frame part, a rotary abrading member carried by said part, and rotary means operable to relatively adjust the axis of said member relative to said part, the adjusting movements of said means being in a plane which intersects the member axis.

3. In a machine for surfacing flat floors, a rotary abrading member having its working face beveled so that when a segmental portion of such face is in contact with a floor being finished the remainder of the face is out of contact with the floor, whereby to remove any prior markings made in the floor surface by the abrading member.

4. In a machine of the class described, an abrading member having its working face beveled, and means for orbital adjusting the surface cutting portion of said face.

5. In a machine of the class described, a frame part, a shaft, means carrying the shaft and adjustable to cause an end thereof to have orbital movements relative to said part, and a rotary surfacing or polishing head carried by such shaft end.

6. In a machine of the class described, a frame part, a rotary surfacing or polishing head carried by said part and having a beveled working face, and means for orbitally adjusting said head to cause its working face to have contact with a subjacent surface at predetermined points around the head axis.

7. In a machine of the class described, a rotary head having its axis inclined relative to a subjacent surface, and means for orbitally adjusting the head axis to change its direction of inclination.

8. In a machine of the class described, a rotary head having its axis inclined relative to a line which is perpendicular to a surface to be acted on and having its radial

working face beveled with the adjacent portions of such face and said surface parallel, and means for changing the direction of inclination of the head axis to revolubly adjust the point of contact of the head with said surface relative to the head axis.

9. In a machine of the class described, a frame part, a rotary abrading head carried by said part with its axis inclined relative to a line perpendicular to a subjacent surface to adapt the bottom side of said head to have contact with such surface at one side only of the head axis, and means for changing the point of such contact in orbital relation the head axis.

10. In a machine of the class described, a frame part, a bearing member carried by said part, an inclined shaft journaled in said member, an abrading member carried by an end of said shaft, and means for relatively adjusting said bearing member and frame part to orbitally change the direction of inclination of the shaft.

11. In a machine of the class described, a frame part, a bearing member adjustably carried by said part, a shaft journaled in said member, a rotary head carried by an end of said shaft, and means interposed between portions of said frame part and member to maintain the shaft inclined relative to a line which is perpendicular to a subjacent surface and being adjustable to change the direction of inclination of the shaft.

12. In a machine of the class described, a frame part, a bearing member carried by said part, a shaft carried by said member, and having an abrading head at one end, and a cam ring encircling the shaft between portions of said frame part and member and being rotatably adjustable to change the direction of projection of the shaft.

13. In a machine of the class described, a main frame, a bearing member carried by said main frame, a wedge shaped ring interposed between said frame and head, means for clamping said member, main frame and ring together to permit the member to have yielding tilting movements relative to the main frame when the ring is turned, and surfacing means carried by said member.

14. In a machine of the class described, a frame part, a bearing member yieldingly carried by said part, a shaft journaled in said member and having an abrading head at one end, and wedge means mounted between portions of said frame part and member to incline the shaft relative to the frame part and rotatably adjustable to change the direction of such inclination.

15. In a machine of the class described, a truck frame, a bearing member carried by said frame for universal movements relative thereto, a shaft journaled in said member, a rotary abrading or polishing head carried by an end of said shaft, and means operable to universally adjust said member to change the direction of projection of said shaft.

16. In a machine of the class described, a truck frame, a bearing member rising from a part thereof, a shaft journaled in said member, a rotary head carried by an end of said shaft, and having a beveled working face on one side thereof, means coacting with said frame and member to normally maintain the member in position to incline its shaft relative to a vertical and being rotatably adjustable to revolubly adjust the inclination of said shaft, and means for driving said shaft.

17. In a machine of the class described, a truck frame, an abrading member carrying head carried by said frame for vertical tilting movements relative thereto to enable it to be placed in upright or reclining positions, and means for securing said head in upright position relative to the truck frame.

18. In a machine of the class described, a truck frame, a motor carried by said frame, a bearing-head tiltably carried by the frame, a rotary abrading member carried by said head, and drive means connecting said motor and member and being separable to permit a tilting of the head from upright to reclining position.

19. In a machine of the class described, a frame, a motor carried by said frame and having a substantially horizontal rotor axis, a bearing head tiltably carried by the frame, a vertically disposed shaft mounted in said head, an operating member carried by said shaft, and drive means between said motor and shaft having parts thereof separable to permit a tilting of said head from upright to reclining position.

20. In a machine of the class described, a truck frame, a bearing member carried thereby, a shaft journaled in said member, an abrading member carried by said shaft, a motor mounted on said frame and having its shaft journaled in a part of said bearing member, and variable speed driving means connecting the motor shaft and said abrading member shaft.

21. In a machine of the class described, a truck frame, a table pivoted to said frame for vertical rocking movements, and having a part for clamping action with a part of the frame to retain the table in operative position relative thereto, and abrading means carried by said table and tiltable therewith, and means for adjusting the abrading means relative to the table.

22. In a machine of the class described, a truck frame, a table disposed in advance of one end thereof and having a part pivoted to said frame for vertical rocking movements to enable the table to be placed

in upright of reclining positions, and a part in releasable stud and socket engagement with said frame to secure the table in operative position relative thereto, a bearing member carried by said table, a shaft journaled in said member and projecting below the table, a rotary abrading or polishing head carried by said shaft below the table, and drive means carried by the frame in separable connection with said shaft.

23. In a machine of the class described, a main frame having a detachable part, and an abrading disk, a shaft therefor, and a variable power transmission mechanism carried as a unit by said frame part.

24. In a machine of the class described, a main frame, an auxiliary frame detachably carried by said main frame, an abrading disk, a shaft therefor, and a variable speed friction power transmission mechanism for the shaft carried as a unit by said auxiliary frame.

25. In a machine of the class described, a truck frame, an auxiliary frame carried at one end of the truck frame for tilting movements relative thereto, and an abrading member, a shaft therefor, a shaft carrying part and a variable speed power transmission mechanism for the shaft carried as a unit by said auxiliary frame.

26. In a machine of the class described, a bearing head, a shaft mounted in said head, an abrading member carried by said shaft, a driven wheel mounted for axial shifting movements on said shaft, and drive means having a friction disk in driving contact with the periphery of said wheel.

27. In a machine of the class described, a bearing head, a shaft journaled in said head, an abrading member carried by said shaft, a driven wheel mounted on said shaft, drive means having a friction drive disk in driving contact with said wheel, and means for adjusting the pressure between said drive and driven parts.

28. In a machine of the class described, a main supporting frame having a T-shaped mortise therein, an abrading-member-carrying table having arms projected therefrom with one arm pivoted to said frame and the other arm carrying a T-head clamping bolt for removably fitting into the mortise in said frame to secure the table in operative position relative to said frame.

29. In a machine of the class described, a frame, a cross shaft carried by said frame, a horizontally disposed lever carried by said shaft between the opposite side portions of the frame, a cross bar carried by an end of said lever, frame supporting wheels carried by said cross bar at its opposite ends, means yieldingly influencing an upward movement of the opposite end of the lever to maintain the associated frame end normally raised, and means operable to move the lever to effect a lowering of the portion of the frame carrying the lever.

30. In a machine of the class described, a base frame having front and rear supporting casters, a horizontally disposed lever disposed between the opposite side portions of the frame and fulcrumed thereto for vertical rocking movements, a cross bar carried at one end of said lever for vertical pivotal movements relative thereto, said cross bar forming bearings for and carrying the casters disposed at one end of the frame, means yieldingly acting on said lever to normally maintain it in position to cooperate with the casters carried by said cross bar to support the frame a predetermined distance above a subjacent surface, and means operable to move said lever against the influence of said first means to permit a lowering of the associated end of the frame.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS P. HUYCK.

Witnesses:
C. W. Owen,
E. E. Thomas.