March 3, 1936. E. L. TORRISON 2,032,382

RUBBING MACHINE

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Fig. 1.

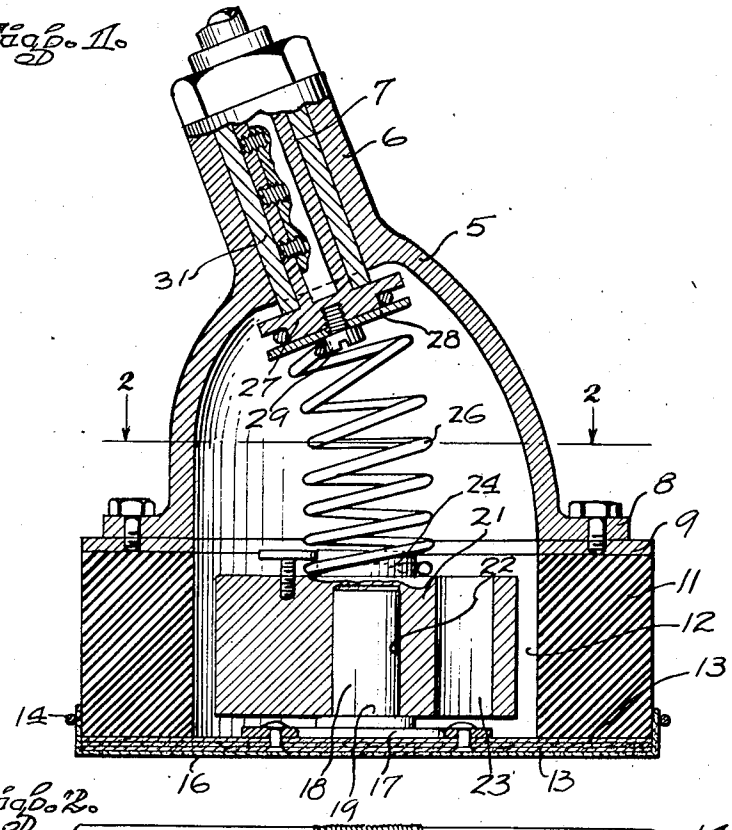
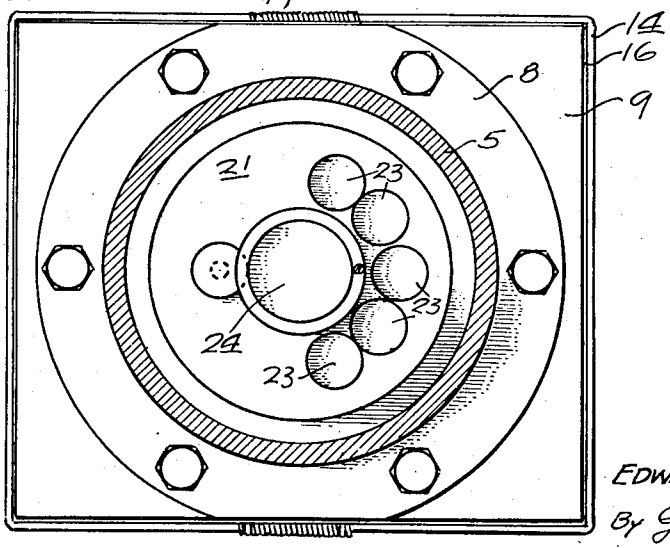


Fig. 2.



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RUBBING MACHINE

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16 Claims. (Cl. 51—170)

This invention relates to a rubbing machine.

The primary object of the invention is to provide a machine wherein oscillating movement is utilized in connection with a flexible body to create a rubbing motion on a flexible contact shoe, for surfacing, polishing, or otherwise finishing a surface, without any reaction or strain on the hand of the operator.

Another object of this invention is to provide a rubbing machine which is highly useful and simple in construction. Convenience of arrangement, lightness and comparative inexpense of manufacture are further objects which have been borne in mind in the production and development of the invention.

I am aware that some changes may be made in the general arrangements and combinations of the several devices and parts, as well as in the details of the construction thereof without departing from the scope of the present invention as set forth in the following specification, and as defined in the following claims; hence I do not limit my invention to the exact arrangements and combinations of the said device and parts as described in the said specification, nor do I confine myself to the exact details of the construction of the said parts as illustrated in the accompanying drawing.

The invention is clearly illustrated in the accompanying drawing, wherein:

Figure 1 is a sectional view of my rubbing machine.

Figure 2 is a sectional plan view of my rubbing machine, the section being taken substantially on line 2—2 of Figure 1.

In carrying out my invention I make use of a holder or handle 5 in the form of a hollow casing with a neck 6 for the usual flexible drive shaft connection 7. The casing may be vertical, or the neck 6 may be extended at an angle, as shown, to facilitate gripping and handling of the device. On the bottom of the holder 5 is a flange 8 to which latter is bolted a rigid plate 9. A resiliently flexible body, such as a soft rubber cushion 11 is vulcanized to the underside of the plate 9. The cushion 11 has a central cylindrical, cavity 12 therethrough.

The bottom of the cushion 11 is covered by a flexible pad 13, which may be made of a plurality of sheets of canvas vulcanized together and cemented to the bottom of the cushion 11. Around the outside of the cushion 11 near its bottom edges is a spring clamp 14, whereby a rubbing shoe 16 is clamped in place. The shoe 16 covers the underface of the pad 13 and it is made of sand paper or abrasive, or soft polishing material as it may be required in a desired treatment of a surface to be finished.

To the inside face of the pad 13 is riveted, or otherwise suitably secured, the annular flange 17 of a vertical journal shaft 18. At the lower end of the shaft 18 is bearing shoulder 19 on which rests a rotor 21. The rotor 21 consists of a metal cylinder or drum. A bore 22 in rotor 21 extends from its bottom upwardly to a point spaced from the top of the rotor 21, and fits over the stub shaft 18 so that the latter forms the axis of rotation of the rotor 21. The axis of rotation thus provided is central to the rotor 21. On one side from the centerline of the rotor 21 a plurality of vertical holes 23 are provided extending from top to bottom, hence one side of the rotor 21 is heavier than the other side and the center of gravity of the rotor 21 is to one side of the axis of rotation of said rotor.

On the center of the top of the rotor 21 is a reduced neck 24 around which fits the lower end of a strong coil spring 26. The coil spring 26 is suitably anchored in the top of the rotor 21 such as by means of flat headed machine screw. The spring 26 is bent upwardly toward the interior of the handle neck 6 and has its upper end anchored on the flanged end 27 of the drive shaft connection 7 by means of a clamp plate 28 and a screw 29. The inside of the connecting drive shaft 7 is provided with the usual keys for attachment to a suitable flexible drive shaft. The connection shaft 7 rotates in a bearing bushing 31 in said handle neck 6.

In operation a shoe 16 of suitable material for the particular work is clamped over the bottom of the cushion 11. For instance the device may be used for preparing a surface in all painting work, by the use of different grades of sand paper, abrasive shoe, or the like, or it may be used with shoes for sanding or surfacing wood, or metal or any material, such as stone in terrazzo work. Then a different shoe is used for finishing intermediate coats of paint, or for polishing final, finished surfaces.

Then the operator places the device so that the shoe 16 rests on the surface to be worked upon, and holds it down by hand with any desired pressure. Then the motive power, preferably an electric motor not shown, is turned on. Rotation is transmitted through the connection shaft 7, and the spring 26 to the unbalanced rotor 21. The rotor 21 is rotated at such high speed that it will cause a whipping or shifting of the rotor by reason of its floating axis and the resultant

vibration or oscillation. The flexibility of the driving spring 26 allows the shifting of the axis of rotation of the rotor 21 but holds it at the same angle. Consequently the shifting of the axis of rotation describes substantially a circle or centroid around the initial center of the rotor 21, and the rotor 21 also continues to rotate uninterruptedly around its shifting axis. The moment of inertia of the heavier side of the rotor 21 exerts not only sufficient force to oscillate the rotor 21, but it has enough force to pull the flexible pad 13 therewith and thereby pull the lower portion of the cushion 11. The cushion 11 yields near the bottom and is distorted laterally and angularly in all directions successively as the rotor 21 whips around and shifts its shaft 18 and pad 13 around. On account of the action of the cushion 11 the resulting oscillation of the pad 13 and the shoe 16 therewith is not merely linear, but also angular, so that each point of the shoe 16 describes substantially a circular contact movement on the working surface.

In the above manner intensive rubbing action is obtained without excessive strain or reaction against the hand of the operator. The flexibility of the pad 13 and of the cushion 11 in connection with the practically floating flexible drive of the rotor accomplishes a smooth circular motion of the shoe 16 and the handle 5 is merely guided by the operator over the surface upon which the work is done.

I claim:

1. A rubbing machine comprising a rotary member having its center of gravity offset to one side from its axis of rotation, a flexible member around and spaced from the periphery of said rotary member, holding means for the flexible member, means connected to the flexible member to rotatably support said rotary member, means to rotate said rotary member at such rate of speed as to distort said flexible member whereby each point of the bottom of the flexible member describes a substantial circle, and a rubbing element on the bottom of the flexible member to be moved with the latter.

2. A rubbing machine comprising a rotary member having its center of gravity offset to one side from its axis of rotation, a flexible member around and spaced from the periphery of said rotary member, holding means for the flexible member, means connected to the flexible member to rotatably support said rotary member, means to rotate said rotary member at such rate of speed as to distort said flexible member whereby each point of the bottom of the flexible member describes a substantial circle, and a rubbing element arranged on the bottom of the flexible member to be moved with the latter, said flexible member being substantially of the same height as that of said rotary member.

3. A rubbing machine comprising a rotary member having its center of gravity offset to one side from its axis of rotation, a flexible member around and spaced from the periphery of said rotary member, holding means for the flexible member, means connected to the flexible member to rotatably support said rotary member so that the axis of said rotary member substantially coincides with the center line of the flexible member when at rest, means to rotate said rotary member at such rate of speed as to distort said flexible member whereby each point of the bottom of the flexible member describes a substantial circle, and a rubbing element arranged on the bottom of the flexible member to be moved with the latter.

4. A rubbing machine comprising a rotary member having its center of gravity offset to one side from its axis of rotation, a flexible member around and spaced from the periphery of said rotary member, holding means for the flexible member, means connected to the flexible member to rotatably support said rotary member, resiliently flexible means to rotate said rotary member at such rate of speed as to distort said flexible member whereby each point of the bottom of the flexible member describes a substantial circle, and a rubbing element arranged on the bottom of the flexible member to be moved with the latter.

5. A rubbing machine comprising a rotary member having its center of gravity offset to one side from its axis of rotation, a flexible member around and spaced from the periphery of said rotary member, holding means for the flexible member, means connected to the flexible member to rotatably support said rotary member, means to rotate said rotary member at such rate of speed as to distort said flexible member whereby each point of the bottom of the flexible member describes a substantial circle, and a rubbing element detachably secured to the bottom of the flexible member to be moved with the latter.

6. In a rubbing machine the combination with a hollow flexible member having a working surface thereon, and means for holding said member so as to allow distortion of the portion of said member near said working surface, of a rotatable mass inside of said flexible member being so supported that said mass has angular and linear acceleration when rotated causing its center of rotation to shift so that the whole rotating mass rotates around a plurality of successive instantaneous centers on a centrode substantially described by the center of rotation of said mass, means of connection between the rotatable mass and the flexible member so that the former when rotated distorts the latter so that each point of said working surface on the flexible member is moved in a rotary rubbing action, and means to impart rotary motion to said mass, said last means including a resiliently flexible drive member connected to said rotatable mass.

7. In a machine of the character described a casing, a hollow flexible body extended from the casing, means to hold a rubbing element on the extended portion of the body, a rotary vibrator in the cavity of said body adapted to shift its center of rotation as it rotates, means to rotate said vibrator, and means of connection between the vibrator and the flexible body to distort the body as the vibrator shifts its center of rotation so as to move its bottom relatively to its top with a rubbing motion.

8. In a machine of the character described, a holder, a resiliently compressible, hollow body extended from the holder, a bottom on said body, a rotor journalled on said bottom and being spaced from the inner periphery of said hollow body, a flexible driving connection extended to said rotor to impart rotary motion thereto, and means to cause said rotor to continuously change the location of its axis of rotation and correspondingly shift the bottom of said body relatively to said casing when the rotor is rotated.

9. In a machine of the character described, a holder, a resiliently compressible, hollow body extended from the holder, a bottom on said body, a rotor journalled on said bottom and being

spaced from the inner periphery of said hollow body, a flexible driving connection extended to said rotor to impart rotary motion thereto, and means to cause said rotor to continuously change the location of its axis of rotation and correspondingly shift the bottom of said body relative to said casing when the rotor is rotated, and means to hold an overlying layer over the outside of the bottom of said body.

10. In a device of the character described, a casing, a rubber cushion extended from said casing, said cushion having a central cavity, a bottom on the cushion, a vibrating rotor in the cavity journalled on the bottom, and a flexible drive connection in the casing to transmit rotation to said rotor.

11. In a device of the character described, a casing, a rubber cushion extended from said casing, said cushion having a central cavity, a bottom on the cushion, a vibrating rotor in the cavity journalled on the bottom, a flexible drive connection in the casing to transmit rotation to said rotor, and a flexible shoe detachably held on the outside of the bottom.

12. In a device of the character described, a casing, a rubber cushion extended from said casing, said cushion having a central cavity, a bottom on the cushion, a vibrating rotor in the cavity journalled on the bottom, and a flexible drive connection in the casing to transmit rotation to said rotor, said rotor being held spaced from the periphery of said cavity at all times.

13. In a device of the character described, a casing, a rubber cushion extended from said casing, said cushion having a central cavity, a bottom on the cushion, a vibrating rotor in the cavity journalled on the bottom, and a flexible drive connection in the casing to transmit rotation to said rotor, the center of gravity of said rotor being offset to one side of the axis of its rotation.

14. In a device of the character described, the combination with a holder, a flexible member extended from the holder, of a rotor, said flexible member having a cavity therein, a wall of the cavity adjacent the working face of the flexible member being formed of a firmer flexible material than that of the flexible member, said rotor being journalled on said wall and being adapted to have its center gyrate as the rotor is rotated, so as to exert a gyrating force on said wall thereby to distort the lower portion of said flexible member.

15. In a device of the character described the combination with a holder and a flexible cushion extended from the holder, having a cavity within and coaxial with said cushion, of a flexible working face wall on said cushion adapted to cover an end of said cavity, a rotor journalled on said flexible wall coaxially with said cushion, said rotor being adapted to have its center of rotation gyrate around the initial, standstill position of said center as the rotor is rotated, and a flexible drive connection to impart rotation to said rotor.

16. In a device of the character described the combination with a flexible body having a working surface thereon, and a holder for said body; of a rotor inside said body being rotated around a floating axis, the center of mass of said rotor being to one side of its axis of rotation and means of connection between the rotor and the portion of the body adjacent said working surface to transmit the forces caused by the shifting of said floating axis of rotation of said rotor to said portion of the flexible body to cause said working face to move relatively to said holder.

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