Feb. 9, 1943. R. K LEWIS 2,310,302

FLOOR TREATING MACHINE

Filed March 6, 1941 3 Sheets-Sheet 1

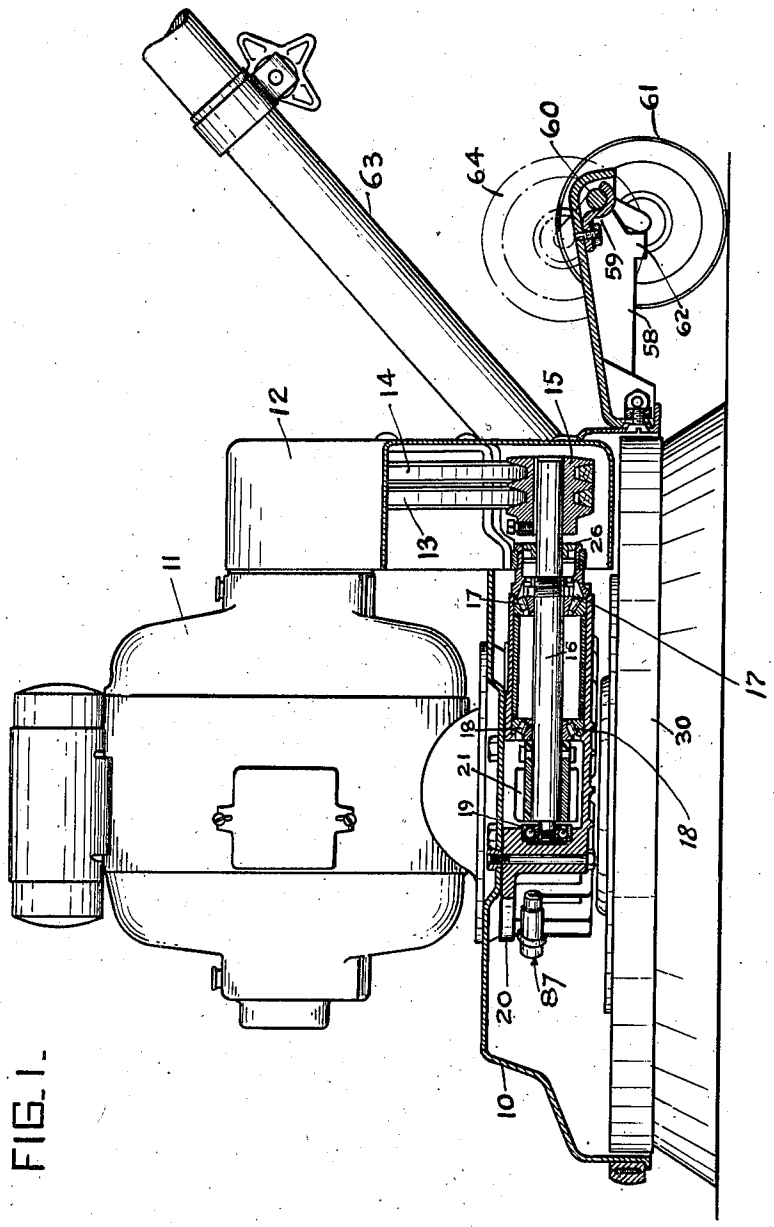


FIG. 1.

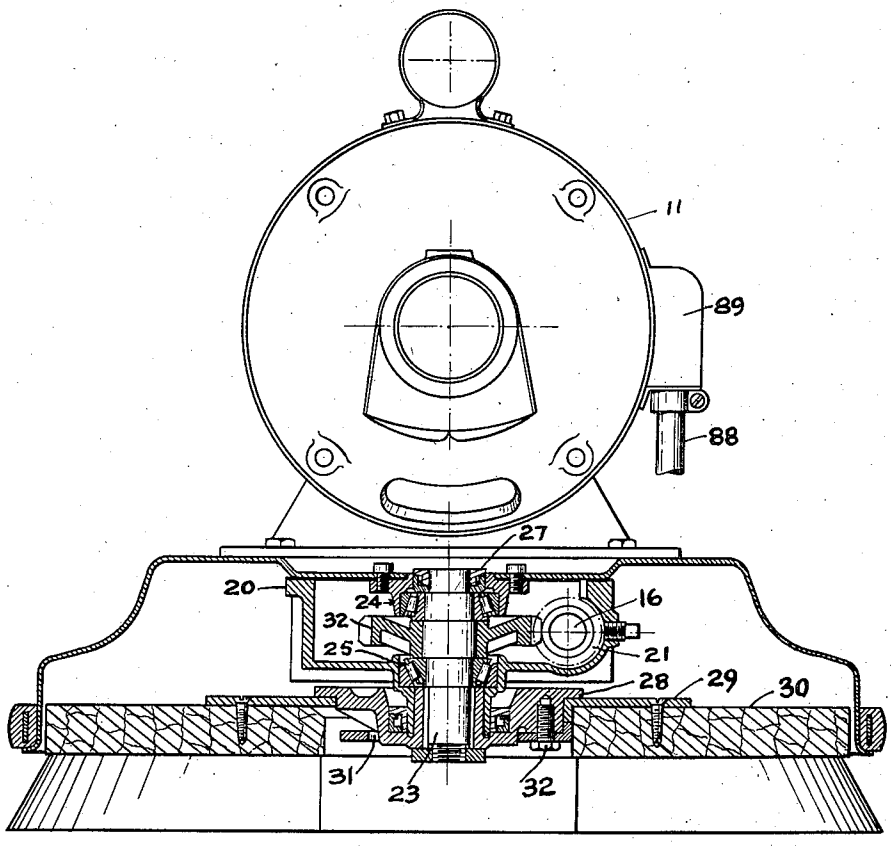
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FIG. 2.



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FIG. 4.

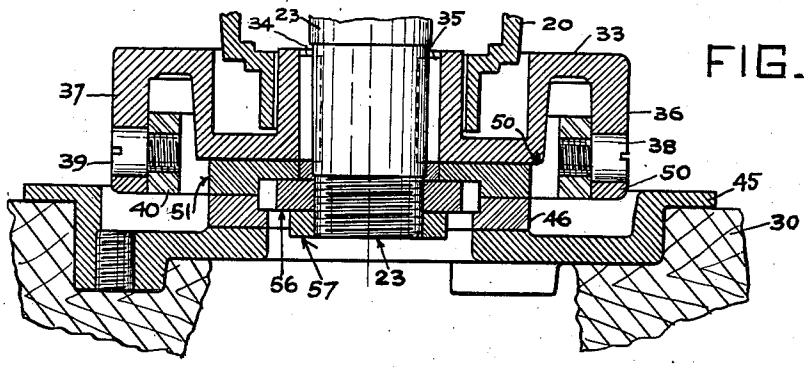


FIG. 3.

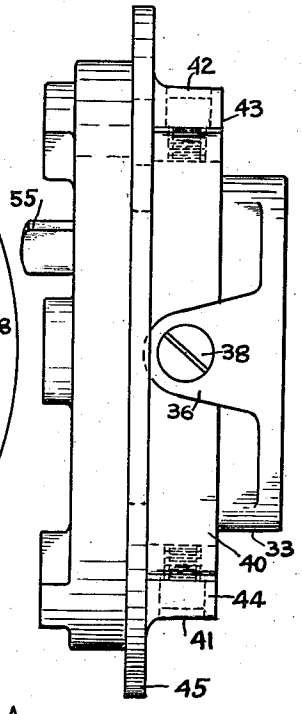


FIG. 5.

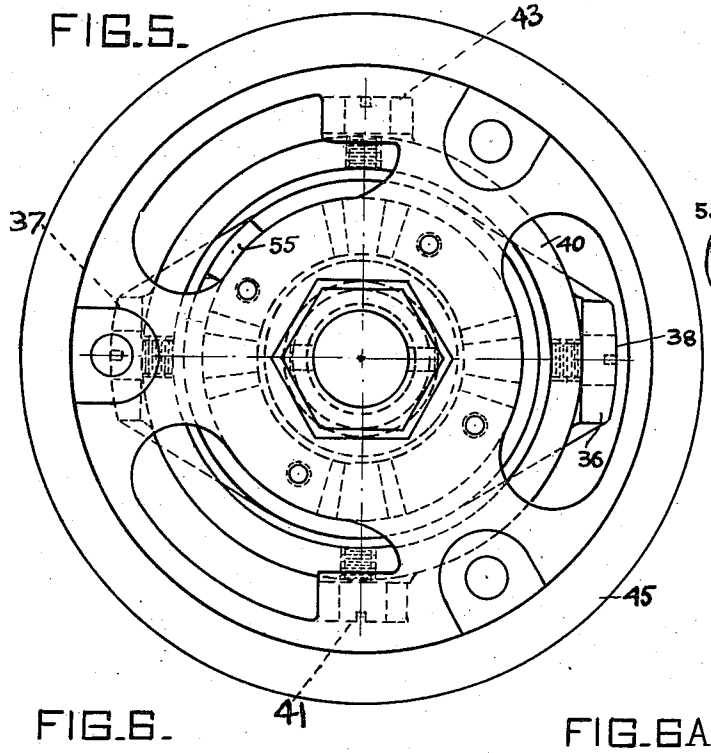


FIG. 6.

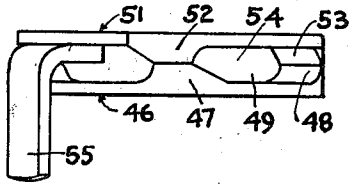
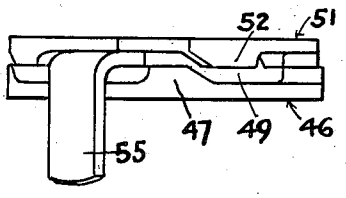


FIG. 6A.



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2,310,302

FLOOR TREATING MACHINE

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Application March 6, 1941, Serial No. 382,013

8 Claims. (Cl. 15—49)

This invention relates to floor treating machines adapted to scrubbing, sand-papering, waxing, polishing, and the like uses.

Floor treating machines according to this invention may be put to a variety of uses, as they may be used as scrubbing machines at one time, and at other times as sand-papering, waxing, polishing and like machines, and it is desirable that they be readily adaptable to such uses with a minimum of manipulation and with the substitution of as few, if any, parts as possible. It is a well known fact that floors which are to be treated, in many instances, have irregular surfaces and in order to effect uniformity in treating such floors, it is desirable that the machines compensate for such irregularities.

It is therefore an object of the present invention to provide a floor treating machine embodying the above desirable features, and particularly one in which the rotary brush structure will automatically adjust itself to any and all irregularities existent in such surfaces to which it is applied.

Another object is to provide a compact machine which is inexpensive to manufacture, and which is easy for the ordinary person to manipulate for the various uses to which it may be put.

Another object is to provide a machine of the character described in which the gear reduction is placed directly below the motor by the use of a chain or belt drive, and in which the motor is placed directly above the gear case.

A further object is to provide a machine of the character described in which the machine may be used either as a "motor weighted" machine or a "divided weight" machine, as the terms are hereinafter defined.

The following specification and claims disclose a preferred embodiment of the invention herein claimed. It will be understood, however, that this disclosure is merely by way of illustration and that many changes and modifications can be made in the construction and arrangement of the various parts without departing from the inventive concept as defined in the accompanying claims.

In the drawings:

Figure 1 is a side view of the improved machine, partly in section, showing the gear case and driving connection to the motor;

Figure 2 is a front elevation, partly in section, of the machine shown in Figure 1;

Figure 3 is a side view of an alternate form of a coupling member;

Figure 4 is a vertical sectional view of the coupling member shown in Figure 3;

Figure 5 is a view of the bottom of the coupling member, Figure 3; and

Figures 6 and 6A are views of cam plates used in the coupling member, Figure 3.

In Figure 1, the numeral 10 denotes the frame of the machine upon which is mounted the electric motor 11 in any suitable manner. The drive shaft of the motor projects into the housing 12 and is equipped with a suitable grooved pulley (not shown) to receive the V-belts 13, 14, which drive the pulley 15 secured to the horizontal shaft 16.

The shaft 16 is supported in suitable bearings 17, 18, 19, in a housing 20 secured to the frame 10.

A worm 21 is secured to the outer end of shaft 16 and engages the worm gear 22 secured to the vertical shaft 23 in any suitable manner, and said shaft 23 is supported in suitable bearings 24, 25, in the housing 20, as shown.

The housing 20 may be filled with suitable lubricant for the bearings and gearing therein, the grease retainers 26, 27, being provided to retain the lubricant.

On the outer end of the shaft 23 is mounted the driving member 28 of a quick-detachable coupling, the driven half 29 of which is secured to the brush 30. This driven member is provided with slotted jaws 31, to engage the cap screws 32 projecting downward from the member 28 so as to form a bayonet lock whereby, by giving the brush member a half-turn in a direction reverse to that of its rotation, it may be detached from the machine. As such attachments are well known, they will not be described in detail. They provide a driving connection for the brush 30, whereby the face of same is rigidly held at a right angle to the axis of shaft 23 and hold the brush in such rigid relationship during its rotation, while in use. Obviously such a structure does not permit of any flexible relationship of the brush head 30 and its driving shaft 23.

In Figures 3 to 6A, inclusive, is shown a coupling device which may be adjusted for rigid or flexible operation. In Figure 4, 33 denotes a coupling hub driven by shaft 23 and coupled thereto by any suitable means, such as the keys 34, 35. This hub has the diametrically opposed downwardly projecting ears 36, 37, in which are located the pivot screws 38, 39, on which a coupling ring 40 is free to swing.

The ring 40 has, at diametrically opposed points on its circumference, a second pair of pivot pins 41, 42, whose axes are at a right angle to the axes

of the pins 38, 39, and mounted on pins 41, 42, so as to swing freely thereon by the ears 43, 44, is the plate member 45 to which the brush 30 is secured in any suitatble manner.

On the upper surface of plate 45 and secured thereto is a plate 46 having a plurality of cam surfaces 47, 48, equally spaced around its flat upper surface and having depressions, as shown at 49, between said cams.

Mounted above plate 46 and lying between the cam face of same and the lower surface 50 of the hub 33, is a movable cam plate 51 having cam surfaces 52, 53, equally spaced around its flat lower surface and having depressions as shown at 54 between said cams.

A downwardly projecting lever handle 55 is attached to the plate 51 and projects slightly below the entire coupling, as shown in Figure 3. The cam plate 51 and the plate member 45 carrying cam plate 46 are held in position relative to shaft 23 by means of the nut 56 on shaft 23, said nut being tightened only sufficiently to hold the parts in their desired relation while permitting the cam plate 51 to be moved about shaft 23 by means of lever 55 secured to said plate. When the proper adjustment of nut 56 is obtained, it is locked in position by lock-nut 57.

Referring to Figure 6, it will be observed that if lever 55 has been moved to a position where the cams 47, 48, and 52, 53, on plates 46 and 51, respectively, engage each other, that the parts of the coupling device are locked so that the hub 33 and the plate member 45 are rigidly secured together and the gimbal action of ring 40 and its pivot connection to the other parts is locked, the surface of brush 30 being always maintained at a right angle to the axis of shaft 23.

To make the gimbal action effective, the lever 55 is moved to the position as shown in Figure 6A, where the cams on plates 46 and 51 no longer oppose each other. The plate member 45 is now free to move about the pivot pins 41, 42, and the ring 40 carrying these pins can move about pins 38, 39, so that the gimbal action now becomes effective and the plate member 45 carrying the brush 30 is now flexibly mounted in respect to the axis of the shaft 23.

A bracket 58 is secured to the rear of the casing or frame 10, and movably supported therein by means of the bearing flange 59 is a substantially U-shaped shaft 60 having out-turned ends supporting wheels, one of which is shown at 61 in Figure 1. When shaft 60 is thrown against the stop 62, the wheels are in their lowest position and, by bearing down on the handle 63 the weight of the machine may be lifted off the brush 30 and transferred to the wheels. By raising the weight off the wheels and swinging them to the rear and upwardly, they may be swung to the position shown in dotted lines, Figure 1, at 64, so that the machine can be manipulated without danger of the wheels coming in contact with the surface on which the machine rests.

It will be seen from the foregoing that when the lever 55 is in the position shown in Figure 6A that the brush member 30 is free to wobble, and therefore the brush may automatically adjust itself to any and all irregularities existent in the surface to which it is applied.

It will be observed that the electric motor 11 is located substantially in the center of the top of the frame 10, and that the gear mechanism is located substantially underneath this motor, so that when the wheels are raised to the position shown at 64 (Figure 1), the entire weight of the apparatus is applied to the brush. Such a machine is herein termed a "motor weighted" machine, and is sometimes referred to as a "riding on head" machine, and it has certain advantages in use, but with such a "motor weighted" machine it is necessary to have the brush head 30 inflexibly secured to its driving shaft 23, as shown in Figures 1 and 2. Therefore when the operator throws the weight of the machine to one side or the other, which is necessary to steer the same, the machine has a tendency to pull away from the operator, and sometimes leaves the operator's hands if he is inexperienced.

With the arrangement shown in Figures 3 to 6A, however, the wheels being in the position shown in solid lines in Figure 1, the machine may be made into a "divided weight" machine, as part of the weight rests on the brush head and part on the wheels. This stabilizes the action of the machine and permits of a more delicate control by the operator of the weight on the brush. However, under these conditions if the brush head were rigidly secured to the shaft 23, it is obvious that the full surface of the brush might not remain on the floor as the operator pushes the machine forward and backwards, if the floor or other surface is irregular.

However, when the brush head is allowed to wobble, which is made possible by the introduction of the coupling, (Figures 3 to 6A, inclusive), between the brush head 30 and the driving shaft 23, the brush can at all times be kept with its full surface in contact with the floor or other surface as the operator moves the machine thereover.

The machine herein disclosed, therefore, combines the two principles of a "motor weighted" machine and "divided weight" machine, and therefore can be used by both experienced and inexperienced operators, and is easily changed from one type to the other without changing any parts, and at the will of the operator.

As the operation of a machine of this character has already been described in connection with the special coupling shown in Figures 3 to 6A, inclusive, and as the operation of such machines when the brush head is rigidly secured to the driven shaft as shown in Figures 1 and 2 is already well known, it will not be described in detail.

What is claimed is:

1. In a machine of the class described, having a driving shaft and a brush member driven thereby, a yieldable coupling between said shaft and member, and means including a locking member in said coupling for locking the parts thereof to rigidly couple said shaft to said member thereby eliminating the yield in said coupling.

2. In a machine of the class described having a driving shaft and a brush member driven thereby, a coupling connecting said shaft and member including a gimbal ring to permit said member to assume various transverse angular positions in respect to said shaft while rotated thereby, and means for locking said ring to hold said member rigidly to said shaft during the rotation thereof.

3. In a machine as claimed in claim 2, wherein said locking means includes a manually operable lever extending from said coupling and adapted upon movement in one direction to permit the brush member to wobble during rotation, and when moved in another direction to lock said brush member rigidly to said shaft, as stated.

4. In combination with a machine of the class described having a frame, a motor, a driving shaft, and a brush member driven by said motor

all supported thereon; a coupling interposed between said shaft and brush member including means for positively rotating said member while permitting free angular movement of same in planes transverse to its axis of rotation, said coupling means including means for locking said brush member to said shaft, and a pair of wheels extending rearwardly of said frame and adapted to support part of the weight of said machine in addition to that supported by the brush member whereby said machine can be used as a divided weight machine while the working face of said brush member remains in full surface contact with the floor over which it is moved, other parts of the machine being freely movable in all planes relative to said floor, said wheels being movable to a position where they permit the brush member to support the entire weight of the machine whereby same may be used as a motor weighted machine.

5. In a machine of the class described having a driving shaft and a working element rotated thereby, means for rigidly coupling said shaft and element whereby said machine can be used as a motor weighted machine, the weight of which is supported entirely on said element, additional means for supporting said machine, and means for disabling said rigid coupling when said additional supporting means is in use whereby the weight of the entire machine is supported partly on said element and partly on said additional means as a divided weight machine while said element is working, said element being free to wobble the while.

6. A coupling for machines of the class described comprising a driving member, a driven member connected to said driving member for positive rotation thereby, said driven member being free to move in planes transverse to its axis of rotation, said members having opposed cam faces, and means comprising a movable member lying between said driving and driven members for locking same in predetermined fixed relationship during rotation by the engagement of said movable member with said cam faces on said driving and driven members.

7. The coupling as claimed in claim 6 wherein said means includes a manually adjustable lever extending through the driven member, and a cam plate radially movable by said lever and adapted to be moved thereby to lock said driving and driven members.

8. In a machine of the class described, a frame, a motor mounted thereon and having a horizontal driving shaft, a casing within said frame, a second horizontal shaft supported in said casing and extending therefrom, a vertical shaft supported in said casing and extending outwardly therefrom, and having its axis of rotation passing through the axis of said driving shaft mounted thereabove, driving means connecting said driving and second horizontal shafts, gearing enclosed in said casing and connecting said second horizontal and vertical shafts, a casing surrounding said driving means and secured to said frame, and a brush member secured to said vertical shaft and rotatable thereby.

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