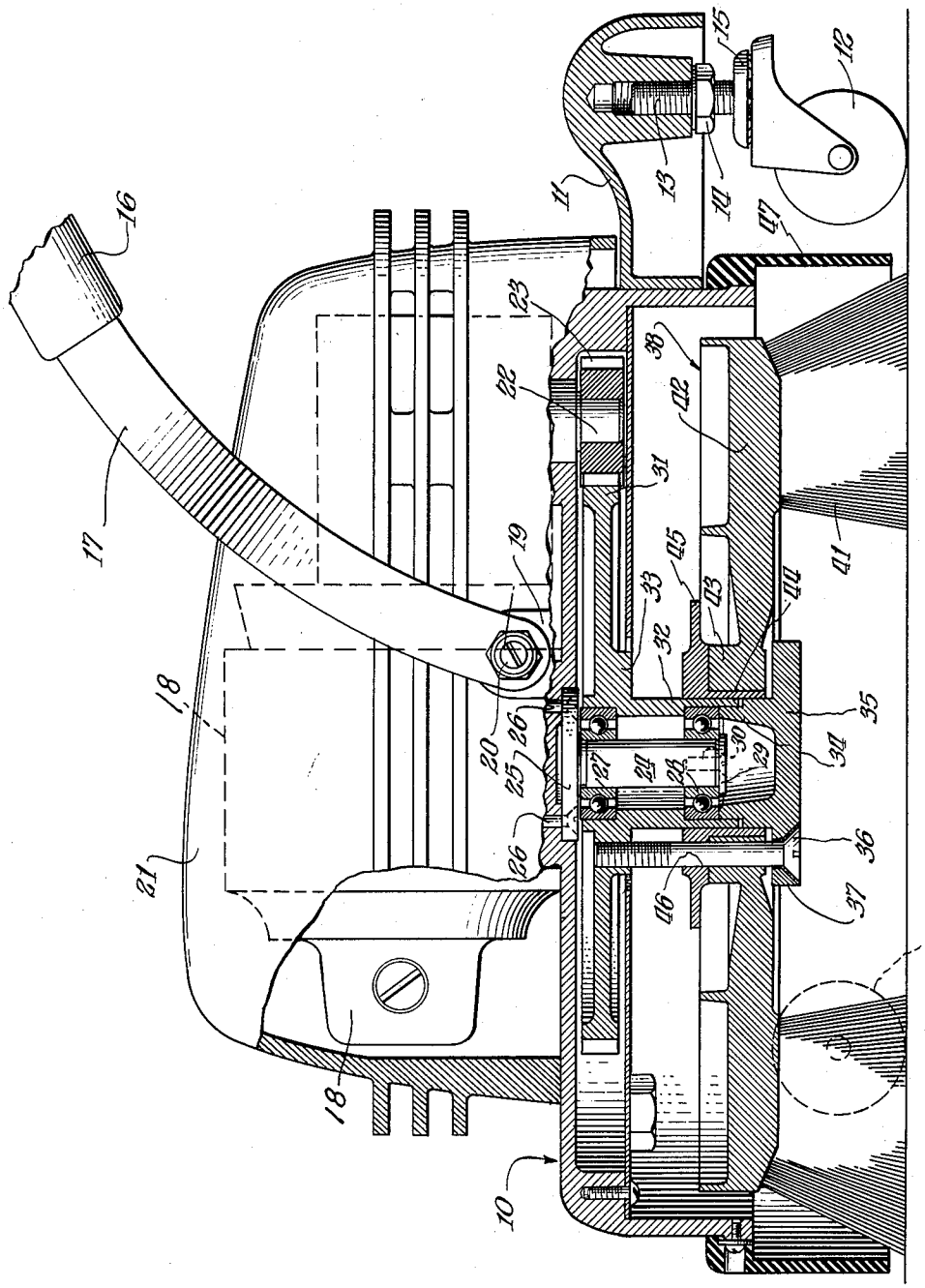
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FLOOR TREATING MACHINE

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FLOOR TREATING MACHINE

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1 Claim. (Cl. 15—49)

This invention relates to power driven floor treating machines and has particular reference to a novel and improved rotary mounting structure to carry the rotor of the machine, which in the present disclosure includes a rug scrubbing brush.

In rug scrubbing and other floor treating machines it has been the prior practice to provide a frame to carry the motor, with a downwardly extending shaft or gear housing carrying the rotor and brush, and devices to raise, lower or tilt the rotor and brush to regulate the contact between the brush and the floor. According to the present teachings, it is proposed to depart from this practice by providing a machine having a frame, driving motor and gear reduction unit mounted on a plurality of casters so that it is supported at a predetermined position above the floor, with a "free floating" rotor and brush; driven by the machine but arranged for vertical sliding movement on a rotatable rotor pilot so that the brush is held on the rug or floor surface by the weight of the rotor and brush alone. This has been found to be of considerable advantage in the rug scrubbing machines, for example, where it provides for efficient cleansing of the rug surface and develops adequate lather, yet functions with a minimum of wear on the nap of the rug and accomplishes unusually long life for the bristles of the brush. In addition, it avoids the necessity of any manual adjustments of the device to suit it to operation on rugs having nap of greater or lesser thickness than average.

It is therefore a specific object of the present invention to provide a novel and improved revolving rotor pilot having a connection adapted to transmit rotary motion to the rotor and brush, yet to permit free floating vertical movement of the rotor and brush within predetermined limits.

A further object of the invention resides in the provision of a rotor pilot having a sliding connection for a free floating rotor as indicated above, wherein the individual mechanical parts are so designed that they are simple to assemble, yet unusually sturdy and rugged and not apt to be damaged by rough usage or abuse. This is of prime importance in a machine of the character here under discussion, since these machines are widely used in the rental trade, in which they are not only operated by persons entirely unfamiliar with their structure, but are repeatedly subjected to almost every conceivable form of misuse.

A still further object of the invention is the provision of a mounting for a free floating rotor wherein all parts are relatively simple and regular in contour, having no parts requiring milling or broaching operations in their manufacture, so that the unit may be economically produced by mass production methods and conveniently manufactured without special machine tool equipment.

A still further object of the invention is to provide a rotatable rotor pilot for a free floating floor treating machine rotor having a novel structure wherein floating

movement of the rotor is accomplished without perceptible tendency of binding, yet wherein the individual parts may be quickly and easily disassembled to permit removal or replacement of the rotor or its brush if required.

These and other incidental objects, which will appear hereinafter, are accomplished according to the present teachings by the utilization of a mechanism as illustrated in the single figure of drawings herein, which illustrates a present preferred embodiment of these teachings.

The machine frame, generally indicated by the ordinal **10**, is preferably of cast metal construction, and is shown as being provided with outstanding brackets **11**, each of which carries a caster **12** threaded into the bracket with an adjustable shank **13** locked by a nut **14**. As shown, anti-friction bearings **15** are provided to permit free movement of the casters. The frame is preferably provided with a handle **16**, the lower end of which terminates in a yoke **17** whose opposite ends are pivoted to bosses **19**, by pivot studs **20**. The bosses **19** as shown are an integral part of a motor housnig **21** which contains a driving motor **18** and reduction gearing to drive the vertical stud shaft **22** on which the brush driving pinion **23** is mounted.

The principal rotary parts of the mechanism are supported by a central, downwardly extending stud **24** having an enlarged flange **25** at its upper end fixedly secured into the frame **10** by a plurality of machine screws **26**. The stud **24** is stationary and carries upper and lower ball bearings **27** and **28** at its upper and lower ends. The lower bearing **28** is directly secured by a lower cap **29** secured to the end of the stud **24** by a machine screw **30**. The ball bearings **27** and **28** are spaced apart by opposite counterbores in the sleeve **32** so that they serve as a mounting for a driven spur gear **31** mounted at the level of the bearings **27**. Thus the sleeve **32** acts as a relatively long tubular rotor pilot. The extension sleeve **32** extends downwardly from the hub portion **33** of the gear **31** to a point beyond the bearing **28**. The lower end of the sleeve **32** is closed by an internal plug portion **34** of a bottom cap **35**, which is secured in the lower end of the sleeve pilot **32** by equally spaced pins in the form of machine screws **36**, each of which extends through an outwardly extending flange **37** on the bottom cap **35**. These screws are received in threaded apertures in the hub flange **33** of the gear **31**.

The brush **38** includes bristles **41** set in a circular aluminum rotor **42** having a rotor hub **43** in which a bronze bearing bushing **44** is carried. The bushing **44** is loosely fitted on the outer cylindrical surface of the pilot sleeve **32** of the rotor pilot, so that it will slide freely up or down, but the length of the central bore through the bushing **44** is sufficient to prevent any possibility of binding between the parts. The rotor hub **43** and bushing **44** have drilled apertures **46** at points corresponding to the spacing of the machine screws **36**, so that the machine screws extend through the apertures in the rotor hub **43** and bushing flange **45**, so that when the gear **31** is driven by the pinion **23**, the rotary motion thereof is transmitted to the rotor and brush; yet the rotor and brush are left free to float upwardly or downwardly on the pilot sleeve **32** and to assume an intermediate position between the flanges **37** and **33**. Its actual operating position is determined primarily by the thickness of the nap on which the device is used and, of course, upon the length of the bristles **41** and the adjustment of the caster studs **13**.

A downwardly depending skirt portion **47** is ordinarily provided so that when liquid soap or "shampoo" is introduced into the brush through a soap duct (not shown) the lather developed by the brush will be confined to the area under the machine, and while this skirt may be

of various materials, it is normally of yieldable, resilient construction; rubber being preferable for the purpose.

It is to be noted in connection with the structure here disclosed that the specific arrangement of mounting, employing a fixed stud to carry the friction bearings and a sleeve-like rotor pilot to drive the principal rotary parts, provides a unit adequately sealed against entrance of dust, grit or foreign matter; with a cup around the bearings in which a substantial body of lubricant may be held without danger of leakage onto the work surface; yet results in a structure that is mechanically simple and easily accessible for inspection, replacement or repair of the bearings. The floating connection between the driving mechanism and the rotor (which is shown in this instance as a scrubbing brush) is free to float vertically and to adjust itself in position with respect to the surface on which the machine is working, yet this connection is accomplished without conventional types of keyways, splines or slides which ordinarily can be produced only by relatively expensive milling and broaching operations and even then fail to give satisfactory performance in machines subjected to the misuse encountered in the rental trade. The specific form of the sliding connection between the parts is, therefore, of advantage from a manufacturing and maintenance standpoint as well as by reason of the fact that replacement or interchanging of the rotor and brushes is easily accomplished by merely loosening the screws **36** to remove the lower cap. The construction of the rotor pilot and rotor are thus such that free floating movement of the brush is accomplished without perceptible tendency to bind, and the parts are of such shape and formation that their action is not impeded by the presence of water, soap residue, and other dirt, grit and foreign matter that tends to accumulate in any mechanism of this nature.

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

In a floor treating machine including a frame, a driving motor and a rotor having floor treating means thereon, a rotor mounting comprising a fixed stud secured to the frame and projecting downwardly therefrom, a pair of upper and lower anti-friction bearings spaced apart on and supported by said stud, a gear having a substantial horizontal extent carried by the bearings on the stud, said gear having a hub surrounding the upper bearing with a tubular sleeve extending downwardly from the hub and surrounding the lower bearing and holding the lower bearing spaced from the upper bearing, means for establishing a driving connection between said motor and said gear so as to rotate said gear about the axis of said stud, a removable cap on the lower end of said sleeve with an enlarged flange extending outwardly therefrom, a plurality of vertical pins extending between said gear and the flange of said cap at locations spaced substantially from and arranged about the axis of rotation of said gear and connecting said cap to said gear to prevent accidental removal of said cap, said rotor being provided with a group of vertical holes therethrough corresponding in location to said pins and being of such size as to slidingly engage the surfaces of portions of the pins between said gear and said flange, and a bearing member having a tubular portion of substantial axial extent surrounding said sleeve and being free to move vertically with respect to said sleeve, said rotor further being provided with a central opening embracing the outer surface of the tubular portion of said bearing member, said gear and the flange on said cap being spaced apart a distance substantially greater than the thickness of said rotor so that said rotor is free to slide vertically with respect to said pins while being rotated thereby.

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