Dec. 24, 1957 R. T. AMSDEN 2,817,192

GYRATORY AND STRAIGHT-LINE MOVEMENT ABRADING MACHINE

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FIG. 1.

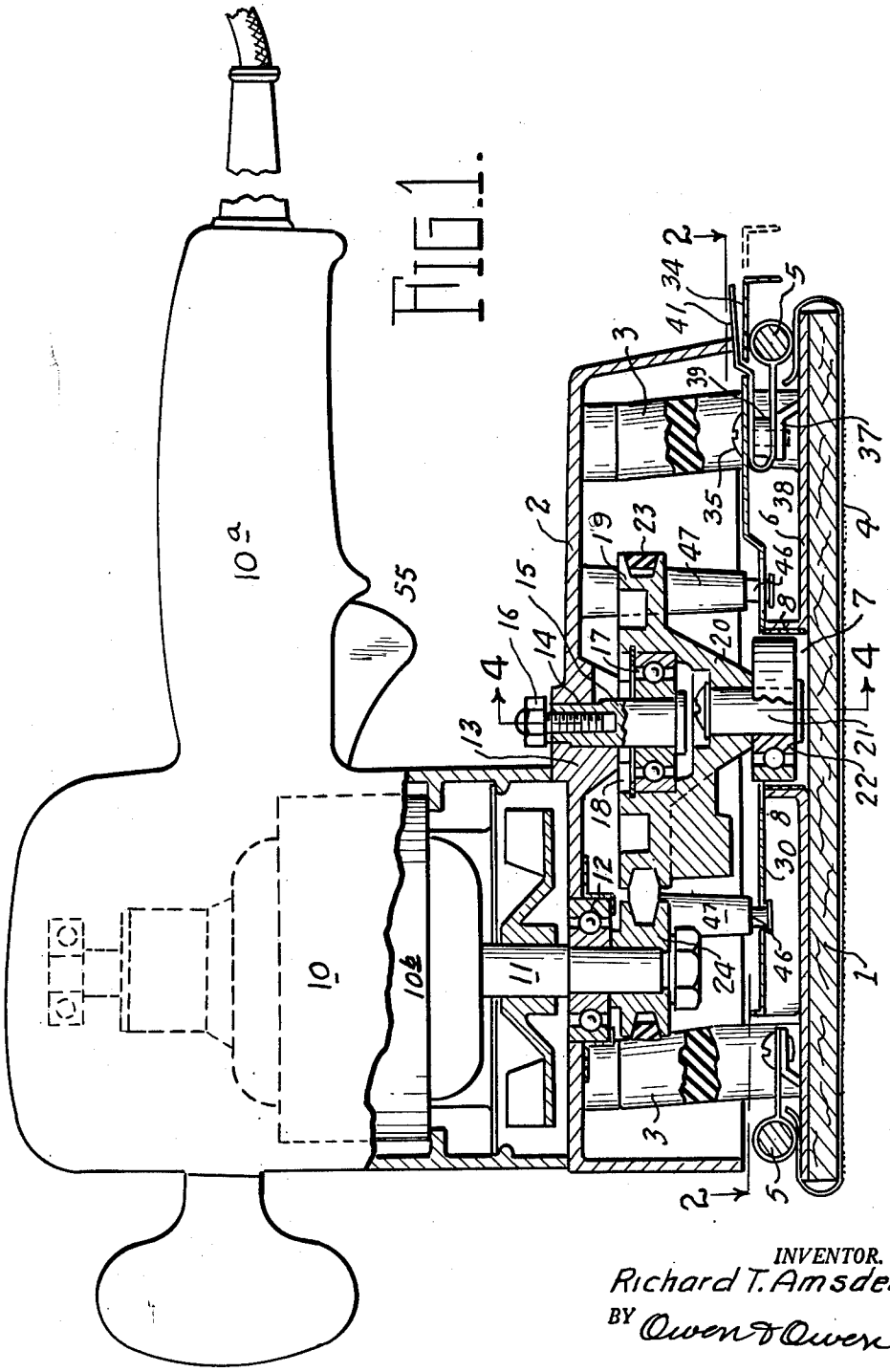

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FIG. 2.

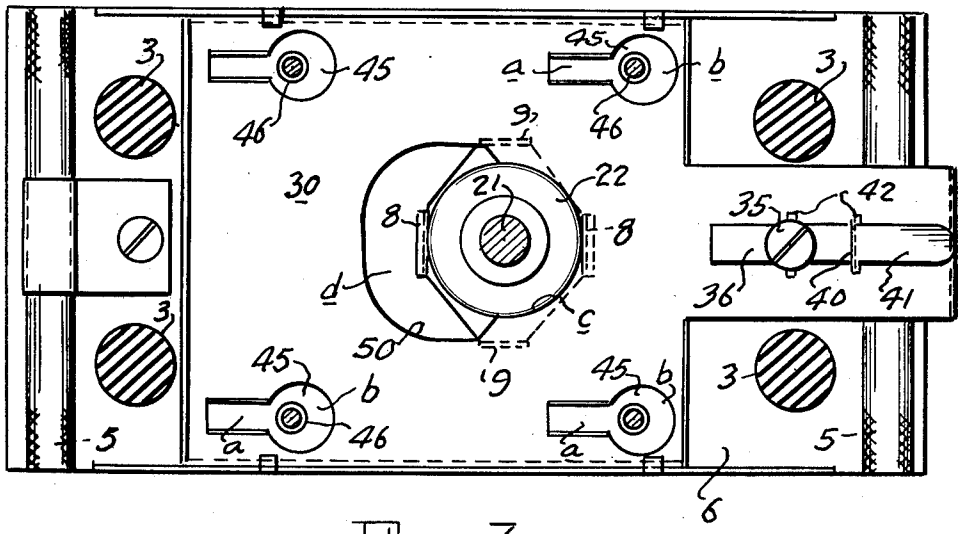

FIG. 3.

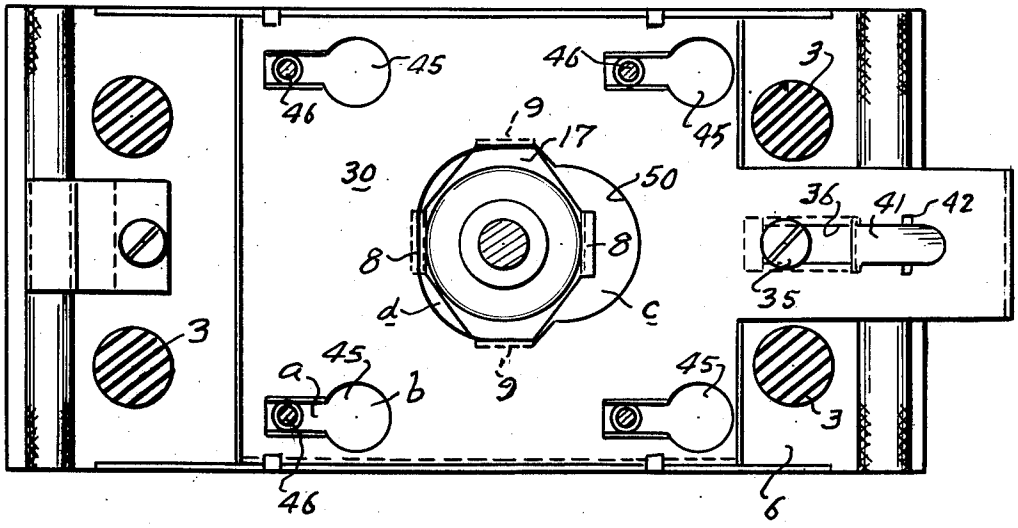

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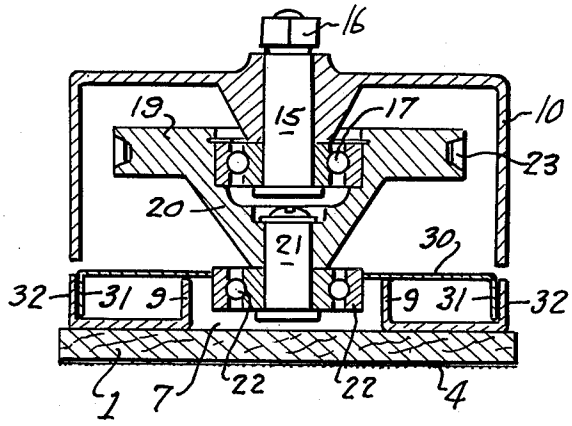
FIG. 4.



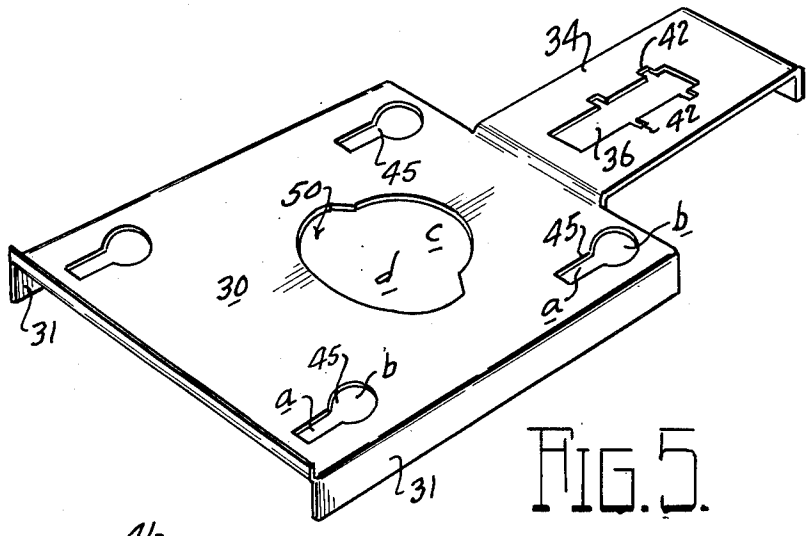


FIG. 5.

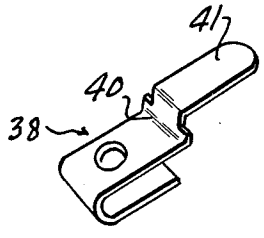


FIG. 6.

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GYRATORY AND STRAIGHT-LINE MOVEMENT ABRADING MACHINE

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Application June 23, 1955, Serial No. 517,441

3 Claims. (Cl. 51—170)

This invention relates to abrading apparatus of the electrically driven type having a surface abrading member mounted and driven for both gyratory and reciprocatory movements.

The primary object of the invention is the provision of simple, efficient and novel means in a machine of this class for controlling the movements of the abrading member whereby it is caused to have either a gyratory or a straight-line longitudinal reciprocatory movement at the will of the operator, thereby enhancing the practicability and commercial value of machines of this character.

Further objects and advantages of the invention will be apparent from the following detailed description, and from the accompanying drawings illustrating one embodiment thereof, and in which—

Fig. 1 is a side elevation of a machine embodying the invention, with a part in central vertical section and with parts broken away;

Fig. 2 is a section on the line 2—2 in Fig. 1, with the control plate in position for gyratory operation;

Fig. 3 is a similar section, with the control plate in position for straight-line reciprocatory movements of the abrading member;

Fig. 4 is a cross-section on the line 4—4 in Fig. 1;

Fig. 5 is a perspective view of the control plate, and

Fig. 6 is a perspective view of the catch member used in connection with control plate.

Referring to the drawings, 1 designates an abrading shoe and 2 the machine frame supported on the shoe by lateral yielding or deflectable means in the nature, in the present instance, of rubber posts 3.

The abrading shoe 1, which may serve as an abrading, rubbing or scrubbing member, is preferably of flat plate or board-like form, is faced on its underside with any suitable rubbing, scrubbing or abrading material 4, such for instance as sandpaper, with its ends engaging around the ends of the member and held by clamping bars 5.

The top of the shoe 1 has a metal plate 6 fixedly secured thereto and this is provided with a centrally disposed opening 7 having two pairs of lugs 8 and 9 rising from its edge wall, with the lugs of one pair disposed at right angles to those of the other pair, as shown in Fig. 3. The lugs 8 are diametrically spaced lengthwise of the shoe and the space therebetween is less than that between the lugs 9. These latter lugs may be omitted if desired.

An electric motor housing 10 is mounted on the top of the frame 2 preferably at one end thereof, and encloses a motor 10*b* the armature shaft 11 of which is vertically disposed and extends down through the frame top, being mounted in an anti-friction bearing 12 therein.

The frame 2, substantially central of its top, is provided with an enlargement or boss 13 having a vertical opening 14 therethrough in which a post 15 is inserted from below and firmly held shouldered therein by a clamping screw 16. This post carries at its lower end a ball bearing set 17 the inner ring of which fits on the post while its outer ring fits into the upwardly opening

hub socket 18 of a driven pulley 19. This pulley has at its underside a hub extension 20 carrying a vertical post 21 the axis of which is slightly offset laterally from that of the post 15. The socket 18 extends down into the extension 20 and terminates in a bottom opening into which the post 21 is mounted. The lower end of this post projects below the extension 20 and carries a ball bearing set 22 disposed within the opening 7 of the shoe plate 6. Revoluble movements of the bearing set 22 within the opening causes its outer ring to alternately engage first one and then the other of the lugs 8 and to impart longitudinal reciprocatory movements of the abrading shoe. The pulley 19 is driven by a belt 23 from a drive pulley 24 on the lower end of the motor shaft 11.

The movement imparted to the abrading shoe 1 by revoluble movements of the bearing set 22 is caused to be either longitudinally reciprocatory or gyratory, depending on the set or position of a control plate 30 shown in perspective in Fig. 5. This plate is mounted over the top plate 6 of the shoe 1 and is guided for longitudinal reciprocatory movements relative thereto by downwardly turned side edge flanges 31 on the control plate. The flanges 31 rest at their bottom edges on the plate 6 and support the control plate in a plane immediately above the tops of the lugs 8 and 9. One end of the control plate, the right in Fig. 1, has a relatively narrow extension or handle member 34 projecting centrally therefrom in substantially the plane of the plate, except in the present instance it is slightly raised therefrom. The outer end of this member extends out under the skirt flange of the frame 2 to exposed position at the adjacent end of the machine and has a turned-down flange to facilitate grasping by an operator.

The reciprocatory movements of the extension member 34 are guided by a screw 35 projecting through a longitudinal slot 36 therein and threaded into a lug 37 on the plate 6, and is held in two positions of adjustment by a spring catch finger or dog 38, shown in perspective in Fig. 6. This finger has its inner or anchored end looped to provide spaced leg portions through which the screw 35 projects and which are spaced by a collar 39 on the screw. The long upper leg or leaf of the catch finger parallels and lies freely against the member 34 for a short distance outwardly from its inner end and then has an abrupt upward angle 40 with a relatively narrow outward extension or thumb-piece 41 projecting outwardly from its upper end in a plane substantially parallel to the inner end portion of the leg. The piece 41 is of a width to project freely through the slot 36 while the angled portion 40, which is of greater width, fits at its end edges into a registering pair of notches 42 in the side edges of the slot 36. Two pairs of those notches are provided in spaced relation lengthwise of the slot, thus permitting the control plate 30 to be locked in two positions of its movement on the shoe 1. A depression of the catch member 41 lowers the part 40 from the notches and releases the control member 30 for longitudinal adjustment. The thumb-piece 41 overlaps the outer end of the plate extension 34 so that it may be released in grasping said extension to move it.

The control plate 30 is provided in each corner with a keyhole-shaped slot 45 having at its forward or left side (Fig. 5) a narrow straight portion *a* extending lengthwise of the plate and at its rear or right end and a circular portion *b* which in diameter is approximately twice the width of the portion *a*, or at least is as large as the area of gyratory movement desired for the abrading member 1 relative to the frame 2. Each of these slots receives the stud end 46 of a respective depending post 47 on the underside of the frame 2, which stud, when the control plate is in forward position, is disposed in the large por-

tion *b* of its slot, as in Fig. 2, and which in rearward position is disposed in the narrow portion of its slot, as in Fig. 3. It is apparent that when the studs **46** are in the slot portions *a* the plate **30** and abrading shoe **1** are restricted to longitudinal reciprocatory movements and when in the portions *b* may have gyratory movements.

The gyratory bearing set **22** on the eccentric stud **21** in addition to working in the space **7** between the lugs **8, 8** on the plate **6** is disposed within a central opening **50** in the control plate **30**. This opening **50** includes a rearward half circular part *c* in which the outer ring of the bearing set **22** substantially fits to cooperate with the shoe plate studs **8, 8** to permit gyratory movements of the bearing set both to the control plate **30** and to the shoe **1**. The opening **50** at its forward side has a portion *d* which, when the bearing set is disposed therein, occasioned by a rearward adjusting movement of the control plate **30**, permits such set to have lost motion movements transverse to the longitudinal axis of the control plate and to act alone on the studs **8, 8** to impart longitudinal reciprocatory movement to the plate **30** and abrading shoe **1** with such movement guided by the studs **46** working in the straight portions *a* of the slot **45**.

In use, the operator grasps the housing handle **10***a*, presses the switch member **55** to start the motor and moves the machine over the surface to be operated on, as well understood in the art. If a gyratory action of the shoe **1** is desired, the operator sees that the handle or extension **34** on the control plate **30** is pushed in with the shouldered ends of the part **40** of catch finger **38** engaged in the outer pair of notches **42**. When the plate is in position, the bearing set **22** is centered in the recess *c* of the plate opening **50** in engagement with its curved rear wall, and the guide studs **46** on the frame bosses **47** are substantially centered in the large ends *b* of the plate openings **45**. Gyration of the bearing set **22** in this position acts on the central plate **30** and the two opposed lugs **8, 8** of the plate **6**, between which it is disposed, to impart gyratory movement to the shoe **1**. When it is desired to impart longitudinal reciprocatory movements alone to the shoe, the operator releases the catch **38** from the outer set of cooperating notches **42** and moves the control plate rearward to bring the other pair of notches **42** in register with the locking part **40** of the catch finger. This positions the control plate **30**, as shown in Fig. 3, with the studs **46** substantially disposed in the straight elongated portion *a* of the guide slots **45**. The bearing set **22**, acting between lugs **8, 8** now imparts longitudinal reciprocatory movements alone to the control plate **30** and shoe **1**, sidewise movements being prevented by the studs **46** acting in the straight portions *a* of the slots **45**.

The bearing set **22**, in this position, revolves or gyrates in the enlarged portion *d* of the central plate opening **50** and between the side lugs **9, 9**, which are more widely spaced than the lugs **8, 8**, so that no transverse movement is imported to the shoe **1**. In other words, the gyrating bearing set has a lost motion transverse movement relative to the shoe **1**, which lost movement is sufficient to prevent the imparting of any movement to the shoe by the throw of the bearing set that is transverse to the straight portions *a* of the guide slots **45**. The only purpose of the lugs **9, 9** is to prevent any greater transverse deflection of the shoe **1** relative to the machine frame than would occur under the normal gyrating conditions.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

I claim:

1. An abrading machine having a frame, a shoe deflectively supported by and below the frame, drive means on the frame comprising a revolvable eccentric member projecting into the shoe, a pair of oppositely disposed space lugs on the shoe engaging said revolvable eccentric member at diametrically opposite points, a plate having an aperture therein disposed above the shoe and fastened thereto, said aperture consisting of a relatively small eccentric engaging portion and a large eccentric disengaging portion, manual means for moving the plate and the shoe attached thereto so that the revolving eccentric member may be brought into contact with said eccentric engaging portion or disengaged therefrom to thereby give the shoe a reciprocatory or gyratory motion.

2. The structure according to claim 1 in which the plate has guide slots therein which engage studs projecting downwardly from the frame.

3. The structure according to claim 1 in which the plate has an extension on one end and in which there is a longitudinally extending slot having two longitudinally spaced side wall notches and there is a catch finger attached to said shoe and having a part for releasably locking engagement with either of said notches to hold the plate in a selected position of adjustment.

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