Feb. 5, 1946. G. E. TROXELL 2,394,274

ROTARY TOWELING MACHINE

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FIG. 1.

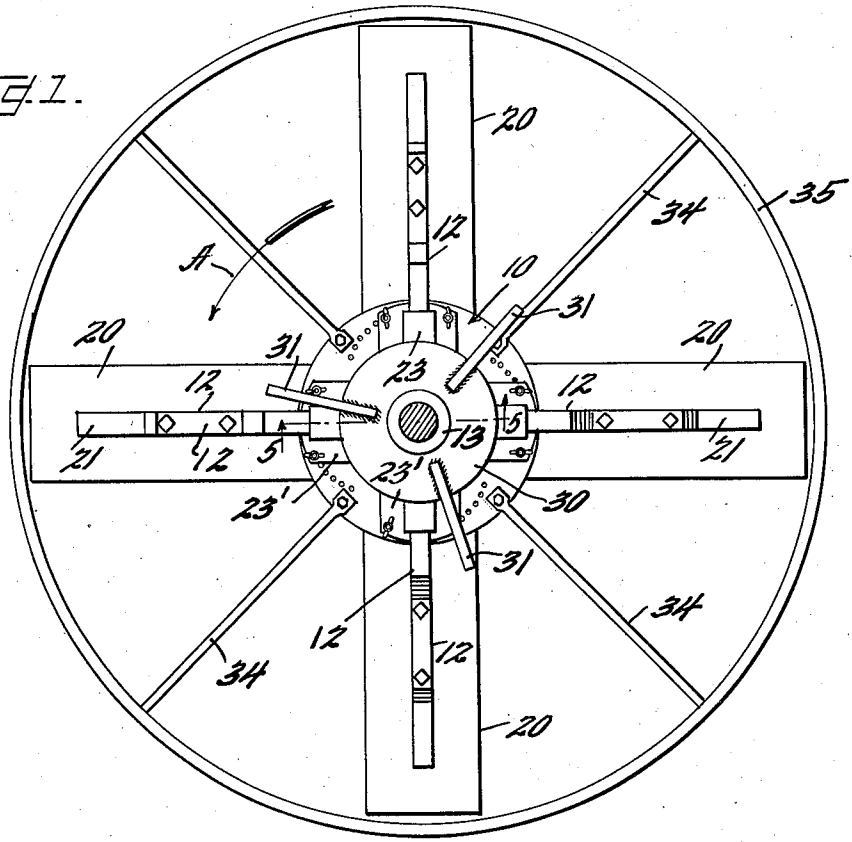
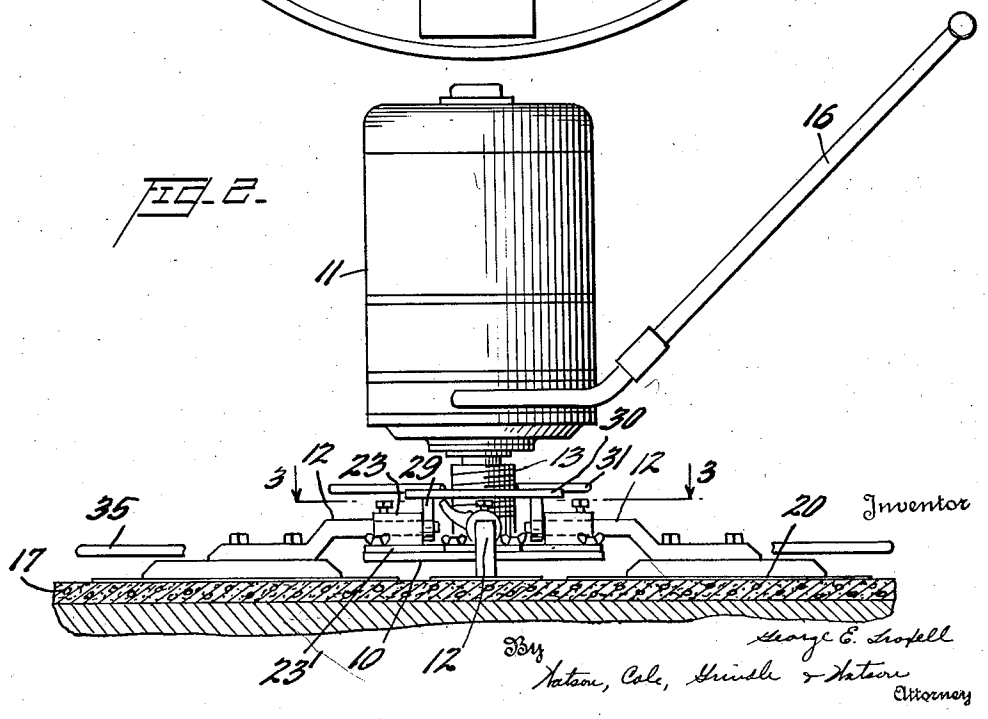


FIG. 2.



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FIG. 3.

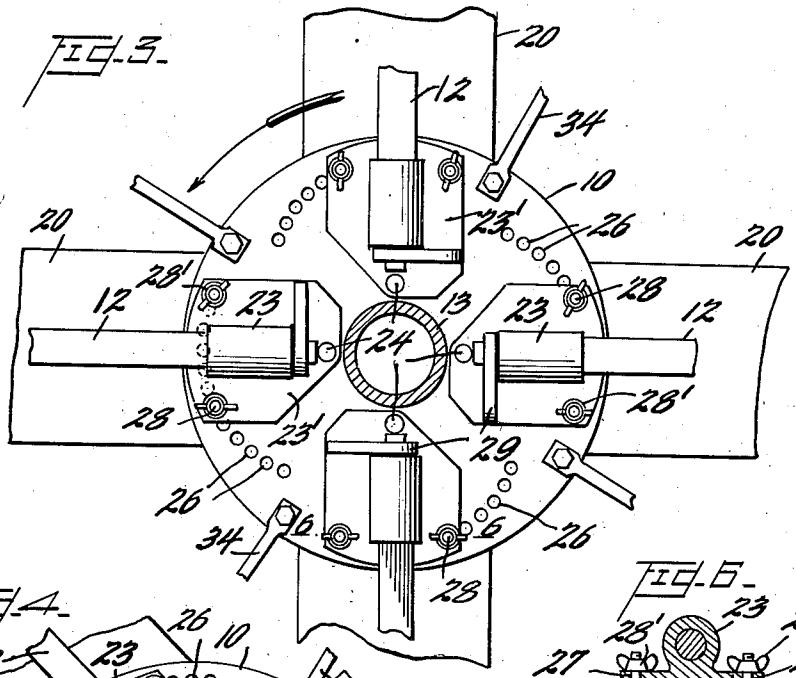


FIG. 4.

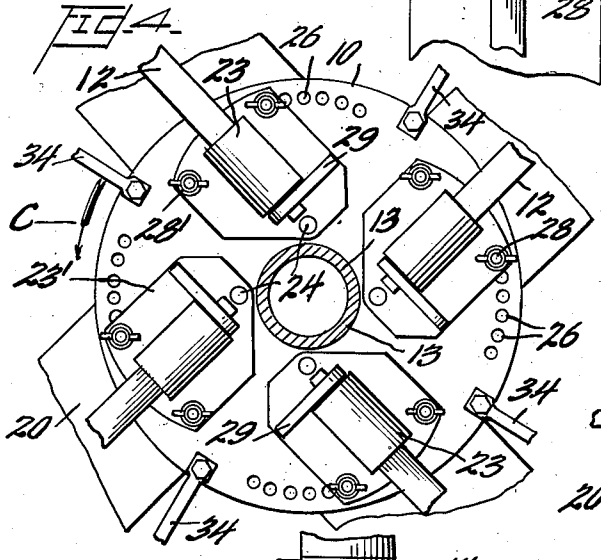


FIG. 6.

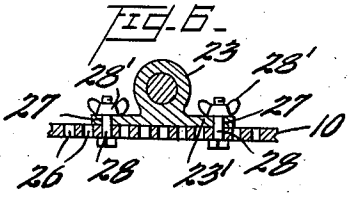
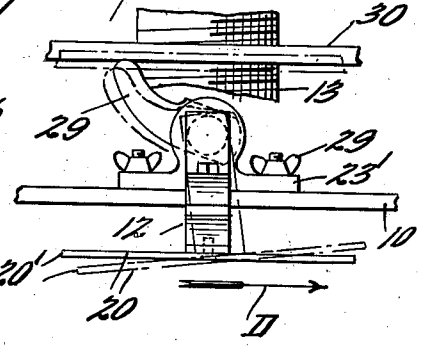


FIG. 7.



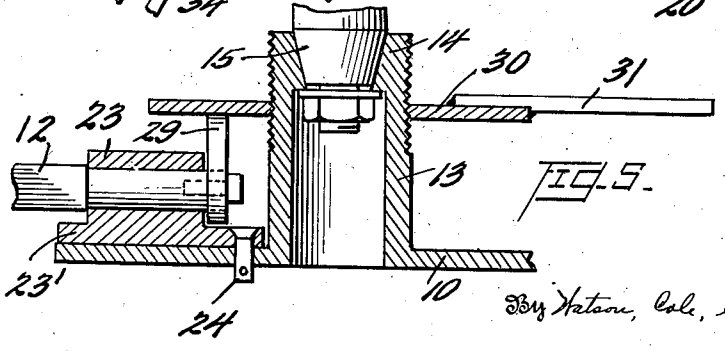


FIG. 5.

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ROTARY TROWELING MACHINE

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Application January 14, 1943, Serial No. 472,425

2 Claims. (Cl. 94—45)

The present invention relates generally to machines for surfacing concrete slabs, such as floor slabs, and particularly to rotary troweling machines.

It has heretofore been suggested that it may be advantageous to employ, in the final surfacing of a concrete slab, a power operated machine in lieu of the conventional hand-operated trowel, the manipulation of which requires so much effort on the part of the operator. One form of finishing machine which has been proposed includes an electric motor and a plurality of smoothing blades or trowels extending outwardly from a common hub, the motor serving to revolve the hub and radially extending blades about a vertical axis while the machine as a whole is moved bodily over the surface of the slab. While the finished effect of hand troweling cannot always be obtained by a power driven machine of this character, the results may be said to be quite satisfactory in the general case and the saving in time and labor is of course considerable. At times when such labor is difficult to obtain, the use of power operated troweling means is of the greatest help in the accomplishment of tasks of considerable magnitude.

In operating an instrumentality of this character, it is highly advantageous to so mount the several outwardly extending trowels that the angular relationship of each trowel to the horizontal may be varied. Where the surface of the slab is relatively wet the working surfaces of the trowel members may be so angularly adjusted that they closely approach the horizontal, but with concrete slabs of drier consistency it is desirable to increase the angle which each trowel working surface makes with the horizontal, if the best results are to be obtained. I have also discovered it to be highly advantageous to so mount the several trowels that they may be disposed either substantially radially of the supporting hub or rotor of the machine, or adjusted horizontally about a vertical axis offset from the axis of rotation of the hub, to positions in which they are no longer radially disposed. In accordance with the invention the several trowels of the apparatus are so mounted that each may be adjusted about a horizontal axis to vary the angular relationship of its working face with respect to the horizontal and may likewise be adjusted about a vertical axis spaced from the axis of rotation of the machine, so that each trowel may be disposed with its longitudinal axis in a truly radial direction or with its longitudinal axis in a direction which makes a substantial angle with a horizontal line passing through the axis of the hub. It should, of course, be possible to make both adjustments without difficulty and in accordance with my present proposal this may be readily accomplished. The invention includes likewise a novel type of guard for the protection of the operator of the machine, this guard being mounted upon the hub upon which the inner ends of the trowel carrying arms are mounted and including a circular member concentric with the axis of the hub and of such diameter as to project beyond the circular paths of movement of the outer ends or tips of the troweling blades. Other features of advantage will become apparent to those skilled in the art as that form of the invention which has been selected for disclosure by way of example is described in detail. Such embodiment is illustrated in the accompanying drawings in which:

Figure 1 is a top plan view of the mechanism, the motor and operating handle, however, having been omitted in order that the hub and associated parts might be more clearly perceived;

Figure 2 is a side elevation of the machine;

Figure 3 is a section on line 3—3 of Figure 2, showing the several parts upon a somewhat larger scale;

Figure 4 is a view similar to Figure 3, but showing the trowel carrying arms adjusted angularly to positions different from those in which they are shown in Figure 3;

Figure 5 is a section on line 5—5 of Figure 1, the scale being somewhat enlarged;

Figure 6 is a section on line 6—6 of Figure 3; and

Figure 7 is a rather diagrammatic view showing the adjustable mounting means for one of the trowels, in two positions of adjustment.

A hub member is indicated at 10 and this member not only serves to support the motor 11 but likewise comprises the carrier for the several trowel supporting arms, which arms are indicated by the numeral 12 in the drawings. It will be seen that the hub member 10 comprises a circular disc having rigid, preferably integral, therewith an upwardly extending tubular element 13 which terminates in a collar portion 14 having a central downwardly tapered recess for the reception of the correspondingly tapered lower end 15 of a shaft which is adapted to be driven by the rotor of motor 11 through certain reducing gearing which is not illustrated. Motors which include reducing gearing are well known and need not be described in detail, it being only necessary to say that the motor chosen as a driving

means for the rotary trowel should have associated with it a reduction gear by means of which the speed of rotation of the blades about the vertical axis of the hub will be that which is found most suitable in the surfacing of concrete. To the casing of the motor 11 is affixed the lower end of the handle 16 by means of which the machine may be moved over the surface of a concrete slab, portion of such a slab being indicated at 17 in Figure 2. The handle 16 likewise comprises means for preventing rotation of the motor casing while the machine is in operation.

Disposed substantially radially of the hub 10 are the several trowels or work engaging blades 20, these blades being preferably substantially rectangular in plan as shown in Figure 1. Secured upon the upper surface of each blade is a longitudinally extending rib 21 and bolted or otherwise suitably connected to each rib 21 is the outer end of a trowel supporting arm 12. Each arm 12 has a portion of circular cross section at its inner end which portion is disposed within, and is rotatably supported by, a bearing 23, each bearing 23 having a base plate 23' which rests upon the upper surface of the flange of the hub member 10. In plan the bearings and bearing base plates are shaped as they appear in Figures 3 and 4 and the base plate of each bearing is perforated to receive a pivot 24, each pivot likewise projecting downwardly through a registering perforation or aperture formed in the flange of the hub 10.

Formed in the flange of hub 10 and arranged about the axis of each pivot 24 is a series of equi-distantly spaced apertures 26, and at its outer end each bearing base plate 23' is provided with apertures 27 which are adapted to be brought into register, respectively, with pairs of these apertures 26 in the hub 10. Bolts 28, provided with wing nuts 28', may be inserted through pairs of registering apertures in the bearing plate and hub flange and, by such means, each bearing may be rigidly clamped to the hub flange 10 in any position of angular adjustment about pivot 24 which may be desired by the operator of the machine. Hence it is clear that the blades of trowel elements 20 may be caused to extend radially from the hub, as indicated in Figure 3, or may be adjusted so that the longitudinal axis of each blade makes a substantial angle with a radial line passing through the axis of the hub and the axis of the corresponding pivot 24. It is found highly advantageous in the actual use of the apparatus to occasionally change the angular adjustment of the several troweling members in this manner, with variations in the character of the slab being surfaced.

To the inner end of each blade carrying arm 12, i. e., the end of this arm which projects inwardly beyond the bearing in which it is mounted, there is fixed a lever 29, these levers extending laterally and upwardly, as indicated in Figure 7. The cylindrical central part 13 of the hub is exteriorly threaded and a thrust plate, indicated at 30 and which is annular in form, is interiorly threaded so as to have threaded relation with part 13 of the hub. Handle members 31 have their inner ends affixed to the thrust plate 30 and extend radially outward. The operator of the machine may conveniently grasp one or more of these handles to effect rotation of the thrust plate relatively to the hub, thus adjusting the plate vertically. If the plate is lowered by rotation, the outer ends of the several levers 29 will be simultaneously depressed, being moved for instance from the positions in which they are shown in full lines in Figure 7 to the positions in which they are shown in dotted lines in this figure, thus increasing the angularity of the troweling blade with respect to the horizontal. By rotating the thrust plate in the opposite direction the opposite angular adjustment of the troweling blades may be effected, the upper ends of the levers 28 always making close contact with the undersurface of the thrust plate due to the fact that the weight of the machine is, when the trowels are angularly adjusted, transmitted to the concrete slab upon which the machine rests, through the rear edges of these trowels. In Figure 7 the rear edge of the trowel shown is indicated at 20' and in the several Figures 1, 3, 4 and 7 the directions of movement of the machine parts illustrated are shown by arrows indicated by the letters A, B, C, and D, respectively.

The guard includes four radially extending arms 34, the inner ends of which are secured to the flange of hub 10, together with the circular member 35 which is supported by these arms, member 35 being concentric with the hub and its diameter being such that it lies outwardly of the paths of movement of the tips or outer ends of the several troweling blades 20. The guard will, of course, revolve with the hub but will at all times serve to prevent the foot of the operator from coming in contact with one or the other of the rotating blades and will likewise serve to prevent contact of any blade with any other object, such for instance as a wall or pillar.

The machine as a whole is readily manipulated by a single operator, who is thereby enabled to surface a large area in a relatively short time. It is simple, durable and readily adjusted as the character of the work undertaken varies.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A rotary troweling machine comprising, in combination, a hub adapted to be rotated about a vertical axis, a plurality of bearing members mounted on the hub for adjustment about axes parallel to the axis of rotation of the hub, means for securing said members in desired positions of adjustment, and a trowel carried by each of said bearing members.

2. A rotary troweling machine comprising, in combination, a hub adapted to be rotated about a vertical axis, a plurality of bearing members mounted on the hub for adjustment about axes parallel to the axis of the hub, means for securing each of said members in a desired position of adjustment, and a trowel mounted upon and carried by each of said bearing members in such manner as to be rotatable about its longitudinal axis.

GEORGE E. TROXELL.