June 13, 1944. L. G. MATHEWS 2,351,278

FLOOR FINISHING MACHINE

Filed April 27, 1942

Fig. 1.

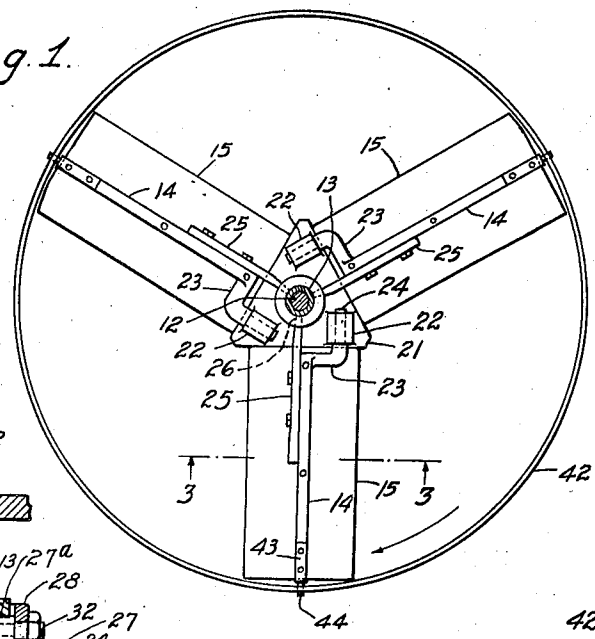


Fig. 2

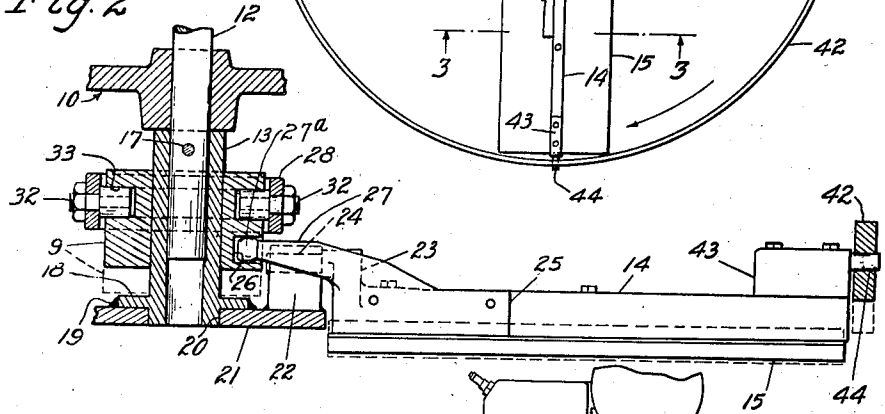
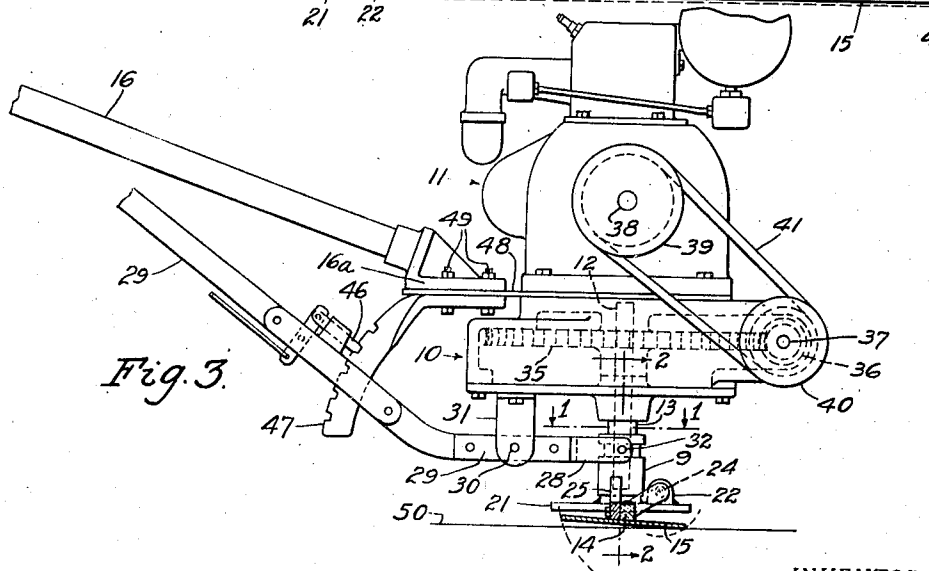


Fig. 3.



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FLOOR FINISHING MACHINE

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7 Claims. (Cl. 94—45)

This invention relates to a machine for smoothing surfaces which have been coated with plastic substances.

Although the machine which forms the subject matter of this invention may be used to smoothen a variety of surfaces, yet it is more particularly intended for use as a cement floor finishing machine.

Among the objects of the invention are to provide, in a machine for operating a set of surface smoothing trowels, means means whereby said trowels are supported in an improved manner for adjustably tilting them at various angles in relation to the surface being troweled by the machine; to provide a simplified means for adjusting at one time a plurality of the trowels; to provide an improved arrangement, in relation to a set of smoothing trowels, of means for rotating all of said trowels in unison about a common center; and to provide a more sturdy and durable structure for a machine of the class to which the invention pertains.

A more specific, very important object of the invention is to provide, for a set of tiltable, mechanically operable trowels, bearing means coinciding with the axes of tilt for said trowels, said bearing means supporting the weight of the machine upon the rotating trowels along radiating vertical planes which are parallel to and only slightly in advance of the trailing edges of the trowels. This arrangement of said bearing means reduces vertical vibration of the structure above the rotating trowels, thereby insuring a more satisfactory troweling operation; and it also makes it much easier to tiltably adjust the trowels, because substantially no vertical movement of the machine takes place during such adjustment.

Other objects, advantages and features of invention will hereinafter appear.

Referring to the accompanying drawing, which illustrates what is at present deemed to be a preferred embodiment of the invention,

Fig. 1 is a transverse section of the machine, on line 1—1 of Fig. 3.

Fig. 2 is a vertical section taken on line 2—2 of Fig. 3, dotted lines showing the trowels in the troweling position.

Fig. 3 is a section on line 3—3 of Fig. 1, a portion of the operating handle being broken away.

Referring in detail to the drawing, the main parts of the machine shown are the central frame or support 10 superimposed upon which is the motor 11 (preferably an internal combustion engine) and downwardly from which frame extends the motor driven shaft 12 which rotates the tubular head 13, being connected with said head by means of pin 17. The whole machine is moved across the floor by means of the tongue or operating handle 16 which is secured to said frame 10. Around its lower portion the tubular head 13 has a flange 18, which is welded at 19 to a triangular base plate 21. Said base plate has through it an aperture 20 within which the lower end of the tubular head 13 is fitted.

The invention resides, to a considerable extent, in the means whereby the trowels 15 are connected with the head 13 and are tiltably adjusted in relation to the floor or surface being troweled. Said head 13 has welded to it a triangular basal portion 21 to the upper side of which is bolted or otherwise secured a plurality of bearing blocks 22, there being three of these blocks in the illustrated embodiment of the invention. Three trowel carrying arms 14 are shown, each having an angularly offset inner end portion 23 reduced in its cross section to form a stub shaft 24 which has its bearing within the block 22 provided for it. A finger 25 is bolted or otherwise attached to that side of each trowel carrying arm 14 which is opposite to its offset part 23, the inner end portion of this finger entering a suitably shaped seat 26 of the aforesaid sleeve 9. Said finger 25 is shown having a slightly offset part 27 which alines with said seat 26 and which is provided with an enlarged bearing extremity 27a to cooperate with said seat without binding during the swinging movement of said offset part incident to tiltably adjusting the trowels. Said sleeve 9 is vertically adjusted in relation to the head 13 by means of a yoke 28 carried by a vertically swingable lever 29 which is fulcrumed on a pin 30 carried by a bifurcated downward extension 31 of the frame 10, said yoke having a pair of inwardly directed roller-carrying pins 32 which enter a groove 33 around said sleeve 9.

To the aforementioned shaft 12 is fixed a large driven worm gear 35 with which meshes a driving worm gear 36 carried by a transmission shaft 37. Power from the motor shaft 38 is transmitted to said shaft 37 by means of pulleys 39 and 40 over which passes a belt 41.

A circular rim 42 surrounds the trowels 15, the outer part of each trowel having bolted to its upper side a member 43 which carries a pivot pin 44 that projects through said rim and alines axially with the finger 25 at the opposite end of the same trowel.

The already mentioned adjusting lever 29, which carries the yoke 28, is locked in the adjusted position by reason of its dog 46 cooperating with a toothed segment 47 which, together with the handle 16, is bolted to a projecting plate

48 which forms a part of the frame 10, a single set of bolts 49 serving to secure both the base 16a of the handle 16 and the segment 47 to said frame.

In operation of the device the workman, by grasping the handle 16, will move it around over the floor as he desires and will at the same time hold against rotation the frame 10 together with the parts in a fixed relation thereto. But the head 13 and its sleeve 9 will rotate and together with these parts will rotate the trowels 15 and rim 42. Adjustment of the yoke 28 and lever 29 may be effected to vary the tilt of the trowels, while the device is in operation. The rim 42 spaces the trowels properly from each other and also constitutes a safety feature.

At all times during the operation of the machine the trailing edges of the trowels are in contact with the work, the set of trowels being rotated in the clockwise direction, as indicated by the arrow in Fig. 1. By the lifting and lowering action of the sleeve 9 upon the inner end portions 27a of the fingers 25 the trowels are tilted as indicated by the arcuate broken lines in Fig. 3. This tilting of the trowels so as to raise and lower their front edges is accomplished without appreciable raising or lowering of the machine, because the axis of tilt for each trowel is almost directly vertically above the trailing edge portion of the trowel. The base plate 21 is at all times maintained in an upwardly spaced relation to the cement being troweled.

I claim:

1. A device of the kind described comprising a plurality of trowels, a frame, a rotatable mounting means carried by said frame whereon each of said trowels is pivotally supported in a horizontally offset relation to its axis for tiltable adjustment, means to rotate said mounting means together with said trowels over the surface of the floor, and means to tiltably adjust said trowels and maintain them in adjusted position during their rotation, the weight of said frame being supported by said trowels at points located adjacent to the vertical planes occupied by the trailing edge portions of the latter.

2. A device of the kind described comprising a rotary head, a set of arms which radiate from said head each in a generally horizontal direction, an elongated trowel extending along and secured to each of said arms, the inner end portion of each of said arms being angularly crank shaped, the inner extremity of each of said arms being turnably contained within a bearing provided for it on a part carried by said head, a sleeve member carried by said head in a vertically adjustable relation thereto, said head slidably supporting said sleeve member, a finger carried by each of the aforesaid arms, the extremity of said crank shaped arm portion being in a horizontally offset relation to said finger, said fingers each extending turnably into a seat provided for it in said sleeve, a tongue secured to said head to propel the device, and means to manually adjust said sleeve vertically and maintain it in the adjusted position while it rotates with said head.

3. A troweling machine comprising a frame or support having a handle portion whereby it is propelled and prevented from rotating, a plurality of trowels radiating from a common center, each of said trowels having a trailing edge portion, a rotatable shaft carried by and projecting downwardly from the aforesaid frame or support, means whereby said shaft is operatively connected with said plurality of trowels to rotate them, an arm rigidly connected with each of said trowels, said means for rotating the trowels having a bearing portion which is engaged by an end portion of said arm at a point adjacent to the vertical plane occupied by the trailing edge portion of said trowel, whereby the weight of the aforesaid frame or support is sustained at points substantially in vertical alinement with the trailing edge portions of said trowels, and means including a finger carried by each trowel in a horizontally offset relation to said end portion of the aforesaid arm to adjust the tilt of each trowel and maintain it in adjusted position during the operation of the machine.

4. A device of the kind described comprising a non-rotating support, a plurality of trowels radiating therefrom, means whereby said trowels are rotatably connected with said support and are tiltably adjustable in relation to their widths along axes vertically above and parallel with their trailing edge portions, the weight of said support being thus supported along horizontal lines which extend along vertical planes which pass through the trailing edge portions of said trowels.

5. The subject matter of claim 3 and, the means for tiltably adjusting said trowels comprising an arm and a finger both rigidly fixed to each trowel, said arm having a terminal bearing portion which alines with the axis of tilt of the trowel and has a bearing in a part of said support, and said finger having a circular extremity which engages a circular bearing seat for it formed in a vertically adjustable part of said support.

6. In a machine of the character described, a frame, a rotary shaft depending from the frame, a base member secured to the lower end of the shaft, a plurality of circumferentially spaced bearings fixed on the base member, a sleeve mounted to slide axially on the shaft and having a plurality of circumferentially spaced seat openings, a plurality of flat elongated trowels extending radially outward of the shaft and base member, an arm fixed on and extending approximately along the longitudinal center line of each trowel, a right angularly extending arm at the inner end of the arm, a crank pin extending inwardly from the outer end of said arm and turnably engaging one of said bearings, said crank pin being parallel with and offset from the center line of the trowel a distance approximating one half the width of the trowel, a finger member secured to one side of the arm on the trowel and parallel therewith, an inwardly projecting journal element at the inner end of the finger turnably engaging one of said seat openings in the shaft, and manually operable means connecting with the sleeve for vertically adjusting the head and frame with reference to the supporting trowels and effecting tilting of the trowels with relation to the offset crank pins.

7. In a machine of the character described, a frame, a motor carried on the frame, an actuating handle attached to the frame, a rotary shaft journaled on and depending from the frame, gear mechanism in the frame having driving connection with the motor for rotating the shaft, a tubular head fixed to and projecting below the shaft, a base member secured to the lower end of the head, a plurality of bearings fixed on the base member outwardly of the head and in circumferentially spaced relation, a sleeve mounted to slide axially on said head, said sleeve having an annular groove in its upper portion and a plurality of circumferentially spaced seat openings therebelow, a plurality of flat elongated trowels extending radially outward of the head and base member, an arm fixed on and extending substan-

tially along the longitudinal center line of each trowel, a right angularly extending crank arm at the inner end of the longitudinal arm, a crank pin extending inwardly of the outer end of the crank arm and turnably engaging one of said bearings on the base member, said crank pin being parallel with and offset from the center line of the trowel a distance approximating one half the width of the trowel, an elongated finger bar secured to one side of the longitudinal arm and parallel therewith, an inwardly projecting journal element at the inner end of the finger bar turnably engaging one of said seat openings in the head, a lever pivotally connected to the frame having a handle portion extending outwardly of the pivot, and a yoke portion extending inwardly of the lever pivot having elements projecting into the groove in the head whereby vertical movement of the lever adjusts the head and frame with relation to the supporting trowels and effects tilting of the trowels with relation to the offset crank pins.

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