

July 18, 1967

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3,331,290

POWERED TROWEL

Filed Dec. 10, 1965

3 Sheets-Sheet 1

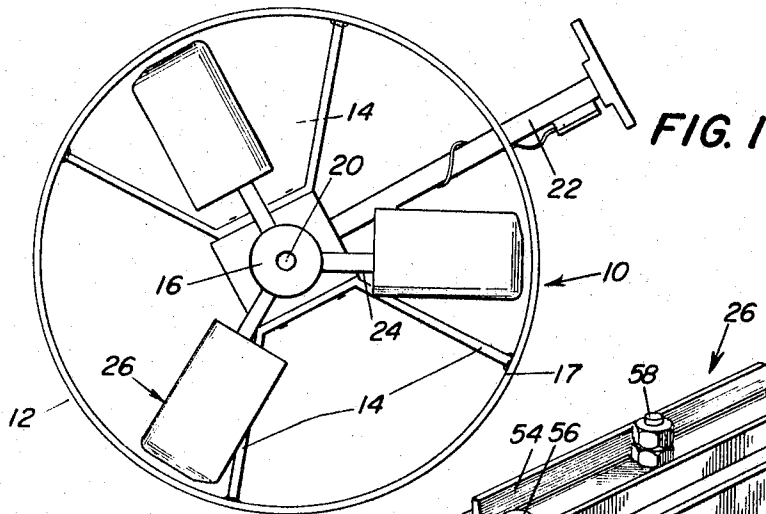


FIG. 1

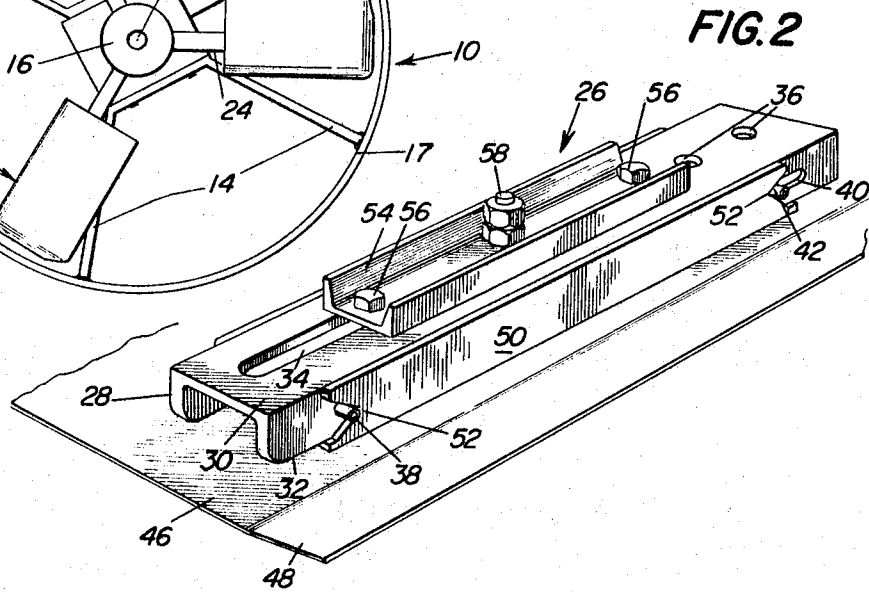


FIG. 2

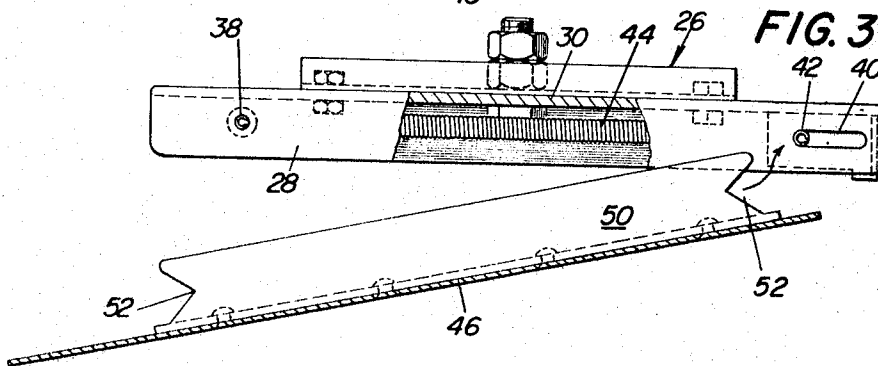


FIG. 3

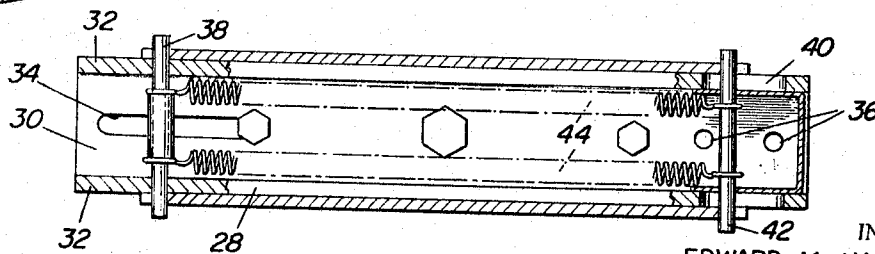


FIG. 4

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POWERED TROWEL

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3 Sheets-Sheet 2

FIG. 5

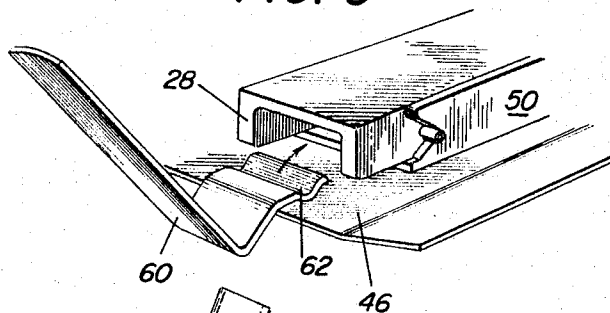


FIG. 6

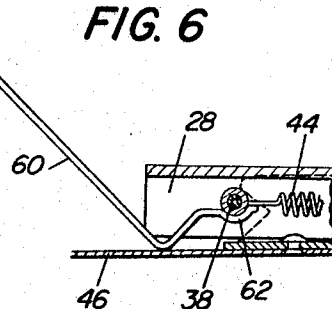


FIG. 7

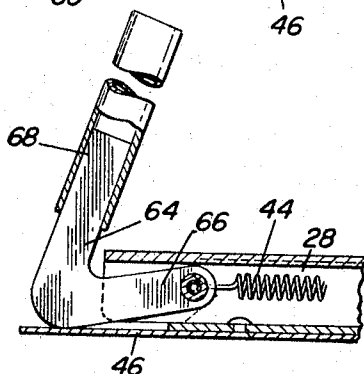


FIG. 8

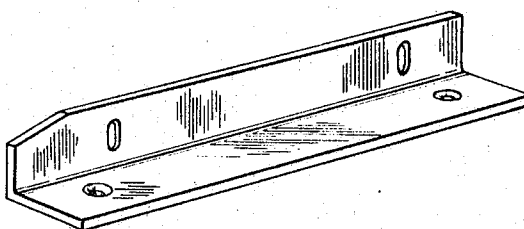


FIG. 9

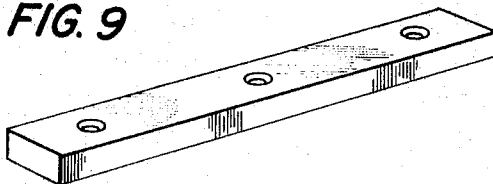
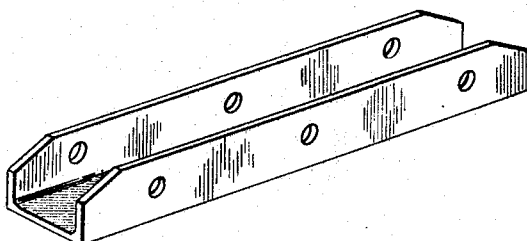


FIG. 10



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3,331,290

POWERED TROWEL

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3 Sheets-Sheet 3

FIG. 11

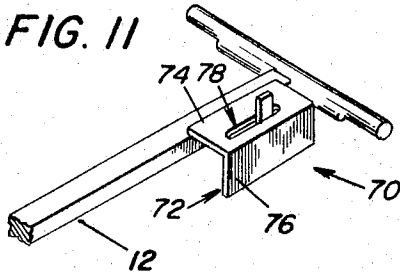


FIG. 12

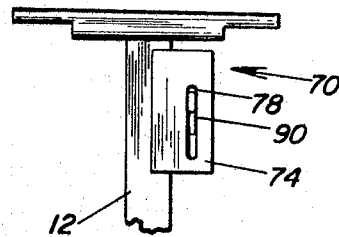


FIG. 13

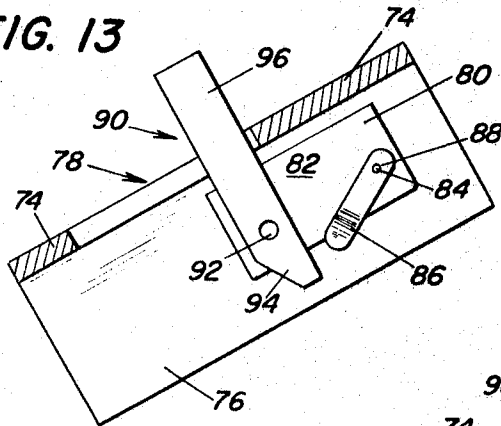
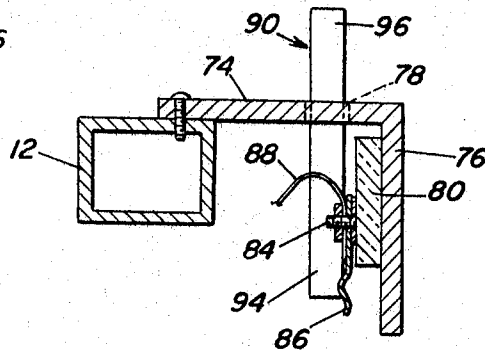


FIG. 14



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1

3,331,290

POWERED TROWEL

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5 Claims. (Cl. 94-45)

The present invention relates to new and useful improvements in trowel machines for finishing concrete surfaces, and more particularly and specifically to unique and useful improvements in powered rotary trowels incorporating novel safety switch means and trowel blade attaching features.

The prior art evidences powered rotary trowel machines consisting of a ring or hub supporting centrally thereof a power unit coupled to radially projecting and rotating trowel supporting arms. The prior art further evidences various means and devices utilized in such trowelling apparatus for quick detachable connection of trowel blades to the rotating arms.

It has been discovered that trowel blades used in powered rotary trowels must be frequently changed or replaced by reason of different trowelling functions, wear or damage. It has also been discovered that powered rotary trowels incorporating a plurality of blades rotating in a common direction in contact with a cement surfaces tend to pull or spin out of the control of the operator if the frictional load between the blade and cement suddenly increases due to uneven surface areas and other like causes. Such tendency of powered trowels is inherently dangerous to the operator and others in the area of operation and can result in damaging the unset cement surfaces being worked.

It is a principal object of the present invention to provide an improved powered trowel which avoids or eliminates certain structural and functional problems and disadvantages inherent in prior art devices of like nature.

Another object of this invention is the provision of a novel and unique powered trowel incorporating a blade supporting adaptor which enables the quick and ready removal and replacement of trowel blades and which further enables the use of trowel blades of various manufacture and construction without structural modification currently required of prior art devices to accommodate other than a single form of blade construction.

Still another object of this invention is the provision of a novel and highly useful safety switch for powered trowels which acts automatically to stop operation of the power unit of the trowel immediately upon any sudden swinging or uncontrolled movement of the trowel.

A still further object of this invention rests in the provision of a novel and useful powered trowel which is simple and relatively inexpensive in design and manufacture, and which is safe and effective in use, and which is durable and long-lasting in operation.

Still additional objects and advantages of the present invention will become more readily apparent to one skilled in the art when the following description and general statement are read in the light of the accompanying drawings.

The nature of the present invention may be described in general terms as relating to a powered rotary cement trowel consisting, primarily, of a ring, a power unit supported by and centrally of said ring, radially extending arms within said ring coupled to said power unit for rotation therewith, an operator's handle extending upwardly and outwardly from said ring, an adaptor on each said radial arm for removably receiving a trowel blade thereon, and a counterbalanced centrifugal switch on said operator's handle having operable connection with said power unit.

2

Referring now to the accompanying drawings in which like numerals designate similar parts throughout the several views:

FIG. 1 is a bottom plan view of the powered trowel;

FIG. 2 is a perspective view of the trowel blade adaptor and trowel blade;

FIG. 3 is a side elevation of the components of FIG. 2 in detached condition;

FIG. 4 is a bottom plan view in partial section of the trowel blade and adaptor assembly;

FIG. 5 is a fragmentary end view of the adaptor-blade assembly and blade removal tool;

FIG. 6 is a fragmentary side elevation in partial section of the components of FIG. 5 with blade in partial separation;

FIG. 7 is a view similar to FIG. 6 of a modified form of the blade removal tool;

FIG. 8 is a perspective view of a modified attachment component for the adaptor;

FIG. 9 is a perspective view of a further modified attachment component;

FIG. 10 is a perspective view of a still further modified attachment component;

FIG. 11 is a perspective view of a fragmentary section of the trowel handle and safety switch;

FIG. 12 is a plan view of the components of FIG. 11;

FIG. 13 is a sectional view taken on line 13-13 of FIG. 12;

FIG. 14 is a sectional view taken on line 14-14 of FIG. 13.

With reference to the accompanying drawings, the powered trowel, generally designated at 10, consists of rigid supporting ring 12 having spaced, radially extending braces 14 secured to said ring and converging central thereof at an elevated position thereabove where they are secured to a power unit 16 which, in the present instance takes the form of a gasoline engine having an output shaft 20 depending centrally of said supporting ring. An operator's handle 22 is secured to the power unit-ring assembly to project angularly therefrom to a point above and beyond the perimeter of said ring.

A plurality, in this case three, of rigid arms 24 are secured to the engine output shaft 20 to extend radially therefrom in equally spaced relationship about said shaft and with said ring. The arms 24 are of equal length and terminate within the perimeter of the supporting ring.

Associated with each radial arm 24 is a trowel blade supporting adaptor, generally designated 26 (FIGS. 2 and 4). Each adaptor 26, in the preferred embodiment consists of an elongated U-shaped channel member consisting of a central web portion 30 interconnecting perpendicularly extending parallel side flanges 32. One side channel member is disposed in an inverted condition beneath each of the radial arms 24. The top or central portion 30 of each channel member is provided adjacent one end thereof with an elongated vertical slot 34 formed on the longitudinal centerline. The web 30 is additionally provided adjacent the second end with a series of spaced vertical holes 36 on the longitudinal centerline thereof.

At a spaced distance from one end of the channel member 28 a rigid pin 38 is fixed transversely of the member and extends outwardly for a spaced distance through from each side flange 32 of the channel member. Each side flange portions 32 of the channel member is provided with a limited longitudinal slot 40 adjacent and remote to the pin 38. The slots 40 are in register transversely of the channel member and receive in sliding projection therethrough the remote ends of a second rigid pin 42 which is movable longitudinally of the channel member within the confines of the slot.

The pins 38 and 42 are interconnected by a pair of

gated, parallel coil springs 44 extending therebetween within the channel portion of the channel member 28. The springs normally bias pin 42 to that end of slot 40 closest to pin 38.

A flat rectangular cement trowel blade 46, having one end angularly offset as at 48 to provide a floating blade portion, is associated with each adaptor. Each trowel blade is provided longitudinally of one face thereof, the normally disposed upper face, with a pair of parallel spaced plates 50 riveted or otherwise secured to the blade. The parallel plates 50 terminate short of each end of the blade and the vertical end edges of each plate are notched inwardly, as at 52, intermediate the vertical dimension thereof. The longitudinal spacing between the innermost recesses of the remote notched edges of each plate 50 is slightly greater than the longitudinal spacing of pins 38 and 42 under normal influence of springs 44. The spacing of the parallel plates 50 transversely of the trowel blade is slightly greater than the overall transverse dimension of the U-shaped channel member 28.

As is seen in FIG. 3 of the drawings, the trowel blade 46 is removably secured or assembled with the U-shaped channel member 28 by positioning the blade below the channel member with the parallel plates 50 upwardly disposed and vertically aligned one immediately outside of each side flange 32 of the channel member; by tilting the blade longitudinally to bring the notches 52 in one pair of ends of the parallel plates 50 into engagement with the remote ends of pin 42 where they project through flanges 32 of the channel member; by then forcing the blade, and plates, against pin 42 sufficiently to move the pin to the outer end of slot 40 remote from pin 38 against the normal bias of springs 44; moving the second, lower end of the tilted blade 46 vertically beneath the channel member 28 to align the end notches 52 in plates 50 at that end of the blade remote to pin 42 longitudinally between pins 38 and 42; relaxing force on the blade 46 to permit pin 42, under influence of springs 44, to move the blade and plates 50 longitudinally toward the fixed pin 38 to bring the notches 52 at those ends of plates 50 adjacent pin 38 into registry with pin 38 thereby locking the plates 50 between the spring biased pins and to the inverted channel member 28.

In the preferred embodiment of the invention shown in FIGS. 2-4, the upper face of the web portion 30 of channel member 28 supports a smaller channel member 54 seated in upright condition and secured to said web 30 by spaced threaded fasteners 56 adjacent the ends thereof which engage in the slot 34 and in one of the holes 36 formed in the web portion 30 of the channel member 28. The smaller channel member 54 supports an upstanding threaded member 58 which secures to the radial arm 24 at an intermediate point on said arm to dispose the trowel blade in working condition therebeneath.

In FIGS. 8-10 there are shown replacement components for the small channel member 54 which adapt the inverted channel member 28 and blade 46 for assembly with the different forms or configurations of radial arms incorporated in various powered trowels currently known in the prior art and available commercially.

In FIGS. 5 and 6 there is shown a lever tool 60 consisting of an L-shaped bar having a transverse groove 62 in the short leg thereof engageable, as seen in FIG. 6, with the fixed pin 38 of the U-shaped channel member 28 to disengage a blade 46 from said channel member. The lever, operating between said fixed pin and the upper surface of the blade acts, against the normal bias of the springs 44, to permit the displacement of the blade from the channel member.

FIG. 7 illustrates a modified disengaging tool 64 which takes the form of a bellcrank having one end 66 pivotally fixed to the pin 38 with the second end 68 exposed beyond and above said channel member 28 to permit depression hereof to disengage the trowel blade 46, as shown.

In FIGS. 11-14 there is illustrated a preferred embodi-

ment of a safety switch for the powered trowel. The switch, generally designated 70, consists of an L-shaped plate 72 having one leg portion 74 thereof secured in a horizontal position to the trowel handle disposing the second leg 76 in a depending vertical position outwardly from said handle. The horizontal leg 74 of the switch plate is provided with a longitudinal slot 78 therein and the depending vertical leg is provided with a terminal block 80 disposed generally below the slot 78 in the horizontal leg. The terminal block 80 consists of an insulated plate 82 secured to the depending leg 76 and a threaded fastener 84 fixed to said insulated plate and extending outwardly therefrom in parallel beneath the horizontal leg 74 of the switch plate. The threaded fastener 84 supports a spring clip or resilient plate 86 which lies in a parallel plane with the depending vertical leg 76 of the switch plate in a vertically offset position beneath the centerline of the slot 78 in the horizontal leg 74 of the switch plate. A grounding wire 88 is secured to said terminal block and extends from said handle to a connection with the spark plug of the gasoline engine powering the trowel.

An elongated lever 90 is pivoted, as at 92, to the depending vertical leg of the switch plate to present a short end 94 thereof beyond the pivot point 92 which is movable into and out of engagement with the spring clip or resilient plate 86 upon opposite directional movement of the long end 96 of the lever which projects upwardly through the slot 78 in the horizontal leg 74 of the switch plate.

The lever 90 is normally positioned in a substantially vertical condition with the short end 94 displaced from and disengaged from the clip or resilient plate 86 (FIG. 13). When the trowel is suddenly moved or spun in the direction of rotation of the radial arms and blades, the heavier, longer upper end 96 of the lever, which overbalances the shorter, lower end 94 thereof, will be caused by centrifugal force to move in the slot thereby moving the short end 94 thereof into grounding engagement with the terminal block clip or plate 86 thereby "killing" the gasoline motor through the medium of the grounding wire 88 connected to the spark plug of the motor. The switch may simply be reset to permit restarting of the gasoline engine by manually returning the lever to its original, normal vertical condition.

Having thus described and explained my invention in terms of the several contemplated embodiments thereof, what I desire to claim is:

1. In a powered rotary trowel consisting of a support ring, a power unit supported centrally of said ring, radial arms within said ring coupled to said power unit for powered rotation within said ring, and a handle coupled to and extending angularly from said ring-power unit assembly; means for securing a trowel blade to each of said radial arms comprising, a rigid plate coupled to and depending from each radial arm, a pair of pins supported in horizontal spaced relationship by each said plate, one of said pins on each plate mounted for limited sliding movement toward and away from the other said pin, resilient means coupling said pins and biasing them toward one another, a cement trowel blade having parallel spaced upstanding plate elements longitudinally thereof, the ends of each said upstanding plate being inwardly notched, and the longitudinal dimension of said last named parallel plates between the depth of the notches in the remote ends thereof being slightly greater than the spacing between the pins in one of said channel members under the normal bias of said resilient means, the notched ends of said trowel supported plates being engaged between said resiliently biased pins coupling said blade to said radial arm supported plate.

2. A combination as defined in claim 1 wherein a centrifugal grounding switch is secured on said handle, and said switch is operably coupled to the power unit.

3. A combination as defined in claim 1 wherein said rigid pin supporting plate is of inverted U-shaped con-

5

figuration, said pins are supported transversely of the channel portion of said plate in spaced relationship longitudinally thereof, the remote ends of one of said pins projecting through limited longitudinally extending slots in the transversely opposed walls of said U-shaped plate, and said resilient means consisting of coil springs extending longitudinally of the channel portion of the plate and coupled between said spaced pins.

4. A combination as defined in claim 2 wherein said switch consists of an elongated plate slotted longitudinally thereof, a friction terminal supported on and insulated from said plate, a grounding wire from said terminal to said power means, a counter-balanced switch lever pivoted

6

on said plate having an end engageable with said friction terminal, and said lever normally positioned out of contact with said terminal with the counter-balancing end positioned subject to centrifugal dislocation.

5. A combination as defined in claim 4 wherein said lever is grounded through said plate, handle and trowel assembly.

References Cited

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