Aug. 28, 1934. A. W. MALL 1,971,790

PORTABLE POWER TOOL

Filed June 22, 1932 2 Sheets-Sheet 1

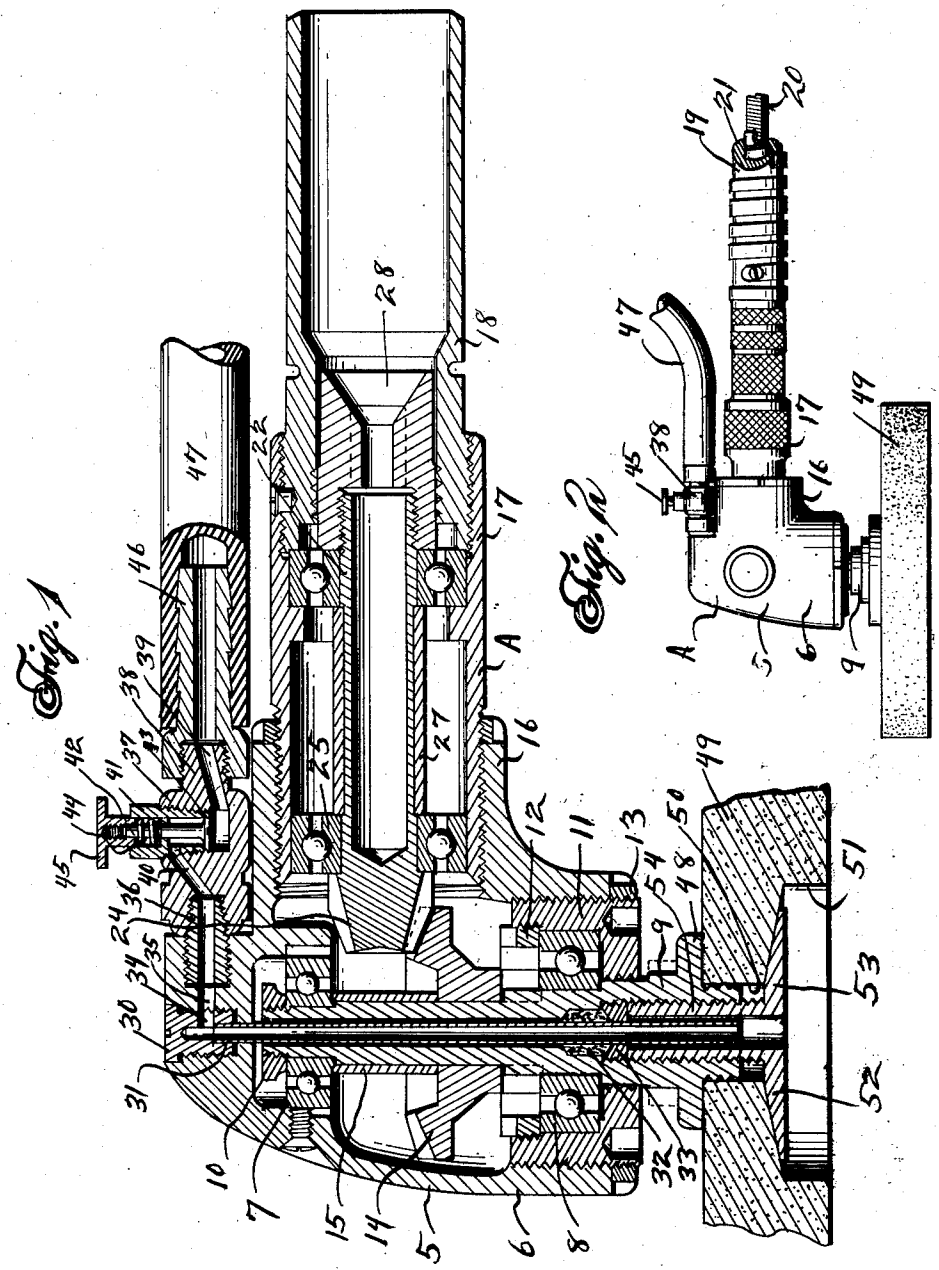


Fig. 1

Fig. 2

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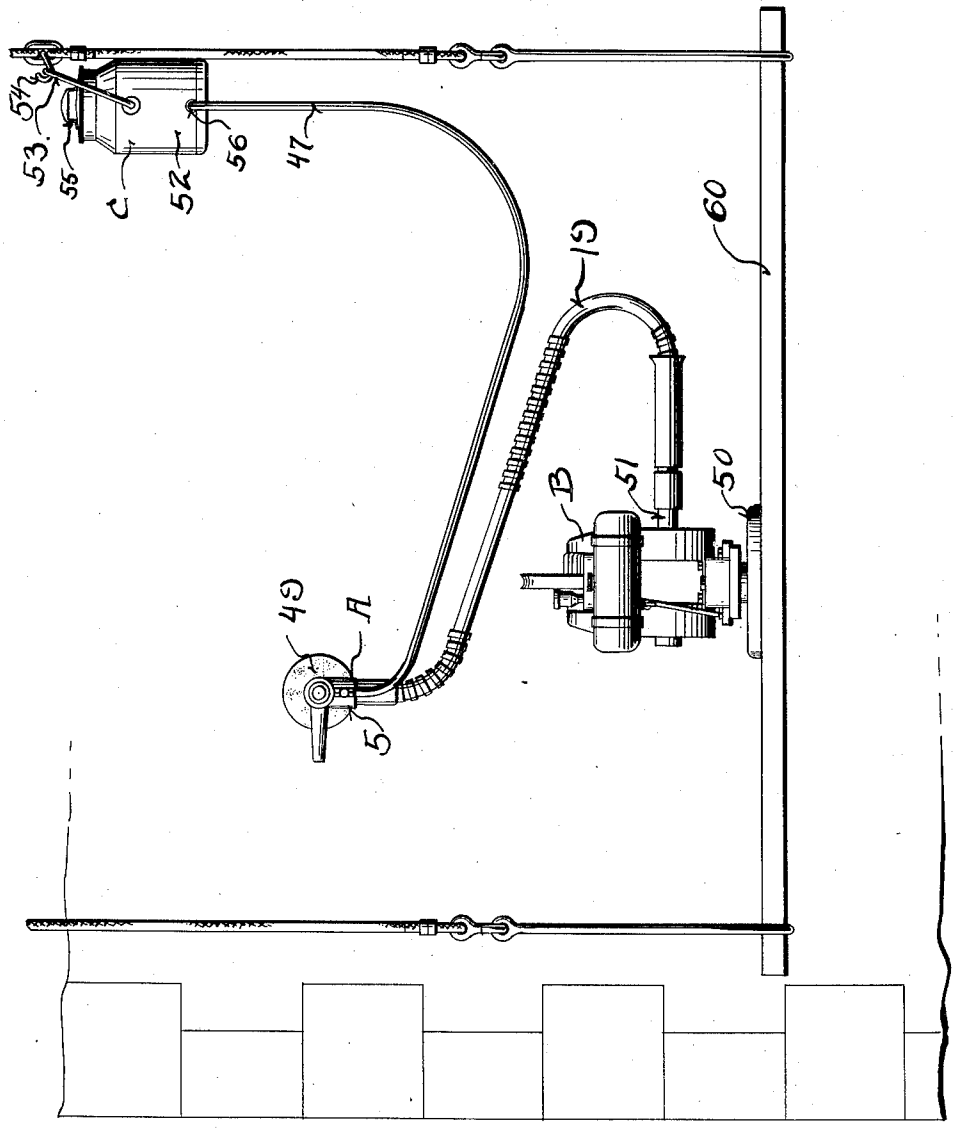


Fig. 3

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PORTABLE POWER TOOL

Arthur W. Mall, Chicago, Ill.

Application June 22, 1932, Serial No. 618,684

1 Claim. (Cl. 51—170)

This invention relates to portable power tools and more particularly to a novel portable tool for finishing and surfacing concrete.

One of the primary objects of my invention is the provision of a portable tool embodying a rotatable grinding head or wheel, with novel means for supplying a flow of water to the wheel, whereby the tool can be effectively used on concrete work, both for the purpose of grouting and grinding the concrete surface, the entire tool being so constructed as to permit the convenient and expeditious finishing of concrete structures by the use of a portable power device.

Another and salient object of my invention is the provision of a portable equipment for use in finishing and surfacing concrete, particularly adapted for use in connection with structural work, where electric current is not available, the equipment embodying a small and compact internal combustion engine for driving the flexible power shaft of the grinding wheel and a small tank utilized as a water reservoir for feeding the liquid to the grinding wheel, the entire apparatus being of such a construction that the same can be handled by one person and readily used and placed in confined spaces, such as on scaffolding and the like.

A further object of my invention is the provision of a wet spindle head for portable tools, so that a constant flow of water can be delivered through the spindle to the working tool, said head including means associated directly therewith for controlling the flow of water through the tool.

A further object of my invention is the provision of a pressure valve for controlling the flow of water through the tool connected directly with the casing of the tool and in convenient reach to be actuated by the thumb of the operator, whereby the water supply can be regulated from a constant drip for working in the grout of the concrete structure to a steady stream for washing down the work during the grinding and finishing of the concrete.

A further object of my invention is the provision of novel means for forming the tool, whereby the water can be led directly through the spindle shaft of the tool into the center of the grinding wheel or finishing head.

A still further object of my invention is to provide a portable equipment embodying an improved wet spindle for use in concrete grouting and finishing of the above character, which will be durable and efficient in use, one which can be manufactured and placed upon the market at a small cost, and one which will be economical to operate.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described, and claimed, and illustrated in the accompanying drawings, in which:

Figure 1 is a vertical longitudinal section through my improved tool head or wet spindle, the grinding wheel being shown broken away and in section;

Figure 2 is a side elevation of the tool showing the flexible drive shaft connected therewith; and,

Figure 3 is a rear elevation of the complete portable outfit, showing the same in use on a concrete structure.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates my novel tool for finishing concrete; B the portable engine for operating the same and C the portable water tank.

As shown, the tool A is of the angle type, but it is to be understood that the invention is equally adapted for straight tool heads.

The improved tool head A comprises an angle casing 5 having its main body portion 6 provided with upper and lower bearings 7 and 8, which are shown to be of the ball bearing type, for receiving the hollow tool spindle 9. This tool spindle 9 projects beyond the body portion of the casing 6 and is retained in place by an inner nut 10 threaded thereon, which engages the inner bearing 7.

A closure cap 11 is threaded into the outer end of the casing 5 and has in turn threaded therein a nut 12 for engaging the inner face of the outer bearing 8. The cap 11 closes the outer end of the casing and is held in its locked position by means of a retaining ring 13. Secured to the hollow spindle 9 in any preferred way, is a bevelled pinion 14 and a spacer sleeve 15 is placed about the hollow spindle and is interposed between the inner bearing 7 and the pinion wheel 14. The laterally projecting part 16 of the casing 5 has threaded therein, the supporting casing sleeve 17. This casing sleeve 17 has in turn threaded therein, the coupling sleeve 18 for receiving the flexible drive shaft 19. The flexible drive shaft 19 will not be described in detail, but the same extends from and is driven by the engine B, as will be later pointed out.

As shown, the flexible drive shaft 19 includes the flexible rotatable drive core 20 and the outer stationary protecting housing 21.

Rotatably mounted within the casing sleeve 17 is the pinion shaft 22, the forward end of which extends into the body portion 6 of the casing and the forward end of the pinion shaft is provided with a bevelled pinion 24 for meshing with the pinion 14, which is keyed or otherwise secured to the hollow spindle 9.

Any preferred type of bearings 25 can be provided for rotatably supporting the pinion shaft 22 in the casing sleeve and I prefer to utilize a spacing sleeve 27 around the pinion shaft and between the supporting bearings 25. The rear end of the pinion shaft carries the drive nut 28 for receiving the core tip (not shown) of the flexible drive core 20 of the flexible drive shaft 19.

Threaded into the top of the casing 5 is a removable bushing 30 which has connected therewith the water feed tube 31. This water feed tube 31 is concentrically disposed relative to the hollow spindle 9 and extends axially therethrough. A suitable packing 32 can be placed around the water feed tube 31 and in the hollow spindle shaft 9. A packing nut or gland 33 is threaded into the bore of the hollow spindle for engaging the packing.

The bushing 30 is provided with a way 34, which communicates with the water feed tube 31 and a passageway 35 formed in the casing 6. This passageway 35 has threaded into the same, a water feed nipple 36. This nipple 36 is arranged in parallel relation to the casing sleeve 17 and supports a pressure valve 37.

The pressure valve 37 is of a novel type, and, as shown, is disposed directly above the lateral portion 16 of the housing, so that the same can be readily actuated by the thumb of the workman. The pressure valve 37 embodies a valve casing 38 having the angularly extending inlet and outlet passageways 39 and 40. Threaded into the valve casing 38 is a valve cage 41, the inner end of which is provided with a valve seat directly above the inlet passageway 39.

Slidably supported by the valve cage 41 is the valve stem 42 having formed thereon the valve head 43 for engaging the valve seat. An expansion spring 44 normally holds the valve on its seat and the valve stem 42 is provided with a manipulating thumb button 45 for permitting the convenient operation of the valve against the tension of its spring 44. This valve opens inwardly and when the same is moved off of its seat, the passageway 39 will be uncovered, allowing the flow of water through the cage and into the passageway 40 and thence into the water feed tube 31. Due to the fact that the valve head 38 moves across the water inlet passageway 39, the flow of water can be readily controlled from a steady drip to a constant flow or stream. A hose coupling 46 is secured to the valve casing 37 and receives a flexible water conducting hose 47, which may lead from any suitable source of water supply or to the tank C.

The outer active end of the spindle 9 can be provided with an annular stop shoulder 48 for the tool being used. As shown, this tool is of the grinding wheel type, and it is generally indicated by the reference character 49. This grinding wheel is provided with an axial bore 50 for receiving the spindle and this bore is enlarged to form a chamber 51 at the outer face of the tool.

A clamp screw 52 is provided for holding the grinding wheel 49 on the spindle and this clamping screw embodies a relatively large head 53 and a hollow exteriorly threaded shank 54. The shank 54 is threaded into the bore of the spindle until the head 53 impinges against the wall of the chamber 51. This will firmly clamp the grinding wheel in place.

The outer end of the water feed tube 31 extends into the hollow shank of the clamping screw 52 and thus the water flows through the clamping screw and into the chamber 51 of the grinding wheel and thence to the work.

When the device is being used for concrete finishing, after the form boards have been removed from the concrete structure, a plaster is made of one part sifted sand and one part cement. This plaster is then washed over the surface of the work, filling in all of the low places and the bolt holes. This tool effectively works in this "grout", and by pressing in on the thumb piece 45 of the valve, a constant drip of water can be supplied. The grinding wheel is run at a comparatively low speed for the grouting operation.

After the grout dries, the grinding wheel is run at a high rate of speed and a steady flow of water is admitted to the chamber of the grinding wheel. This effectively finishes and polishes the concrete.

From the foregoing description, it can be seen that I have provided a novel tool for finishing concrete surfaces.

My complete apparatus has been particularly designed for use in connection with bridges, overheads, viaducts and grade separations, located so as to make the obtaining of electric power no obstacle for operating the device. Thus, as clearly shown in Figure 3 of the drawing, the device includes the portable internal combustion engine B. This engine is of such a character that the same can be readily handled by a single person, and it is of a compact and durable nature and requires a minimum amount of fuel for the proper operation thereof. The engine B is preferably mounted upon a supporting base 50 and the engine can have a swivel connection therewith, so that the engine can turn on the base. The drive shaft 51 extends from one side of the engine and has operatively connected thereto, the flexible drive shaft 19 heretofore described. The portable water tank 52 is also of such a character that the same can be readily carried by the operator and is provided with a bale handle 53 whereby the same can be readily suspended in an overhead position from a suitable supporting hook or the like 54. The tank or water reservoir C is provided with a large removable cover 55 so that the water can be readily poured into the same and a nipple 56 leads from the bottom of the reservoir and has connected therewith the flexible water feed hose 47.

As shown in Figure 3, the device can be successfully used on suspended scaffolding or the like 60 and owing to the compact nature of the entire apparatus, the same can be efficiently used in confined spaces.

Changes in details may be made without departing from the spirit or the scope of this invention, but what I claim as new is:

A portable tool for surfacing and finishing concrete structures comprising an angle-shaped casing having a main body portion and a right angularly disposed sleeve, a hollow spindle rotatably mounted within the body, a drive shaft extending into the body through said sleeve having operable connection with the hollow spindle, a grind-

ing wheel connected with the spindle, a water feed tube extending through the hollow spindle, a nut threaded into the body receiving the feed tube having a bore communicating with the tube, a valve casing connected with the body and communicating with the bore, said casing extending parallel to the sleeve and drive shaft, a water feed hose extending parallel to the sleeve having connection with the valve casing, and a valve in said casing for controlling the flow of water through the casing to the feed tube.

ARTHUR W. MALL.