Sept. 15, 1959 M. B. SALISBURY ET AL 2,904,320

PNEUMATIC HAMMER CONCRETE ROUTER AND SCARIFIER

Filed July 29, 1958

2 Sheets-Sheet 1

Fig.1

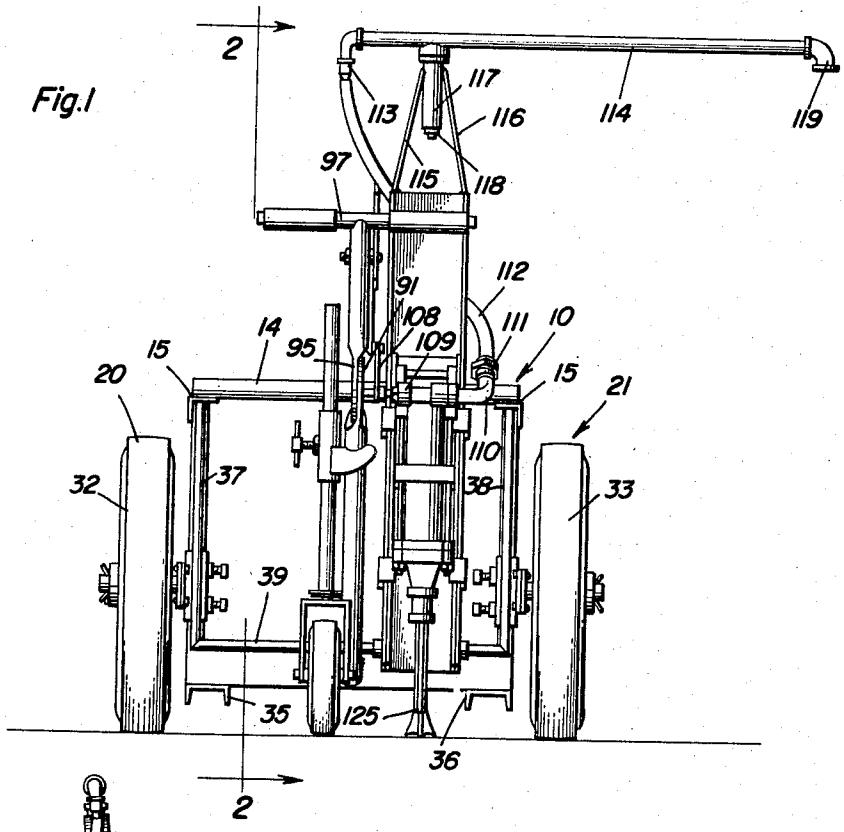
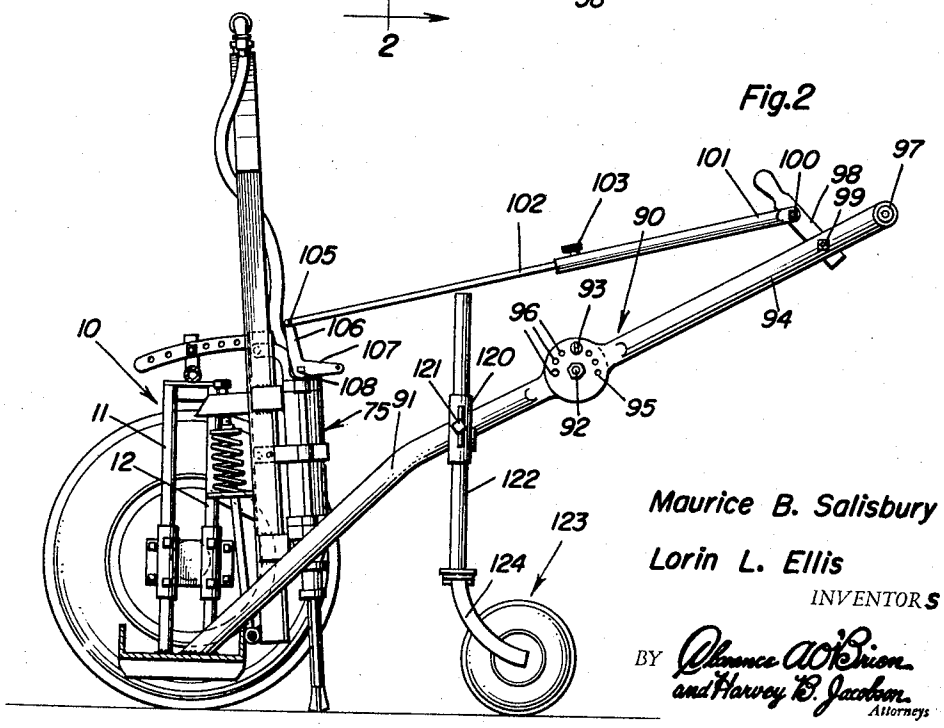


Fig.2



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2 Sheets-Sheet 2

Fig.3

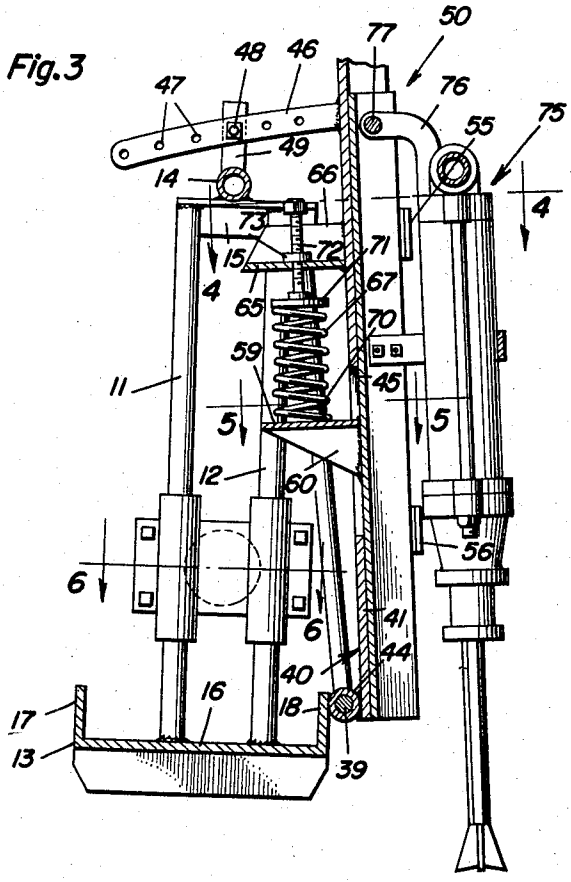


Fig.4

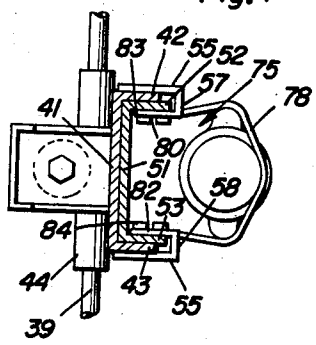


Fig.5

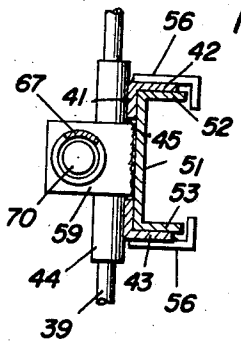


Fig.6

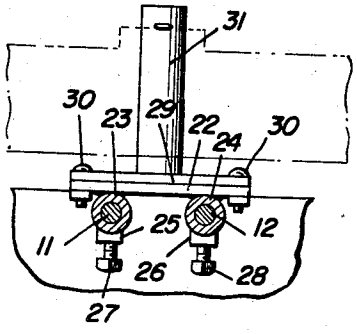
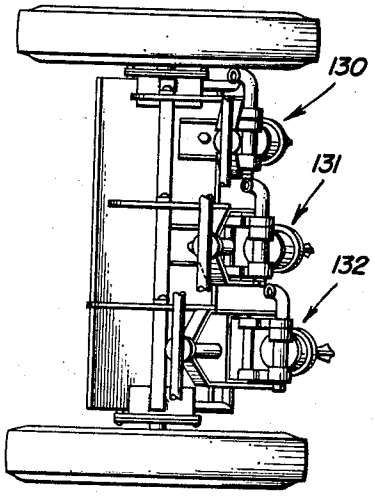


Fig.7



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PNEUMATIC HAMMER CONCRETE ROUTER AND SCARIFIER

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Application July 29, 1958, Serial No. 751,775

2 Claims. (Cl. 262—15)

This invention relates in general to pavement working equipment and pertains more particularly to a manually guided concrete router and scarifier.

An example as to the use to which the present invention is particularly adapted it will be appreciated that the concrete runways of airfields must constantly be maintained in proper condition. Concrete has a tendency, particularly under heavy load or traffic conditions, to scale or chip on its surface which will eventually form large pits or potholes which can be extremely dangerous for the vehicles using the runways. For this reason, it is desirable and necessary to periodically scarify large surface areas of airfield runways to prepare the same for the application of a new top layer or slab so that the surface of the runway may be in reasonable and proper condition. At the present time, only fairly large, complex and expensive machinery is being used for such scarifying purposes, and it is therefore of primary concern in connection with this invention to provide a relatively inexpensive machine for such purpose. In this manner, the unit cost for reconditioning concrete surfaces is materially lowered and, at the same time, the present machine performs the operation with facility and efficiency.

Another object of this invention is to provide a machine for routing and/or scarifying concrete surfaces, in particular, which is so constructed and arranged as to accommodate conventional air jack hammers so that a minimum of special equipment is required in the use and operation of the machine.

A further object of this invention is to provide a concrete router and scarifying machine which is adapted to be steered and manipulated by a walking attendant and which consists essentially of a framework provided with supporting wheels and a guiding handle and having associated therewith a carriage guided on the frame for vertical reciprocation with respect thereto and provided with means for attachment to a conventional air jack hammer which performs the actual scarifying or routing operation and which may be readily mounted and dismounted with respect to the machine to free the hammer for conventional and its usual operations.

Still another object of this invention is to provide a concrete routing and scarifying mechanism in the form of a wheel supported, generally open and rectangular frame disposed in an upright position and wherein the frame is so constructed to accommodate either one or a plurality of jack hammer assemblies in a vertically guided relation thereon so as to perform different types of routing or scarifying operations, as needed.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a rear elevational view of the machine constructed in accordance with this invention and illustrating

the relative disposition of various of the component parts thereof;

Figure 2 is a vertical section taken substantially along the plane of section line 2—2 in Figure 1 and further illustrating details of the component parts of the machine and the relative disposition therebetween;

Figure 3 is an enlarged vertical section through the frame of the machine and through the guide and carriage mechanism for mounting the air jack hammer;

Figure 4 is a horizontal section taken substantially along the plane of section line 4—4 in Figure 3 illustrating the manner in which the carriage is slidably mounted in the guide and further illustrating the manner in which the air jack hammer is strapped to the guide;

Figure 5 is a horizontal section taken substantially along the plane of section line 5—5 in Figure 3 further illustrating details of the mounting between the guide and carriage and further illustrating the spring mounting;

Figure 6 is a horizontal section taken substantially along the plane of section line 6—6 in Figure 3 illustrating details of the wheel spindle mounting mechanism; and

Figure 7 is a top plan view of the machine illustrating a gang of jack hammers mounted thereon.

Referring now more particularly to Figures 1–3 inclusive, the reference numeral 10 indicates in general the framework of the machine which will be seen to include spaced, parallel and upright side members each consisting of a pair of vertical posts or rods 11 and 12 interconnected at their lower ends by a bottom cross-member 13 and at their upper ends by a top member 14. The upper ends of the rods 11 and 12 are directly connected by the angle pieces 15 and between the angle pieces at opposite sides of the machine there extends the cross-member 14 which is preferably of tubular configuration, substantially as shown. The lower cross-member, on the other hand, is of U-shaped configuration with the bight 16 thereof being directly connected to the lower ends of the rods 11 and 12 and having forward and rear upstanding flanges 17 and 18 respectively.

Mounted on the side frame members are wheel assemblies indicated generally by the reference characters 20 and 21, each of which includes a spindle mounting mechanism as is shown most clearly in Figure 6. Each such mounting mechanism includes an inner plate 22 having a pair of sleeves or collars 23 and 24 rigidly affixed to the inner side thereof in spaced parallelism with each other and enclosing and slidingly embracing the respective rods 11 and 12. Each sleeve carries a nut 25 and 26 receiving the set-screws 27 and 28 so as to extend through the sleeves and into engagement with the rods 11 and 12 and hold the spindle mount in a predetermined and selected vertical position relative to the side members to which they are attached for the purpose of raising and lowering the frame 10 with respect to the ground surface and thereby, as will be more clearly apparent hereinafter, control the depth of the routing or scarifying operation.

Each such mount also includes an outer plate 29 detachably secured as by fasteners 30 to the inner plate 22 and which has rigidly secured thereto as by welding, a wheel spindle or axle 31 upon which the respective wheels and tires 32 and 33 are journaled. The underside of the lower cross-frame element has a pair of channel pieces 35 and 36 rigidly affixed thereto and which extend in the longitudinal direction of the machine and operate as skid plates for the lower side of the frame 10.

The frame 10 has rigidly secured thereto a U-shaped sub-frame assembly including the downwardly and rearwardly extending legs 37 and 38 secured at their upper ends to the angle pieces 15 and on the rear side of the frame 10, these legs being interconnected by the cross-

bar 39 which is of circular form and provides a pivot for the lower end of the guide assembly indicated generally by the reference character 40, see particularly Figure 3. The guide assembly includes a channel-shaped guide having a web 41 and opposite side flanges 42 and 43, the lower end of the webs 41 carry a transverse sleeve 44 which embraces and is pivotally related to the crossbar 39 and thus serves to pivotally secure the guide to the frame proper. The guide projects upwardly from the crossbar 39 to a point above the top cross-member 14 of the frame and is provided adjacent the lower end thereof but in an intermediate portion thereof with a vertically elongate opening 45, the purpose of which will be presently apparent. Adjacent the upper end of the guide is a forwardly directed leg 46 which is rigid therewith and which is provided with a series of longitudinally spaced apertures 47 therein to receive a fastener 48 therethrough. The cross-member 14 of the frame 10 is provided with an upstanding ear 49 apertured also to receive the fastener 48 so that the leg 46, ear 49 and fastener 48 cooperate with each other so as to permit forward and rearward shifting of the guide assembly to pivotally adjust the same with respect to the frame.

A carriage, indicated generally by the reference character 50, is vertically slidably disposed within the guide assembly 40. The carriage assembly 50 is likewise of channel configuration and is nested within the guide 40, and includes the web 51 and upstanding side flanges 52 and 53. The flanges 42 and 43 of the guide are provided with pairs of L-shaped straps 55 and 56 which have inwardly directed end portions 57 and 58 to retain the carriage within the guide assemblage. The web 51 of the carriage is provided with a forwardly directed tongue 59 which projects through the previously mentioned opening 45 in the web of the guide and which is gusseted by a plate 60 in the manner shown, the tongue and opening determining the vertical extent of movement of the carriage with respect to the guide.

The web 41 of the guide is also provided with a forwardly directed plate 65 gusseted as at 66 and which is disposed in opposition to the ear 59 of the web of the carriage. Interposed between these two elements 59 and 65 is a spring mechanism including the coil spring 67 seated at its lower end on the ear 59 and located with respect thereto by the nipple 70 and which is seated at its upper end against the disk 71 carried by the lower end of a screw element 72 projecting through the plate 65 and threadedly connected thereto as by a nut element 73 rigid with the plate. This screw 72 is for the purpose of pretensioning the spring 67 as desired.

The spring assembly, as will be readily apparent, resists vertical upward movement of the carriage within the guide and is provided for the purpose of resisting or reacting against the action of the jack hammer indicated generally by the reference character 75 which is mounted on the carriage assembly.

The jack hammer is of conventional construction and includes the handle arms 76 which are sandwiched between the flanges 52 and 53 of the carriage and which are pinned thereto as by a movable cross-pin 77 so as to suspend the jack hammer from the guide. Additionally, a strap 78, see particularly Figure 4, is provided for retaining the jack hammer in clamped relationship on the carriage. This strap has its opposite end portions 80 and 81 removably fastened as by elements 83 and 84 to the inner sides of the flanges 52 and 53 respectively and extends therefrom around the body of the jack hammer to cooperate with the pin 77 to retain the jack hammer on the carriage.

Projecting rearwardly from the frame assemblage is a handle assembly indicated generally by the reference character 90 and which will be seen to include a forward section 91 secured at its forward end to the web 16 of the lower cross-frame member 13 and which terminates in an enlarged plate portion 91 having a central opening therethrough receiving a pivot bolt element 92 and which is provided with an aperture radially spaced therefrom to receive a fastening pin 93. The upper or rearward section 94 of the handle assembly is likewise provided with an enlarged plate 95 pivotally secured to the plate 91 by the pin 92 and which latter plate 95 is provided with a series of circumferentially spaced apertures 96 to selectively receive pin 93 and thereby position the upper portion 94 of the handle in a desired position. The extremity of the handle terminates in a transverse hand grip portion 97 as will be seen most clearly in Figure 1.

A lever 98 is pivotally secured as at 99 to the upper portion of the handle and is pivotally connected as at 100 to a forwardly extending tube 101 which receives at its forward end the rearward end portion of a rod 102, these two elements 101 and 102 being telescopically interengaged but normally held in fixed relationship to each other by the setscrew element 103 carried by the tube 101. The telescopic engagement is to accommodate for the various positions of the upper portion 94 of the handle in respect to the lower portion 91 thereof.

The rod 102 is pivotally connected as at 105 to the upstanding leg 106 of a bellcrank element 107 which in turn is rigidly affixed to the stem 108 of a control valve 109 on the jack hammer 75 proper. Thus, as the lever 98 is manipulated, the control valve will be opened and closed as desired.

The air inlet hose connection 110 of the jack hammer is coupled as by the nut element 111 to a flexible line 112 extending upwardly therefrom and coupled as at 113 to a transverse pipe 114 supported at the upper end of the guide assembly by means of the upstanding and mutually convergent straps 115 and 116. The straps carry a collar or sleeve 117 therebetween and the pipe 114 is provided with a post 118 which is journaled within the collar or sleeve 117 whereby the pipe may rotate about a vertical axis. The free end coupling 119 of the pipe is connected to an air supply air line, not shown.

The lower portion 91 of the handle assemblage carries a vertically mounted sleeve 120 having a setscrew element 121 associated therewith and the vertical spindle 122 of the third wheel assembly 123 which is of the caster type is carried by the sleeve 120 in vertically adjusted positions as set by the screw element 121. The yoke 124 for the caster wheel will of course be swiveled within the vertical spindle 122 as is conventional in caster wheel assemblies.

In the use of the machine as set forth above, the vertical positioning of the wheel assemblies 20 and 21 as well as the wheel assembly 123 will determine the depth of penetration of the jack hammer blade 125 into the underlying pavement and, for practical purposes, this adjustment may be varied between one-eighth inch penetration to about eight inches of penetration. For straight line work, the operator sets the guide at an angle slightly inclined to the vertical such as is shown in Figure 2 of the drawings such as the natural action of the jack hammer will walk the vehicle along and will require no effort on the operator's part to move the assembly other than to effect the guiding thereof. Alternatively, for light scarifying operations, the guide may be mounted vertical and the operator may swing the machine back and forth in about a ten inch arc to cover a wider area than would be normally permitted by the above described straight line operation.

To effect a greater coverage of pavement area, the jack hammers may be ganged upon the machine as is illustrated best in Figure 7 wherein three such jack hammers 130, 131 and 132 are shown mounted thereon in laterally spaced relationship to each other across the framework assemblage. In this way, substantially the full width between the wheels of the vehicle can be accommodated for by the jack hammer assemblage.

From the foregoing, the construction and operation of the device will be readily understood and further explana-

tion is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A concrete router and scarifier comprising a vertically disposed open rectangular frame, said frame including upstanding opposite side members, a top cross-member and a bottom cross-member, a wheel assembly fixed to each side member, a vertically disposed guide pivotally attached at its lower end to said frame and extending above said top cross-member, means connecting said guide to said top cross-member for adjusted movement toward and away therefrom, a carriage slidably disposed in said guide for vertical reciprocation therewithin, a pneumatic hammer fixed to said carriage for operation upon underlying pavement, and spring means interposed between said carriage and said frame for resisting upward movement of said carriage and hammer with respect to said frame, said guide being of channel shape in cross-section and having a longitudinally elongate opening in an intermediate portion of the web thereof, said carriage having an arm projecting through said opening, said spring means being seated at one end, on said arm.

2. A concrete router and scarifier comprising a vertically disposed frame including upstanding opposite side members and a bottom cross member, a wheel assembly fixed on the side members, a vertically disposed guide pivotally attached at its lower end to said frame, means connecting said guide to said frame for adjusted movement toward and away therefrom, a carriage slidably disposed in said guide for vertical reciprocation therein, a pneumatic hammer fixed to said carriage for operation upon underlying pavement, and spring means interposed between said carriage and said frame for resisting upward movement of said carriage and hammer with respect to said frame, said guide being of channel shape in cross-section and having a longitudinally elongated opening in an intermediate portion of the web thereof, said carriage having an arm projecting through said opening, said spring means being seated at one end of said arm.

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