Nov. 23, 1943. W. V. CORNETT 2,335,171

PORTABLE CUTTING AND BREAKING MACHINE

Filed April 26, 1941 3 Sheets-Sheet 1

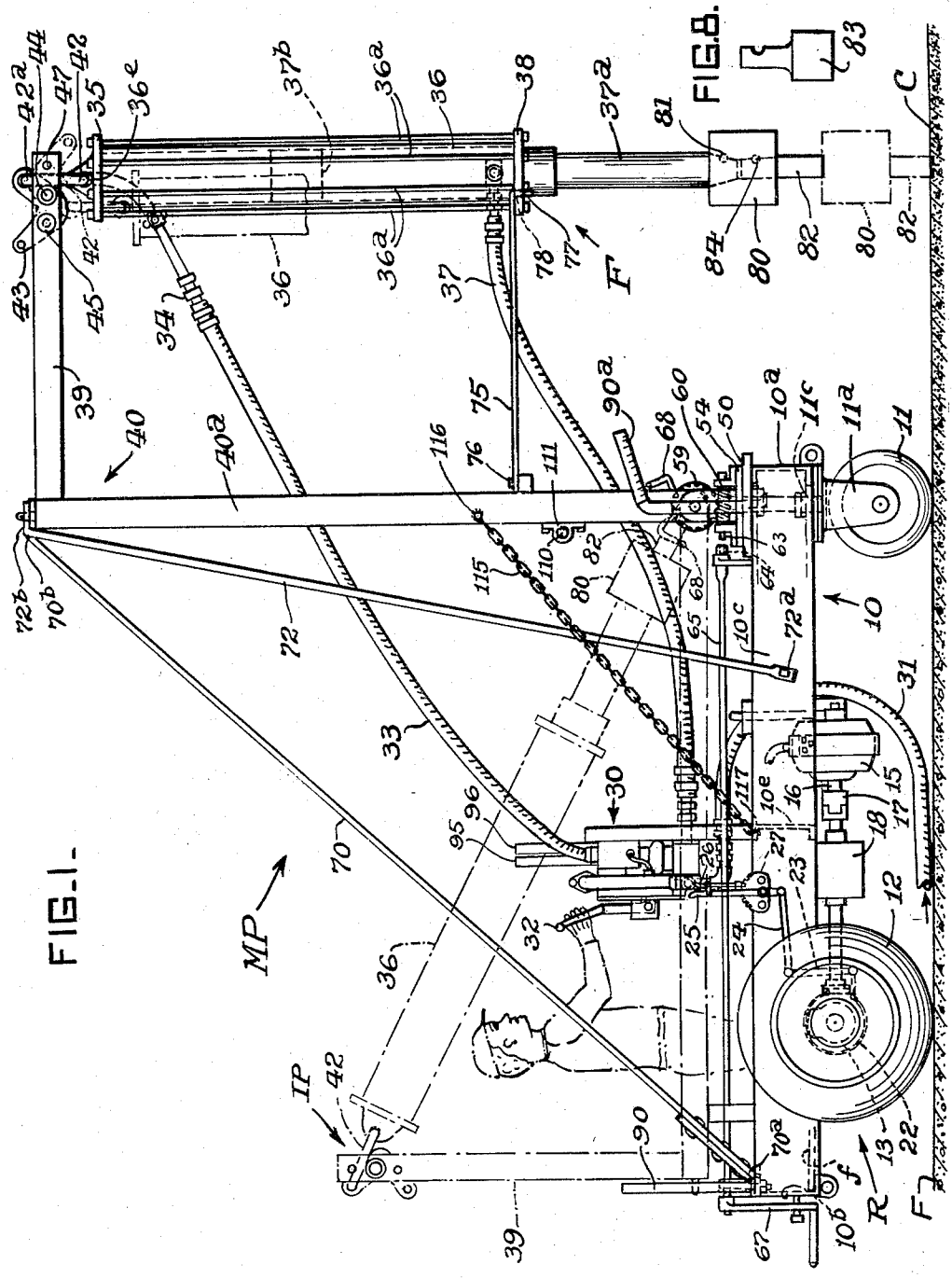


FIG. 1.

FIG. 8.

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FIG. 2.

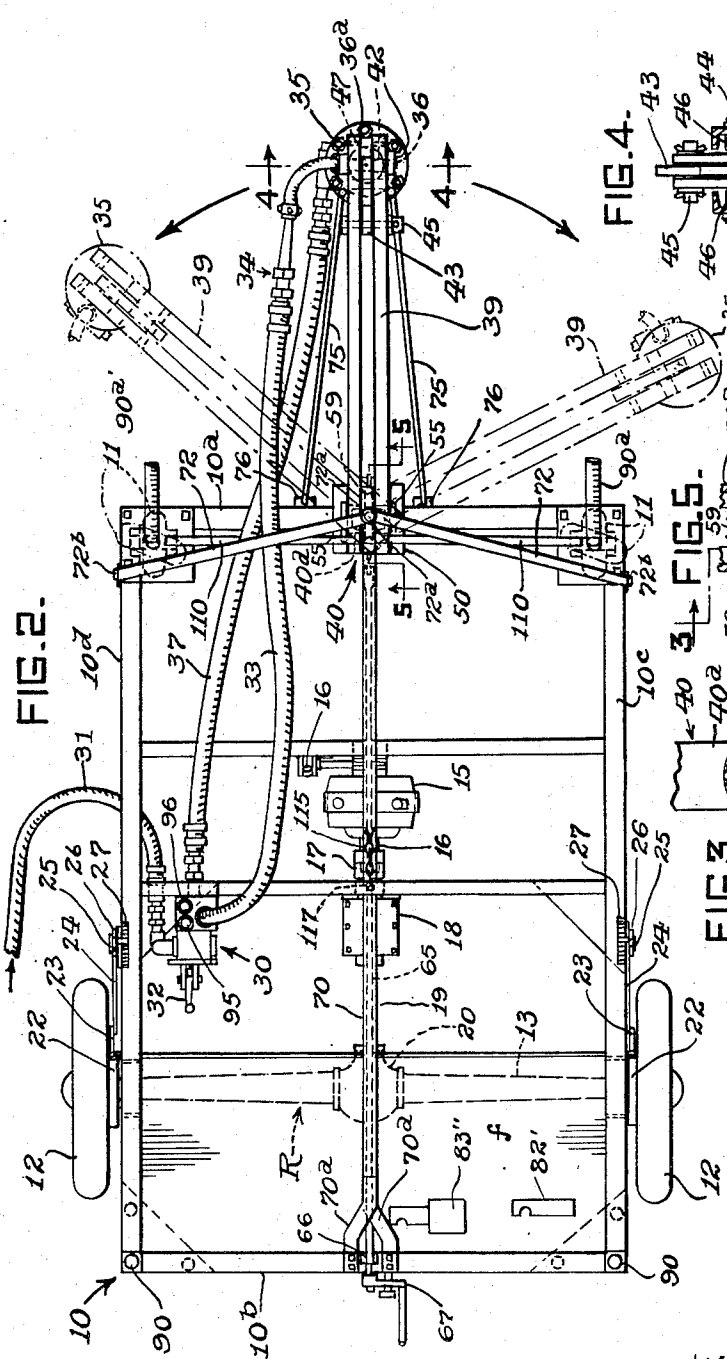


FIG. 4.

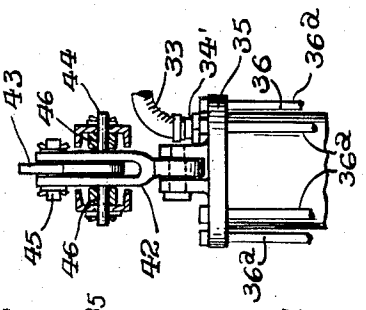


FIG. 5.

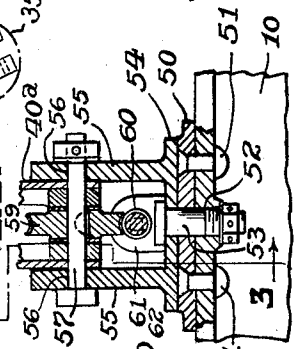
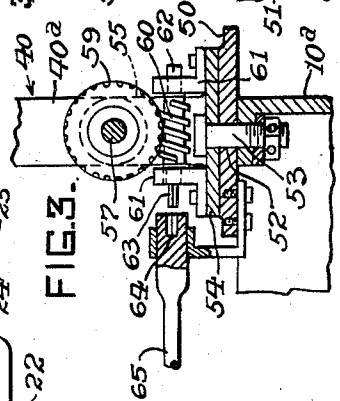


FIG. 3.



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FIG. 7.

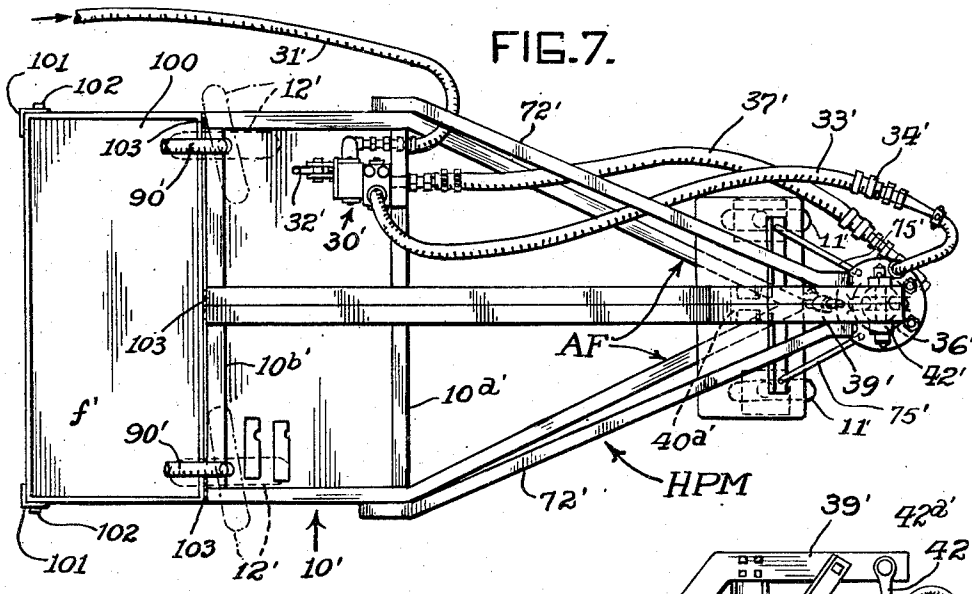
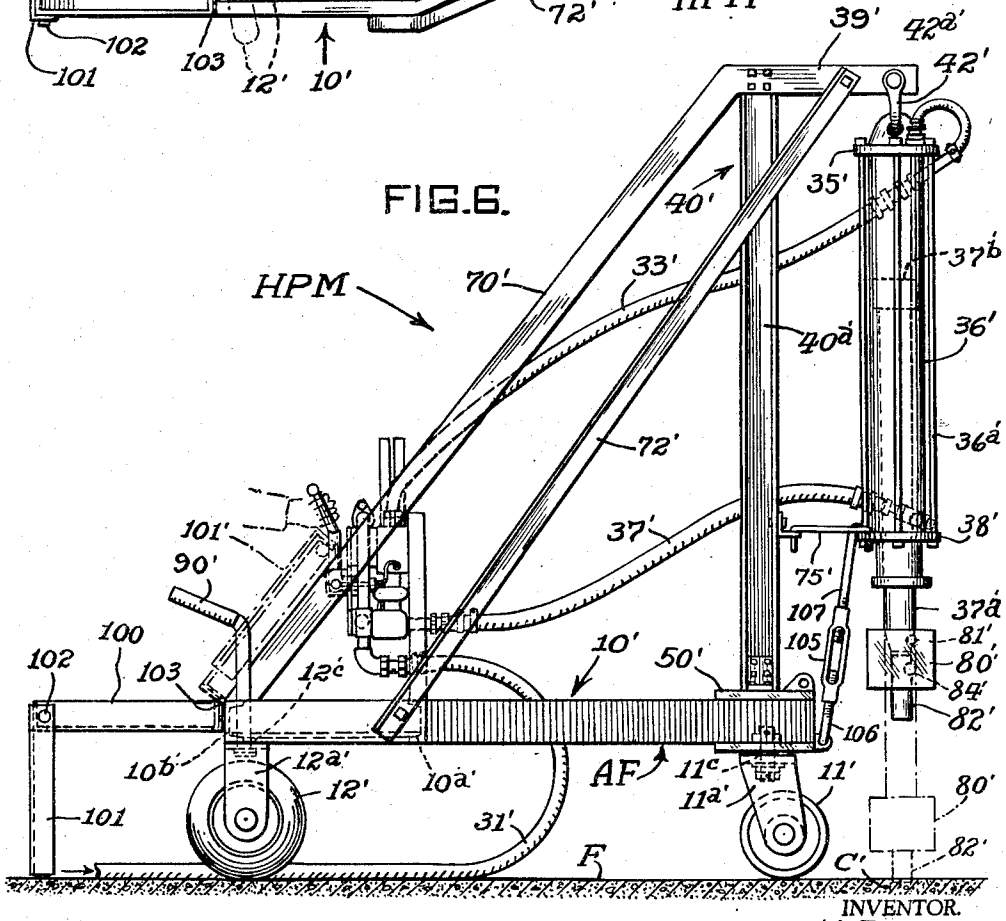


FIG. 6.



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PORTABLE CUTTING AND BREAKING MACHINE

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Application April 26, 1941, Serial No. 390,467

6 Claims. (Cl. 262—13)

This invention relates to a portable concrete cutting and breaking machine pneumatically operated, either in the hand push or motive power driven type.

A salient feature of this invention, is the swiveled front and rear wheels of the hand push machine, either of which are independently operative to each other, in order that the machine may be maneuvered around so the front air cylinder driving the hammer head and cutting tool may turn in about a radius of four and one-half feet, thereby operating on a range of nine inches up to nine feet or more.

Another salient feature of this invention, is the flexible suspension of the air cylinder and its tool driving mechanism by means of a clevis member secured in one of the ends of a bell-crank cam pivotally mounted into bearings of a projecting arm of the mast-boom having a turntable base arrangement for swinging the arm and air cylinder in a circular direction of about 180 degrees, or 90 degrees to the left or right of the center line of machine. The crank-cam also provides means to lower the air cylinder and cutting tool to a lower working level, if so desired.

Another salient feature of this invention, is the optional use of either type of a power or hand push machine, in which the same concrete cutting and breaking mechanism may conveniently be installed, and the driving hammer head is adaptable to have interchangeable tool members for any kind of cutting and breaking up of concrete floors, or the like.

A further salient feature of this invention, is that the hand push machine may be so designed to provide a pointed or an apexed front portion for the air cylinder with its concrete cutting and breaking mechanism to operate and work into narrow places or corner spaces. In this hand push machine, all of the wheels are of the swivel type so the machine may be maneuvered and turned in a very small radius during its working operations. In the motive power machine, only the front wheels are of the swivel type, while the rear wheels are optionally and independently locked by separate band brake levers arranged therewith, so the motive power machine and its air driving and hammering mechanism are movable from left to right, or vice versa, such as may be desired.

Other features of this invention will appear as the description proceeds in the following specification, accompanied by the annexed drawings, in which

Figure 1 is a side elevational view of the pneumatic concrete breaking machine of this invention, which shows a power traction type operated by compressed air.

Figure 2 is a plan view of the same machine shown in Figure 1.

Figure 3 is an elevational-sectional view taken on line 3—3 of Figure 5.

Figure 4 is an enlarged detail view in elevation and partly in section taken on line 4—4 of Figure 2, which shows the cam and clevis connection for the suspension of the air hammer cylinder to the boom of the machine.

Figure 5 is an enlarged sectional view taken on line 5—5 of Figure 2, showing the boom's worm-gear swiveled connection operative onto a turntable supporting base.

Figure 6 is a side view in elevation of a hand-push type concrete breaking machine that operates in a very small space.

Figure 7 is a plan view of the same concrete breaking machine as shown in Figure 6.

Figure 8 is a view in elevation of another form of breaking tool for inserting into the hammer head of the piston rod.

Referring to the drawings, particularly to Figures 1 to 5, inclusive, the numeral 10 designates a frame supported by wheels 11 and 12. The wheels 11 are of a swivel type, so the front F of the machine may be operated straight ahead or at right angles thereof. The wheels 12 are driven by the differential shafts within the axle housing 13, which is rigidly secured to the frame 10, thereby forming the rear support R of the machine. Power means for driving the wheels 12 is provided by an air compressed motor (or gasoline motor) 15, receiving its fuel supply from any suitable source not shown, the motor having a control lever 16, that operates shaft 16, toothed clutch 17, transmission 18, shaft 19 and differential housing 20, secured to the axle housing 13.

Bank brakes 22 are arranged onto each of the wheels 12 and operate independently of each other by means of levers 23, link 24, brake lever 25, locking lever 26 into the quadrant 27. This allows both or either one of the brakes 22 to be set at once to hold or turn the machine steady while in operation. The machine operates on a radius of about four and one-half feet, allowing it to cut and break concrete in a width varying from a few inches to nine feet.

To rotate machine, one of the brakes 22 is applied to either of the wheels 12, while the other brake 22 is not applied and that wheel is free to rotate. The motor 15 is then operated by the lever 16, thereby driving rear end on a radius-like line from the fixed wheel set with its band brake 22, whereby the free wheel 12 and its caster bracket 12^a turns on its swivel bearing 12^c, for example, at about a right angle, thereby causing the front of the machine to travel in a circular direction around the fixed rear wheel.

The air valve device 30 is supplied with compressed air through a hose 31 from any suitable supply source, such as an air compressor (not

shown). The compressed air is admitted to the valve device 30 by the hand valve lever 32 which instantly discharges the compressed air into and through the hose 33 and fittings 34, 34' to the upper head member 35 of the cylinder casing 36 onto one side of the piston 37b which is of a reciprocating action, taking compressed air on both sides of thereof. The hand reverse action of the valve device 30 drives the piston 3 upwardly by admitting air into the hose 37 that connects to the lower cylinder head 38.

The cylinder casing at 36e is flexibly suspended from the swinging arm 39 of the boom by means of a clevis 42 pivotally connecting at 42a to one end of a bell-crank cam 43 which is pivoted at 44 to the outer end of the arm 39. The bell-crank cam 43 is for raising and lowering the cylinder casing 36, in which a pin 45 locks the cam 43 in the holes 46 of the arm or beam 39, as shown in full lines in Figure 1, and when cam is turned over its pivotal center and locked by the pin 45 in the holes 47, it lowers the cylinder casing 39 as shown in dot and dash lines of the same Figure 1.

The arm or beam 39 is an integral and secured part of the mast or post 40a both of which form the boom 40, which swings from left to right as shown in the dot and dash line positions in Figure 2, for reason of the turntable arrangement provided by the plate 50 secured by rivets 51 to the frame 10. The plate 50 has a hole 52 bored in the center thereof, through which the center pin 53 is inserted for operating the swivel bracket or trunnion plate member 54 secured to the end frame member 10a of the main frame 10. The swivel bracket and base plate 54 has extended bracket portions 55 having holes 56 therein to hold a stub-shaft or bolt 57 that provides the pivotal bearing or axis for the mast or post 40a of the boom 40.

The stub-shaft or bolt 57 is keyed to a worm gear 59 that meshes with a worm member 60 mounted onto the bearings 61 secured onto the swivel base plate member 54. The worm shaft 62 has a square shank end 63 that is adaptable to engage a square socket 64 of the rod 65 extending to and through the bearing block 66 onto the rear cross frame member 10b. A suitable crank-handle 67 operates the rod 65 when moved forward for the socket 64 to engage the square shank end 63 when it is desired to tilt the boom 40 to its inoperative and horizontal position shown in the dot and dash line position at IP, in which a suitable clamping member 68 secures the tool-hammer end of the air piston 37b and cylinder casing 36. The braces 70 and 72 are removed from their secured positions during this tilting operation, and are secured onto the main frame 10 as desired.

The brace 70 supports the boom assembly 40 rearwardly and forwardly, having its lower end 70a pivotally secured to the rear cross frame member 10b, and its upper end 71b hooked onto the pin 71 secured into the top portion of the mast or post 40a. The braces 72 support laterally the boom assembly 40, the braces 72 having their lower ends 72a pivotally secured at 73 to the side longitudinal member 10c and 10a, and their upper ends 72b hooked also onto the same pin 71 at top of mast or post 40a.

The cylinder casing 36 may or may not have stay-rods 36a to make secure the heads 35 and 38, and is also braced laterally by rod-hooks 75 having one end pivotally secured at 76 to the mast 40a and the other hook ends 77 inserted into the holes 78 of the cylinder lower head flange and piston bearing 38. The hammer head 80 of the piston 37b and the boom assembly 40 are adapted to rotate or oscillate at right angles of about 90 degrees on the swivel base plate 54, as shown in the dot and dash line positions in Figure 2.

The hammer head 80 is secured by pin 81 to the tapered end of the piston rod 37a, and the concrete cutting and breaking tools 82 or 83, or any of the various tools not shown, are similarly secured by a pin 84 to the hammer head 80, clearly shown in Figure 1.

Steering handles 90, 90a, may or may not be provided at rear and front of the main frame 10, but the operator as shown in dot and dash line position in Figure 1, standing on the floor F or on the floor f (or the floor f may be eliminated, if so desired) of the truck frame 10 may turn or maneuver the machine by operating either or both of the brake levers 25 and the motive power control lever 16.

In operation, the operator manipulates the double acting valve lever 32 forward for driving the hammer head 80 and cutting tool 82 that cuts and breaks the concrete C, in which the piston 37b and rod 37a is driven downwardly in the cylinder 36 by the compressed air released in the valve device 30 through the hose 36 to the upper cylinder head 35. The piston 37b instantly reactuates upwardly by the automatic valve control caused by the lever 32, that simultaneously closes the valve admitting compressed air into the hose 33 and upper cylinder head, and admits the compressed air into the hose 33a at the lower cylinder head 38. The operator pushes forward the hand lever 32 again for the next cutting and breaking operation onto the concrete floor F, and so on. Exhaust pipes 95 and 96 are for the exhausted compressed air from the cylinder 36.

To prevent the boom assembly 40 from being tilted over its vertical center, a removable chain 115 is attached at 116 to the mast-pole member 40a, and anchored at 117 to the cross-frame member 10e. Also suitable means for turning the boom assembly 40 as may be desired, such as for example, by a removable rod 110 inserted through a small lug bracket 111 secured to the mast-pole 40a about three from the floor F. When not in use, the rod is removed from bracket and placed onto rear floor f of machine, wherein other tools may be kept for use on the machine.

The foregoing is a description of the power propelled concrete breaking machine of this invention, however, the same described machine may be embodied in a hand pushed machine HPM, such as shown and illustrated in Figures 7 and 8, in which all the motive power equipment has been eliminated. Otherwise there is a general similarity of the original power machine PM and the hand push type machine HPM, therefore, all similar parts in Figures 7 and 8 will be designated by the same numeral primed accordingly.

Further features are embodied in this hand push type HPM, such as the frame side member 10b' and 10c' converge into an apexed front point-like front portion AF, allowing the cylinder 36' and tool 82' to work in narrow corner or spaces. Also all of the four wheels 11' and 12' are of a swivel type, the rear wheels 12' may or may not be provided with steering handles 90' for setting the wheels at right angles as shown

in the dot and dash line position in Figure 7, so machine may become more steady in operation. The wheels 12 and 12' are of the pneumatic type, to provide a spring-like action for the frame 10 during the vibration and hammering blows of the piston 36b and tools 82 and 80, while the front wheels 11 and 11' may be of a more solid type.

A rear folding tool table or extended floor member 100 is carried by the rear frame member 10b and has legs 101 that fold on pivots 102, as shown in the dot and dash lines in Figure 6, when the table is folded on the hinges 103.

The mast 40a' in this type is rigid and not turnable, for reason the four swivel wheels 11' and 12' provide for the swinging around of the front apexed frame portion AF. Also the cylinder assembly is additionally braced vertically by the turn-buckle 105 and thread rods 106, 107, that are secured as shown onto the front frame member 10a and the lower cylinder head 38, respectively. This assists in firmly steadying the loosely suspended cylinders 36, 36', during the repeated hammer blows of the cutting tool 82 or head 80 onto the concrete floor F. Further means to lock the boom 40 in its working position may be adopted other than the locked gear 59 and worm 60, if so desired.

It is to be understood that I do not confine myself to the exactness of any detail shown in the drawings and as hereinbefore described, which merely illustrates the principle of operations of this invention, and hereby reserve all right to alter and improve any part thereof, providing same comes within the spirit of this invention and the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. In a cutting and breaking machine, in combination, a main frame forming a chassis, wheels supporting said frame, a substantially vertical boom rotatably mounted on said frame adjacent to one end thereof, a substantially horizontal arm secured to said boom and having one end extended beyond said last mentioned end of said frame, an air controlled cylinder depending from said extended end of said arm, bracing means spaced apart from said arm and engaging said cylinder and said boom for steadying said cylinder, a piston reciprocatively mounted in said cylinder, a piston rod connected to said piston and adapted to carry a tool, means on said frame for controlling the delivery of air to the ends of said cylinder for reciprocating said piston, and means on said frame for partially rotating said boom and thereby swinging said cylinder through an arcuate path.

2. In a portable cutting and breaking machine, in combination, a main frame forming a chassis, wheels supporting said frame, a vertical boom adjacent to one end and having its lower end engaging said frame, a plurality of inclined rigid bracing members secured to said frame and terminating in an apex engaged by the upper end of said boom, a substantially horizontal arm secured to said boom and having one end extended beyond said last-mentioned end of said frame, an air controlled cylinder depending from the extended end of said arm, a bracing member below and spaced apart from said arm and engaging said cylinder and said boom; said arm, cylinder, bracing member, and a portion of said boom forming a parallelogram, a piston in said cylinder, a piston rod carried thereby and adapted to carry a tool, and means on said frame for controlling the delivery of compressed air to and from said cylinder.

3. In a portable concrete cutting and breaking machine of the character described, the combination of a main frame supported on a pair of wheels in the front and a pair of wheels in the rear portions of said main frame, all of said wheels being of a swivel type, each of said pair of rear wheels provided with a steering handle, the front portion of said main frame converging into an apexed front portion provided with a boom assembly, an air cylinder casing suspended on said boom assembly, said cylinder casing having a reciprocating piston therein and a piston-rod extending therefrom, said piston-rod having a concrete breaking member secured to its outer free end, an air valve controlling device arranged on said main frame, said device having a pair of hose lines, one of which connects to the upper head portion and the other connecting to the lower head portion of said cylinder casing, said device being adaptable to close said compressed air line connection to said upper head portion of cylinder and to admit compressed air through said other hose line to said lower head portion of said cylinder to reciprocate said piston.

4. In a portable cutting and breaking machine, in combination, a main frame forming a chassis, wheels supporting said frame, a vertical boom adjacent one end of said frame and having its lower end rigidly secured thereto, supporting means rigidly secured to said frame and to said boom and comprised of a plurality of members extending angularly from the top of said boom to points adjacent the opposite end of said frame, a horizontal arm rigidly secured to said boom and having one end extending beyond said first-mentioned end of said frame, and an air hammer suspended from said arm and adapted to freely operate in an area beyond said first-mentioned end of said frame.

5. In a portable cutting and breaking machine, a main frame forming a chassis, wheels supporting said frame, a vertical boom mounted on said frame adjacent to one end thereof, a substantially horizontal arm secured to said boom and having one end extending beyond said last-mentioned end of said frame, an air controlled cylinder depending from the extending end of said arm, bracing means engaging the lower end of said cylinder and said boom for steadying said cylinder, a piston mounted in said cylinder and adapted to carry a tool, and means remote from said cylinder for controlling the delivery of air to and from the ends thereof.

6. In a portable cutting and breaking machine, a main frame forming a chassis, wheels supporting said frame, a vertical boom mounted on said frame adjacent to one end thereof, a substantially horizontal arm secured to said boom and having one end extending beyond said last-mentioned end of said frame, an air controlled cylinder depending from said arm and having its vertical axis spaced apart from said last end of said frame, a bracing member engaging the lower end of said cylinder and pivotally connected to said boom for steadying said cylinder, a piston mounted in said cylinder and adapted to carry a tool, and means on said frame for controlling the delivery of air to and from the ends of said cylinder.

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