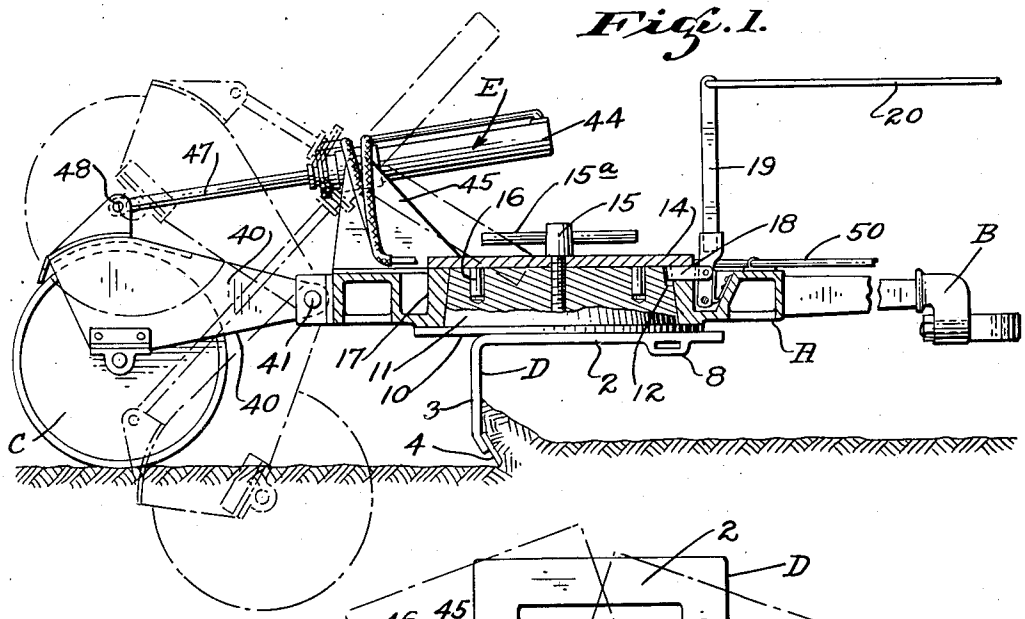
Nov. 27, 1934. J. McALISTER 1,982,219

EARTH WORKING MACHINE

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Fig. 1.



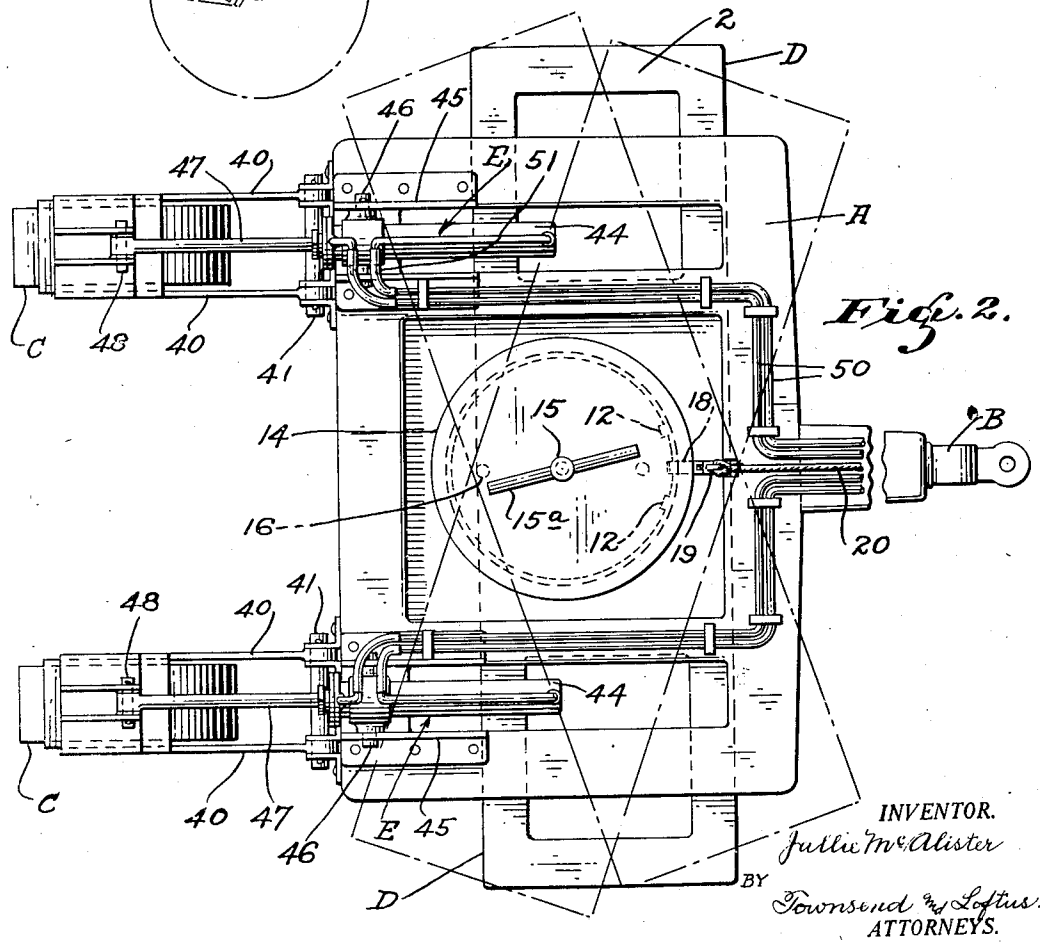


Fig. 2.

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Fig. 3.

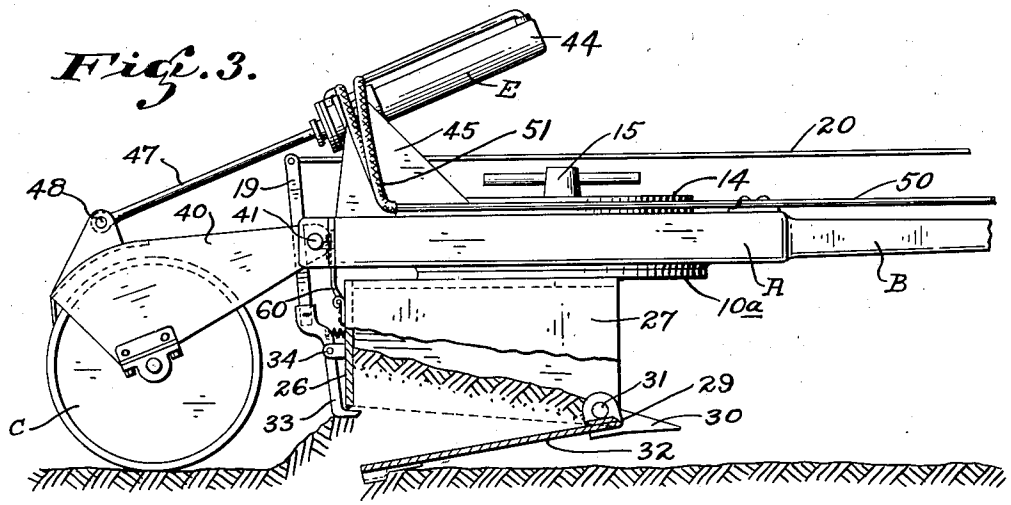


Fig. 4.

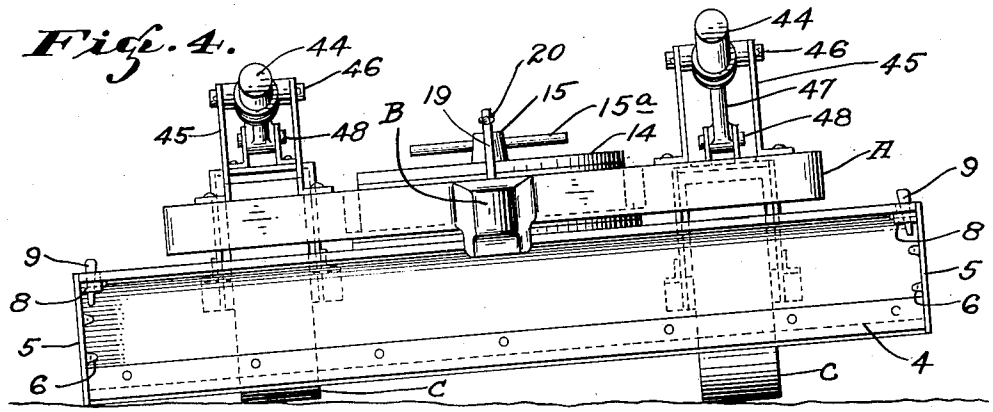
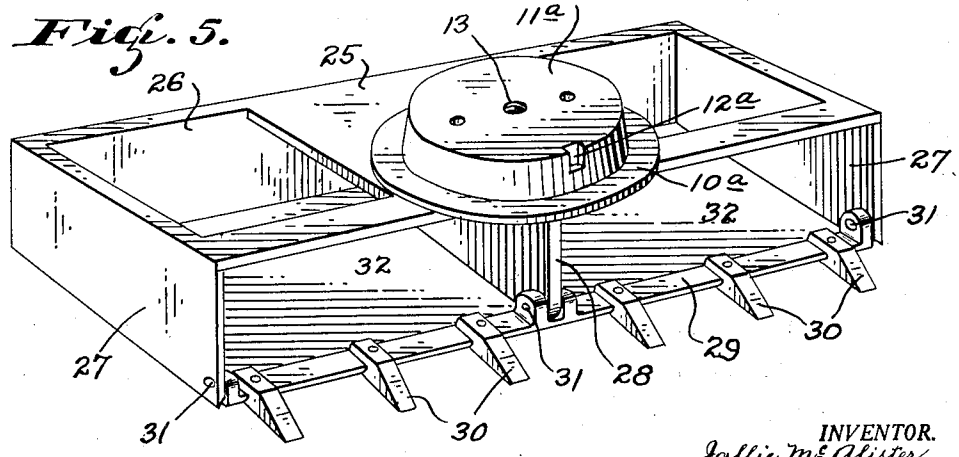


Fig. 5.



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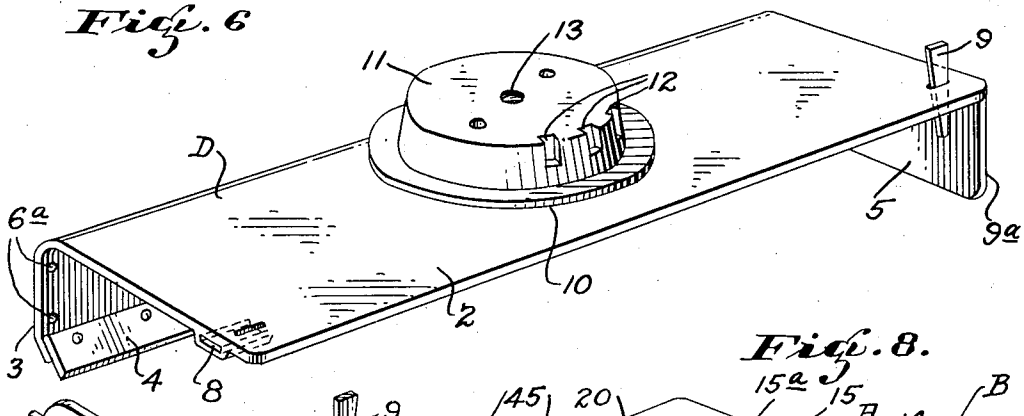
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Fig. 6



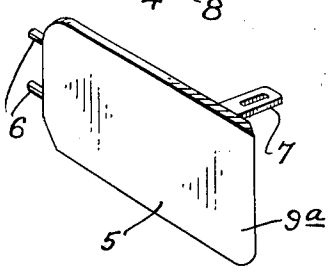


Fig. 8.

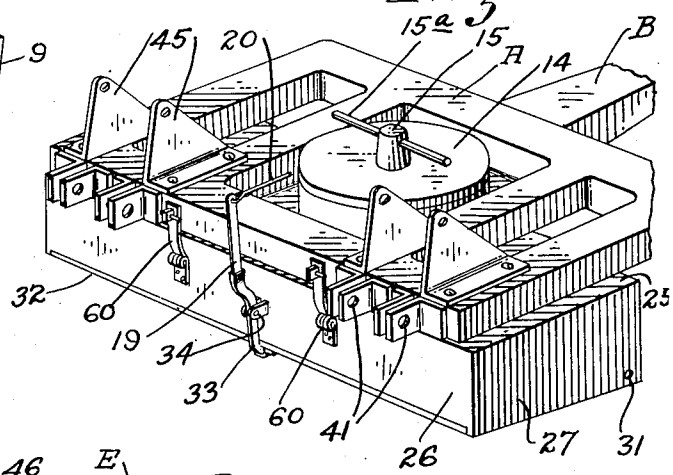
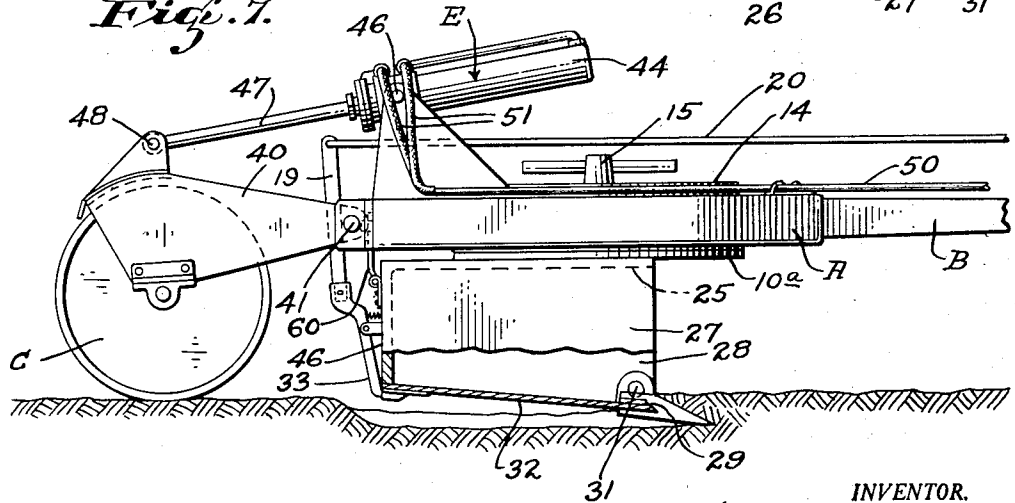


Fig. 7.



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Patented Nov. 27, 1934

1,982,219

UNITED STATES PATENT OFFICE

1,982,219

EARTH WORKING MACHINE

Jallie McAlister, San Francisco, Calif., assignor of one-fourth to M. Mitchell Bourquin, San Francisco, Calif.

Application April 18, 1932, Serial No. 605,923
Renewed April 5, 1934

10 Claims. (Cl. 37—168)

This application relates to an earth working machine and forms a continuation in part of my application entitled "Earth working tool", filed June 15th, 1931, Serial Number 544,424.

The object of the present invention is to generally improve and simplify the construction and operation of earth working machines, such as employed for scraping, scarifying, leveling, grading, and moving of earth and similar materials from one place to another, as in road building operations and the like; to provide a machine or tool of the character described which is provided with interchangeable tools, one tool which may be employed for scraping and leveling operations, and a second tool which may be employed for scarifying a hard rolled surface or for breaking it up, together with means for gathering the broken material, and for carrying or conveying it to a fill; to provide means for discharging and spreading the material and for controlling the thickness of the spread; to provide means whereby the different tools may be quickly and readily attached or removed; to provide means whereby the tools may be adjusted to assume an angular position crosswise of the machine either horizontally or vertically, or both; to provide a machine which can be handled by a single operator both when changing tools and when working; and further, to provide a machine in which the tools are fluid actuated when working to adjust their cutting or digging depth and to elevate them when carrying material or otherwise.

The earth working machine is shown by way of illustration in the accompanying drawings, in which—

Fig. 1 is a side elevation of the machine partially in section, said elevation showing the application of a scraper.

Fig. 2 is a plan view of the machine, showing the application of a scraper.

Fig. 3 is a side elevation of the machine partly in section, showing the application of a combination scarifier and earth carrier.

Fig. 4 is a front view of the machine, showing the application of a scraper, said view showing the manner in which the scraper may be tilted laterally to scrape the inclined side surface of a road or the like.

Fig. 5 is a perspective view of the combination scarifier and earth carrier.

Fig. 6 is a perspective view of the scraper, showing one of the side plates removed.

Fig. 7 is a side elevation of the machine partly in section, showing the application of the scarifier and earth carrier and showing the same in digging position.

Fig. 8 is a perspective view looking at the rear end of the machine, said view showing the rear supporting wheels and arms removed, said view also showing hasp-like members 60 whereby the rear part of the earth carrier is attached to the main frame.

Referring to the drawings in detail, and particularly Figs. 1 and 2, A indicates the main frame of the machine, B the drawbar whereby it is attached to a tractor, or the like, C a pair of rear supporting wheels, and D one of the tools which is adapted to be attached to the main frame.

The tool shown in Figs. 1 and 2 is a scraper, such as used for scraping and leveling purposes. The scraper is best illustrated in Figs. 1 and 6. It consists of a top plate 2 and a back plate 3 to which a scraper plate 4 is attached in any suitable manner. The scraper is provided with detachable end plates, such as shown at 5, which may be quickly applied or removed as conditions may demand. During ordinary scraping operations the scraper is disposed on an angle crosswise of the road surface to be scraped, as shown in Fig. 2, and when so positioned the dirt removed by the scraper blade 4 will discharge to one side or another depending upon the angular position. In other instances, the scraper is set at right angles to the direction of travel, particularly where it is desired to carry the material removed by the scraper blade to some other point, for instance to fill in a depression in the road surface, or the like. In that instance, the side plates 5 are employed. The side plates are provided with dowel pins or lugs 6 at one end, which are adapted to be inserted in recesses 6a formed in the back plate. The forward and upper end of each plate 5 is provided with an inwardly projecting lug 7 and this is insertable in a retainer 8 carried by the top plate 2. The top plate is slotted and so is the lug 7 and, by inserting a wedge-shaped pin 9, the plate is tightly drawn into position and retained against removal. The forward edge of each plate is sharpened to form a shearing or cutting edge, as indicated at 9a, so as to make a clean cut when working against a side bank or the like.

The scraper as a whole is detachable with relation to the main frame A and the detachable connection also permits angular adjustment of the scraper with relation to the main frame, as shown in Fig. 2. The detachable connection comprises a circular plate or collar 10 which is bolted, riveted, or otherwise secured to the top plate of the scraper. The plate carries a post or disc

member 11 of large diameter and the forward surface of the post is provided with a plurality of spaced keyways or grooves 12, and a central threaded opening 13. The manner in which the detachable connection is secured and released will hereinafter be described.

The main frame, as illustrated in the present instance, consists of a steel casting which is comparatively heavy. It is rectangular in shape when viewed from the top, as shown in Fig. 2, and it is provided with a central opening to receive the post member 11, as shown in Fig. 1. The post 11 extends into the central opening, as there shown, and it is secured by a top plate 14 and a threaded bolt 15 which extends through the top plate and into the threaded central opening 13 of the post. The top plate is, furthermore, provided with dowel pins 16 which enter the post so as to secure the plate against rotation and the bolt 15 against unscrewing or becoming loose when the scraper is angularly adjusted, as shown in Fig. 2. The bottom plate 10 to which the post 11 is secured engages a padded bottom surface on the main frame and the scraper is thus secured against upward movement with relation to the main frame. The top plate 14 engages the upper face of an annular flange 17 in which the central opening is formed and the top plate thus secures the post and the scraper attached thereto against downward movement with relation to the main frame. A latch 18 is pivotally mounted in the main frame at a point in alignment with the drawbar and forwardly of the post member. This latch is actuated by a lever 19 and a pull cable 20, which extends to the tractor whereby the scraper is hauled, and, as such, is in control of the operator. The latch normally assumes the position shown in Fig. 1 and, as such, enters one or another of the keyways 12 formed in the post 11, and thus locks the same when adjusted against rotational movement.

The combination scarifier and earth carrier is best illustrated in Figs. 3, 5 and 7. It consists of a top plate 25, a back plate 26, and end plates 27. The top, back and end plates are tied together by the top plate, and also by a central partition plate 28, so as to form a rigid structure. A heavy bar 29 carrying scarifying teeth 30 extends along the front lower edge of the earth carrier and is pivotally attached thereto, as shown at 31. This bar also carries a bottom section 32 and this is adapted to be secured in raised position by a latch 33. This latch is pivotally attached, as at 34, to the rear surface of the back plate 26 and it is actuated by a lever 19 and a pull cable 20, which is extended to the tractor so as to be in control of the operator. The combination scarifying and earth carrying tool is also provided with a plate 10*a* and a post 11*a* of large diameter. This post has only one keyway formed in its peripheral edge, as indicated at 12*a*, as angular adjustment such as shown in dotted lines in Fig. 2, is not resorted to, the tool being always maintained at right angles to the direction of travel. The post 11*a* is adapted to fit the central opening formed in the main frame and it is adapted to be secured therein by the top plate 14, the dowel pins 16, and the securing bolt 15. The means of attachment are, accordingly, substantially the same as the means shown in Fig. 6, the only difference being that the post shown at 11 in Fig. 6 is provided with a plurality of keyways or grooves so as to permit rotation and angular adjustment of the scraper.

It was previously stated that the main frame and the tools carried thereby were supported at the forward end by the drawbar B, as this will be attached to a tractor, or the like, while the rear end was supported by a pair of wheels, indicated at C. These wheels, as shown in the several figures, are journaled in arms, such as indicated at 40. These arms are pivotally attached, as shown at 41, to the rear end of the main frame and they are, furthermore, connected to the main frame by a fluid actuated adjusting mechanism generally indicated at E. This mechanism consists of a pair of cylinders 44 which are pivotally attached in brackets 45 mounted on the rear end of the main frame. A pair of trunnions, or the like, such as shown at 46 form the pivotal connection between the cylinders and the brackets. Each cylinder is provided with a piston and a piston rod 47 and the piston rods are pivotally attached, as at 48, to the outer ends of the arms 40. The pistons' travel in the cylinders may be actuated by compressed air or a liquid under pressure, the opposite ends of the cylinders being provided with flexible pipes 51 which are connected through pipes 50, or the like, with a source of pressure supply on the tractor; a suitable valve mechanism, not illustrated, being provided for directing the fluid under pressure to one end or another of each cylinder, said fluid, when entering, causing extension or retraction of the piston rods and hence a swinging movement of the arms 40 about their pivots 41. By operating the cylinders in unison, the rear end of the main frame may be raised or lowered so as to adjust the cutting depth of the scraper, or the scarifying teeth, or the main frame may be raised to an elevated position, as when traveling from place to place, or when carrying a load of dirt.

By employing two supporting wheels C and by employing a cylinder for each wheel, the cylinders may be independently operated, and the main frame may accordingly assume an angular position crosswise of the road, as shown in Fig. 4; that is, one wheel C is raised to a higher position than the other, thus tilting the frame laterally, as shown in that figure, and permitting scraping of angular surfaces or the like. A valve mechanism to control the flow of fluid under pressure to one cylinder or the other, or to both cylinders in unison, could be illustrated, but as it forms no part of the invention and could be accomplished by numerous types of valves, illustration thereof is thought unnecessary. In fact, a single valve for controlling these operations may be employed, or two separate valves one for each cylinder may be employed.

In actual practice it is desired to point out the fact that a machine, constructed as here shown, may be operated entirely by a single operator; that is, a single operator is in control of the working parts of the machine when working, as he can adjust the depth of the scraper or scarifier by merely adjusting the position of the two rear supporting wheels by means of the fluid actuated mechanism employed. He can trip the bottom section 32 of the earth carrier whenever it is desired to dump a load by merely pulling on the cable 20, and he can spread the load while dumping it. Also, he can control the thickness of the spread; that is, the entire load may be dumped substantially in one position, if the main frame is elevated to sufficient height, or the load may be spread by lowering the main frame through means of the fluid actuating means, for instance, to assume a position, such as shown in Fig. 3. In that instance, when the bottom section 32 is

released by the latch 33, the load will be spread and the thickness of the spread is controlled. The same is true when handling the scraper shown in Figs. 1 and 2, by adjusting the rear supporting wheels C the scraper may be lowered to any depth desired. If the soil removed by the scraper is to be conveyed to one side, the scraper is angularly adjusted, as indicated by dotted lines in Fig. 2, and the soil removed may thus be deposited on one side or another of the road surface. If it is desired to carry the removed soil to a desired point, the side plates 5 are applied. These plates may be carried on the tractor, or wherever convenient. As they are comparatively light in weight the operator can quickly apply or remove them. If it is desired to change from one tool to another, the operator merely removes the bolt 15 and he can do so quickly and readily as the upper end is provided with long wings, such as shown at 15*a*. These provide a large leverage, thus permitting unscrewing of the bolt without tools of any character. When bolt 15 is removed, top plate 14 can also be removed. The operator then actuates the fluid actuating mechanism E and thereby elevates the main frame with relation to the tool until the post 11 is cleared. In this position the operator swings the tractor around and, as such, swings the main frame clear of the tool which has just been removed. He can then drive over to the other tool and maneuver so as to bring the main frame in alignment with the post of that tool and then, by lowering the main frame through the fluid actuated mechanism, the post of that tool will enter the opening in the main frame and, when it is properly entered, the top plate 14 is applied and finally the bolt 15.

By referring to the several drawings, it will be noted that the post tapers from end to end, being smaller in diameter at the upper end, and similarly, that the opening in the frame is also tapered to fit the post. This is an important feature as the tapered opening in the frame is larger in diameter at the lower end, while the post is smaller in diameter at the upper end. Hence, a comparatively large opening is provided for the post as it enters and the flaring or tapering surfaces of the opening and the post guide the post into place and automatically center it.

The tools employed, to-wit, the scraper in one instance and the combination earth carrier and scarifier in the other instance, are heavy large tools and could not possibly be handled by a single operator, but by forming the detachable connection here shown the operator will at no time lift or move the tools, as he merely releases one tool and pulls away from it and then pulls over to the second tool and lowers the main frame over the same. In other words, all heavy work is done by the tractor and the fluid actuated mechanism and the only work required on the part of the operator is that of properly maneuvering the machine and that of removing the bolt 15 and the top plate 14, or replacing the same. These are not excessively heavy and as such can be readily handled.

The combination scarifier and dirt carrier will under certain conditions carry comparatively heavy loads and, as it is not desirable to depend upon the detachable connection under such conditions, an auxiliary attachment is made at the rear end of the frame; that is, a pair of hasp members, such as shown at 60, are pivotally attached to the rear plate 26 of the earth carrier. These are swung upwardly over perforated lugs formed on the rear end of the main frame and by dropping bolts or pins therethrough an auxiliary connection is made at the rear end which materially reduces the strain on the detachable connection or post.

The machine as a whole is exceedingly rigid in construction and so are the detachable connections formed between the machine and the tools employed. All operations can be quickly accomplished and efficiency and a high output of work can accordingly be accomplished by a single operator.

By referring to Figs. 1 and 3, it will be noted that latch 18 only functions when the scraper D is being employed, and that the latch 33 only functions when the earth carrier is being employed, as shown in Fig. 3. Both latches are provided with sockets at their upper ends so as to permit insertion of a handle 19 to which the pull cable 20 is attached. Hence, when changing over from the scraper, shown in Fig. 1, to the earth carrier, shown in Fig. 3, handle 19 is pulled out of the latch 18 and inserted in the socket of latch 33, so that the same handle and cable 20 may be utilized in either instance.

While certain features of the present invention are more or less specifically described, I wish it understood that various changes may be resorted to within the scope of the appended claims. Similarly, that the materials and finish of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A machine of the character described comprising a main frame having a tapering opening formed therein, a tool, a tapering post on the tool insertable in the opening in the frame and forming a swivel connection between the tool and frame, a detachable head plate engageable with the upper end of the post and the upper face of the frame, a dowel connection between said plate and post, and a detachable means extending through the plate and into the post and securing the post and tool carried thereby against removal.

2. A machine of the character described comprising a main frame having an opening formed therein, a tool, a post on the tool insertable in the opening in the frame and forming a swivel connection between the tool and frame, a detachable head plate engageable with the upper end of the post and the upper face of the frame, a dowel connection between said plate and post, a detachable means extending through the plate and into the post and securing the post and tool carried thereby against removal, said post having a keyway formed in one side thereof, and a latch member movable into and out of engagement with said keyway to secure the post and tool carried thereby against turning movement with relation to the frame.

3. A machine of the character described comprising a rectangular shaped frame having a substantially centrally disposed round tapering opening formed therein, a drawbar connected to the front of the frame, supporting wheels at the rear of the frame, a tool carried by the frame, a tapering post on the tool insertable in the frame opening, a plate engaging the upper face of the frame, a dowel connection between said plate and the upper end of the post, and a screw bolt extending through the plate and having threaded connection with the post to secure the post and

the tool carried thereby against removal with relation to the frame.

4. A machine of the character described comprising a rectangular shaped frame having a substantially centrally disposed round opening formed therein, a drawbar connected to the front of the frame, supporting wheels at the rear of the frame, a tool carried by the frame, a post on the tool insertable in the frame opening, a plate engaging the upper face of the frame, a dowel connection between said plate and the upper end of the post, a screw bolt extending through the plate and having threaded connection with the post to secure the post and the tool carried thereby against removal with relation to the frame, a plurality of interspaced keyways formed in one side of the post, and a latch member carried by the frame and movable into and out of engagement with said keyways to secure the post and tool against turning movement in the frame.

5. A machine of the character described comprising a frame, a drawbar secured to the front of the frame, a pair of wheels supporting the rear of the frame, a post adapted to be secured to the frame, an earth carrier secured to the post, and hasps securing the earth carrier to the frame and supporting a portion of the weight of the carrier.

6. In a machine of the character described, a frame, a cone-shaped disc, a tool secured thereto, a frame having a cone-shaped opening formed therein for the reception of the disc whereby the frame may be lowered into position over the disc, and means for securing the disc against endwise removal from the opening in the frame when the frame is lowered over the disc.

7. In a machine of the character described comprising a frame and a tool supported thereby, a tapering post on the tool, said frame having a tapering opening for the reception of said post, said post having a plurality of notches formed in its outer periphery, and means extending into said opening and engageable with said notches selectively to retain the tool in a desired position.

8. In a machine of the character described a frame, a tool supported thereby, a tapering post on the tool, said frame having a tapered opening for the reception of said post, a collar on the lower end of the post engageable with the bottom surface of the frame, means secured to the upper end of the post and engageable with the upper surface of the frame, said means securing the post against endwise removal from the frame but permitting turning of the post and the tool carried thereby, and means securing the post and the tool against turning movement when assuming different turned positions.

9. In a machine of the character described the combination with a frame and a post carried thereby, of a scraper secured to the post, said scraper comprising a top plate and a back plate having a scraper plate secured thereto, and a pair of end plates detachably secured to the top and back plates.

10. In a machine of the character described the combination with the frame and the post carried thereby, of a scraper secured to the post, said scraper comprising a top plate and a back plate having a scraper plate secured thereto, an end plate at each end of the scraper, and means for detachably securing the same, said means comprising a pair of pins on each end plate, said pins being insertable in recesses formed in each end of the back plate, a slotted lug on each end plate, means on the top plate for receiving said lugs, and a pair of wedge-shaped pins insertable in said means for securing the slotted lugs against removal.

JALLIE McALISTER.