

Sept. 26, 1950

J. A. ANDERSON
STONE DIGGER

2,523,263

Filed Oct. 18, 1948

5 Sheets-Sheet 1

Fig. 1.

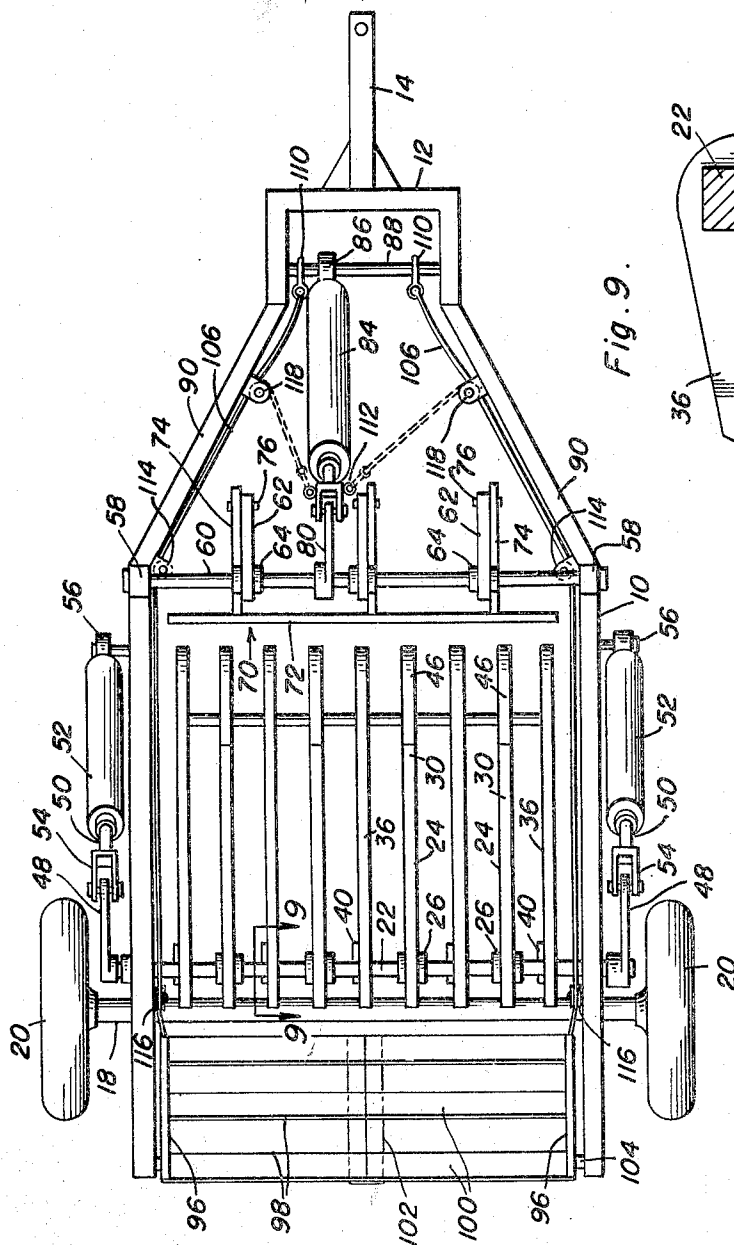
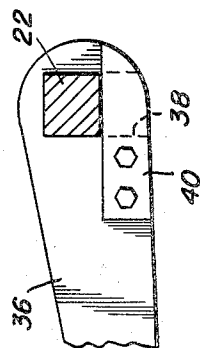


Fig. 9.



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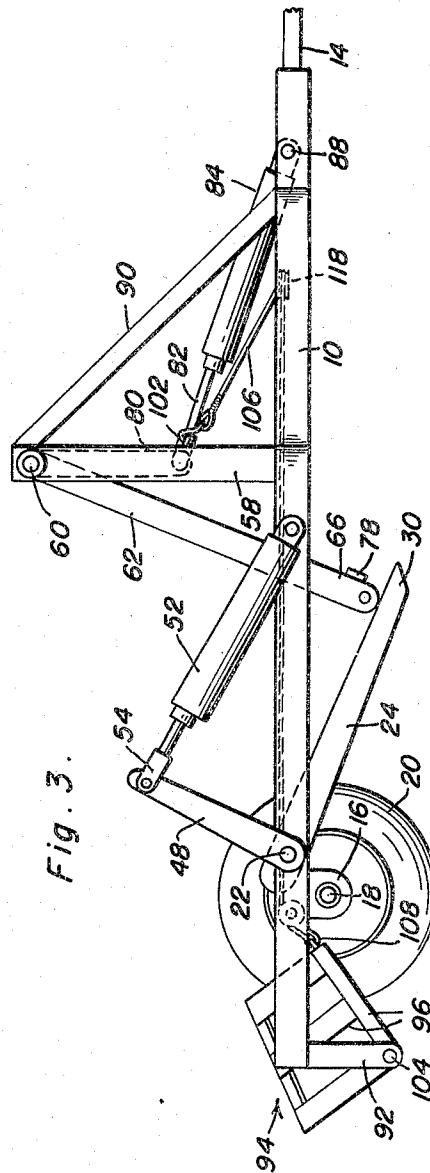
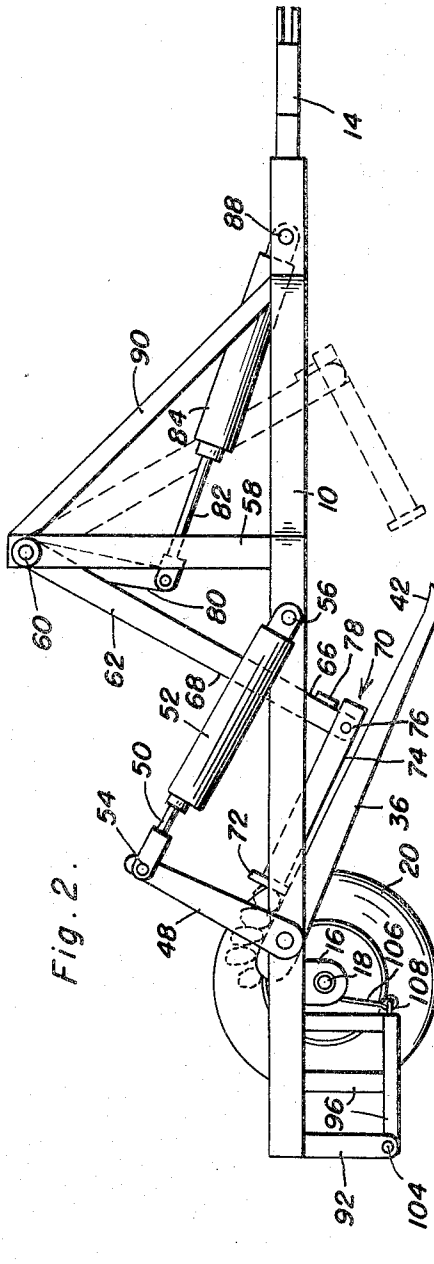
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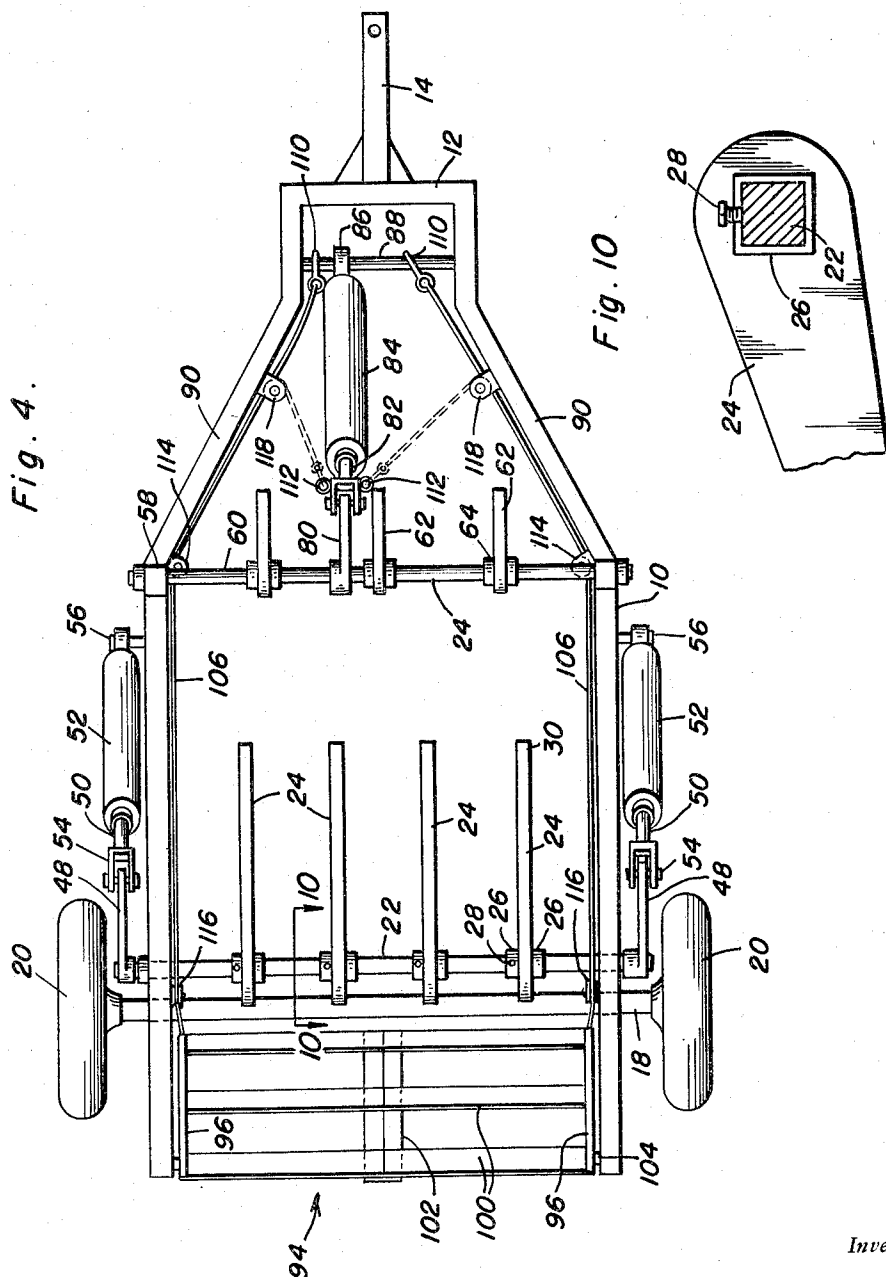
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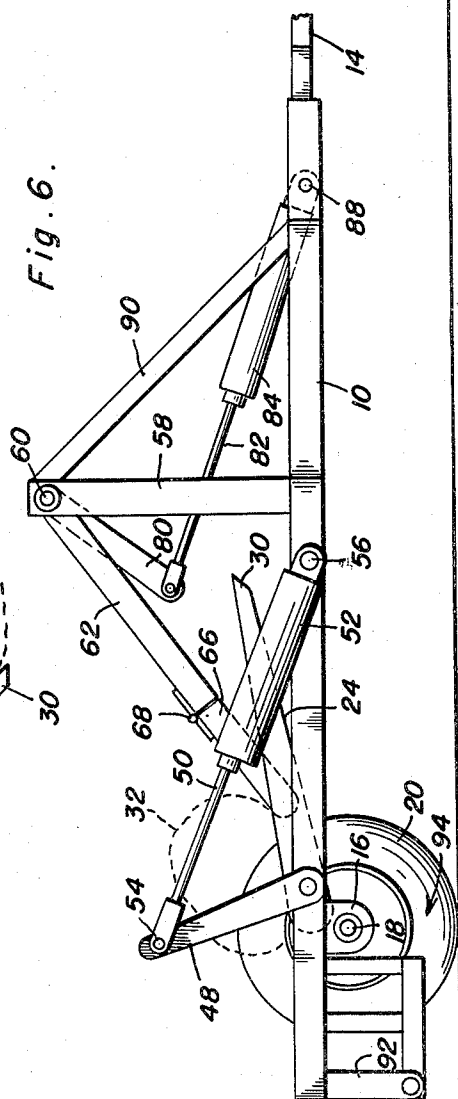
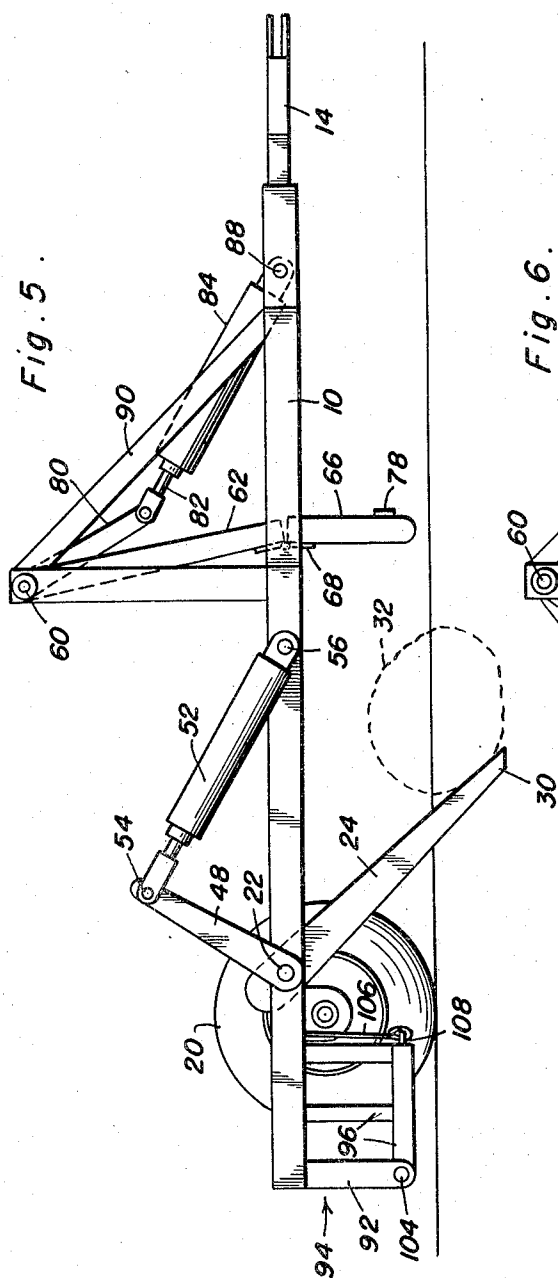
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STONE DIGGER

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UNITED STATES PATENT OFFICE

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STONE DIGGER

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6 Claims. (Cl. 55—17)

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This invention relates generally to stone diggers and more particularly to a stone digger comprising a wheeled frame and power operated stone-engaging arms.

A primary object of this invention is to provide a stone digger which is adapted for dislodging and raising stones of different sizes from the ground, the digger being adapted for use with a tractor equipped with a hydraulic power unit.

Another object of this invention is to provide a stone digger having a stone receptacle and means for emptying the stone receptacle without manually handling the stones.

Still another object of this invention is to provide a stone digger which may be used with or without attachments adapting the digger for use in clearing ground of small stones.

Still another object, of a specific nature, is to provide a stone digger having means for shifting a stone or stones along what is hereinafter referred to as the rear stone-engaging arms for deposition into the stone carrying receptacle.

Still another object of this invention is to provide a stone digger which, although reasonably light in weight, is of extremely rugged design.

Yet another object is to provide a stone digger which is very readily portable when attached to a tractor.

And a last object to be mentioned specifically is to provide a stone digger which is relatively inexpensive and practicable to manufacture, which is safe, simple and convenient to operate, and which will give generally efficient and durable service.

With these objects definitely in view, this invention resides in certain novel features of construction, combination and arrangement of elements and portions as will be hereinafter described in detail in the specification, particularly pointed out in the appended claims, and illustrated in the accompanying drawings which form a material part of this application, and in which:

Figure 1 is a top plan view of the assembled machine, the tubes and valve controls used in conjunction with the hydraulic cylinders being deleted from this view, as well as from the other views in the drawings, these elements being deleted as entailing no invention and not necessary to be represented in order that an understanding of the machine may be had;

Figure 2 is a side elevational view of the machine with the full complement of attachments as illustrated in Figure 1;

Figure 3 is a side elevational view of the machine with the attachments removed and with

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the stone retaining receptacle in tilted position as when stones are being unloaded therefrom;

Figure 4 is a top plan view of the machine with the said attachments removed and showing the cables used to operate the stone retaining receptacle shown in dash line in a second position;

Figure 5 is a side elevational view of the machine with the elements in positions as when a stone lodged in the ground is first engaged by the rear arms;

Figure 6 is a view similar to Figure 5 except that the arms are shown in position assumed when the stone has been dislodged and raised and is about to be shifted into the stone retaining receptacle;

Figure 7 is a rear elevational view of the machine with the above mentioned attachments removed;

Figure 8 is a three-dimensional view of the attachment for the rear arm assembly;

Figure 9 is a vertical transverse sectional view, taken upon the line 9—9 in Figure 1; and

Figure 10 is a similar vertical transverse sectional view taken upon the line 10—10 in Figure 4.

Similar characters of reference designate similar or identical elements and portions throughout the specification and throughout the different views of the drawings.

Referring now to the drawings in detail, this invention includes a rugged inflexible frame having lateral members connected together at their converging front ends by a cross member 12 which carries a tongue 14 removably securable to a tractor drawbar to support the front end of the machine, while the rear end of the machine is supported by means of depending bearing members 16 fixed on the frame 10 and carrying a transverse axle 18 having ground-contacting wheels 20.

A rear shaft 22 which may be square in cross section as indicated in Figure 9 will also have journal portions near the ends thereof whereby this shaft is rotatably mounted on the frame 10 transversely thereof and adjacent to the axle 18. This rear shaft 22 carries a plurality of substantially parallel stone-engaging arms 24 which are rigidly securable to the shaft 22 by means of boxes 26 which are rigidly secured to the arms and which fit onto the squared portion of the shaft 22 as best illustrated in Figure 10, the set screws of sturdy type 28 being used to prevent movement of the arms longitudinally of the rear shaft 22. The forward ends 30 of the arms 24 may be sharpened to facilitate the entrance there-

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of beneath a stone 32 which it is desired to dislodge.

An attachment generally indicated by the numeral 34 and represented in Figure 8 as well as in Figures 1 and 2, is removably securable to the rear shaft 22. This attachment 34 comprises a plurality of parallel spaced arms 36 having notches 38 adapted to fit over the rear shaft 22 and plates 40 are removably secured to the arms 36 so as to hold the attachment rigidly upon the shaft 22. Each of the arms 36 is sharpened as indicated at 42 and a spacer bar 44 is rigidly secured to each of the arms 36 and carries short arms 46 which are proportioned and positioned to comprise extensions of the arms 24, as will be understood from a consideration of Figure 1.

A rear lever 48 is rigidly secured to each end of the rear shaft 22, and these rear levers are connected to the outer ends of the piston rods 50 associated with hydraulic cylinders 52, the connections of the levers 48 with the piston rods 50 being pivotal as indicated at 54. The hydraulic cylinders 52 are also pivotally mounted upon the frame 10, at the sides thereof as indicated at 56. It will be understood that flexible tube connections will lead to valve controls and to hydraulic power means such as that normally provided on tractors wherewith this invention is adapted to be used, these tubes and valve controls being thought unnecessary to be represented in the drawings.

A pair of vertical uprights 58 are carried by the frame 10 on each side thereof and preferably in front of the pivotal connections 56 of the hydraulic cylinders 52 on the frame, and these uprights 58 have bearings at their upper ends in which a front shaft is rotatably mounted, this shaft extending transversely of the machine and carrying a plurality of inflexible arms 62, the connections of the arms 62 on the front shaft 60 being indicated at 64, the details of which are similar to the details already described in connection with the connection of the arms 24 on the rear shaft 22. The arms 62 may be constructed in two sections, the lower section 66 being hinged as indicated at 68 on the lower ends of the upper sections of the arms 62 so that these lower sections may be swung freely rearwardly while being incapable of being swung forwardly of the machine beyond a colinear relationship with the upper portions of these arms.

Another attachment, generally indicated at 70, for the front arms 62 comprises a pusher plate 72 disposed transversely of the machine and connected by forwardly extending arms 74 rigidly mounted on the pusher plate 72 and pivoted as at 76 on the lower ends of the arms 62. A similar number of stop plates 78 may be permanently secured on the lower sections 66 on the front arms 62 to engage forwardly extending portions of the arms 74 to limit the pivotal action of the arms 74 and to limit the downward movement of the pusher plate 72, so that in operation the pusher plate may be made free to follow along the rear arms 24 during the operation of the machine as will be understood from an inspection of Figure 2.

A front lever 80 is rigidly secured to the front shaft 60 and is pivoted to the end of the piston rod 82 associated with another hydraulic cylinder 84, the latter being pivoted as at 86 on a transverse bar 88 terminally mounted on a front portion of the frame 10. Frame braces 90 are used to provide auxiliary support for the uprights 58. The rear side portions of the frame 10 are pro-

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vided with depending bracket members 92 which are used for the pivotal support of the stone-retaining receptacle 94, this receptacle being comprised of ends fabricated from welded inflexible strap members 96 and elongated inflexible members 98 and 100 disposed transversely of the machine, rigidly secured to the end members 96 and inclined toward and rigidly secured to a center member 102. The receptacle 94 is pivoted as at 104 to the sides of the frame 10 at the rear end thereof.

A pair of cables 106 are secured at their rear ends to lower front portions of the receptacle 94, at the ends thereof, as indicated at 108, while the front ends of these cables are removably secured as indicated at 110 to the cross bar 88. As indicated at 112 in Figure 4, in dash lines, the front ends of the cables 106 may be alternatively secured to the piston 82, while these cables are at all times entrained through pulleys 114, 116 and 118 on each side of the frame 10.

The operation of this invention will be clearly understood from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the above recitation of the objects sought to be achieved for this invention and the drawings. In recapitulation, it need only be added that the cylinder 84 may be actuated to operate the stone receptacle 94, when the cables 106 have their front ends secured to the piston 82. At other times, the cables may be used to support the receptacle 94 in the position indicated in Figure 2, the cables in this instance being secured at their front ends to the cross bar 88. The attachments 34 and 70 will ordinarily be used when smaller stones are being operated on and the action of these attachments will be clear from an inspection of Figure 2. The stone digger is freely transportable when the cylinders 52 are operated to raise the arms 24 and the hinging of the lower sections 66 on the ends of the arms 62 allow the digger to be drawn forward over obstructions and otherwise facilitate the operation of this invention. Further description would appear unnecessary.

Obviously many minor variations may be made in this invention within the spirit thereof and the scope of this invention should be determined only in accordance with the proper interpretation of the subjoined claims.

Having described the invention, what is claimed as new is:

1. A stone digger comprising a frame with ground-contacting wheels, a rear shaft rotatably mounted transversely on the frame, substantially parallel rear stone-engaging arms rigidly secured radially on said shaft, power means to rotate said shaft in two directions, a front shaft rotatably mounted transversely on the frame, substantially parallel front stone-engaging arms rigidly secured on said front shaft, and power means to rotate said front shaft in two directions, whereby a stone may be engaged between and above said front and rear arms for dislodgment of a stone from the ground and the raising of the same.

2. A stone digger according to claim 1, and including an attachment comprising a plurality of parallel arms rigidly secured to a spacer bar and removably securable on said rear shaft substantially parallel to said rear arms.

3. A stone digger according to claim 1, and including an attachment comprising a pusher plate pivotally securable to said front arms.

4. A stone digger according to claim 1, and wherein said means to operate the front shaft in-

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cludes a lever rigidly secured to said front shaft and a hydraulic cylinder operatively connected to said lever, cables connected to and between said receptacle and lever, and sheaves to guide said cables, said front arms each comprising an upper section and a lower section hinged together so that the lower section can pivot rearwardly only from colinear relationship with the upper section.

5. A stone digger according to claim 1, and wherein both said means comprise levers on the front and rear shafts, and hydraulic cylinders on said frame operatively connected to said levers, said front arms each comprising an upper section and a lower section hinged together so that the lower section can pivot rearwardly only from colinear relationship with the upper section, arms pivoted to the lower ends of said lower section and extending rearwardly therefrom, stop means on the lower sections to limit the downward pivoting of the forward ends of the last mentioned arms, and a pusher plate secured to

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the last mentioned arms and disposed transversely thereof, said pusher plate being in sliding engagement with the rear arms and guided thereby when the pusher plate is used to push stones upwardly and rearwardly along said rear arms.

6. A stone digger according to claim 1, and wherein said front arms have lower portions thereof pivoted on upper portions thereof.

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