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GRUBBING ATTACHMENT FOR EXCAVATING MACHINES

Filed Jan. 11, 1932.

3 Sheets-Sheet 1

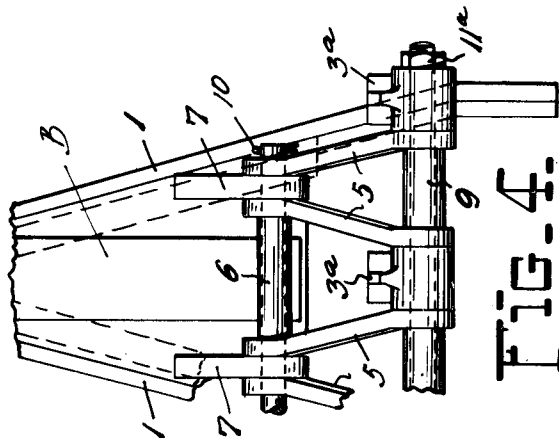


FIG. 4.

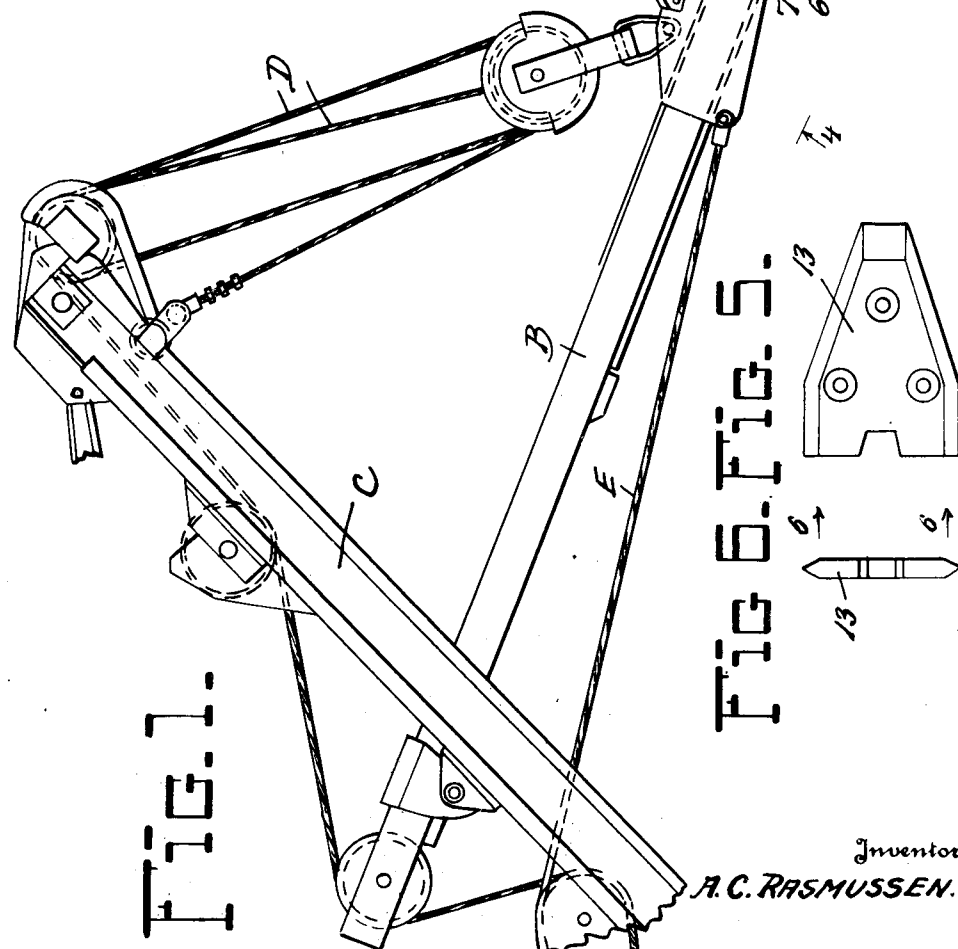


FIG. 5.

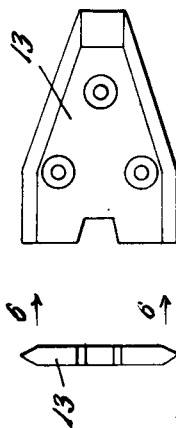


FIG. 1.

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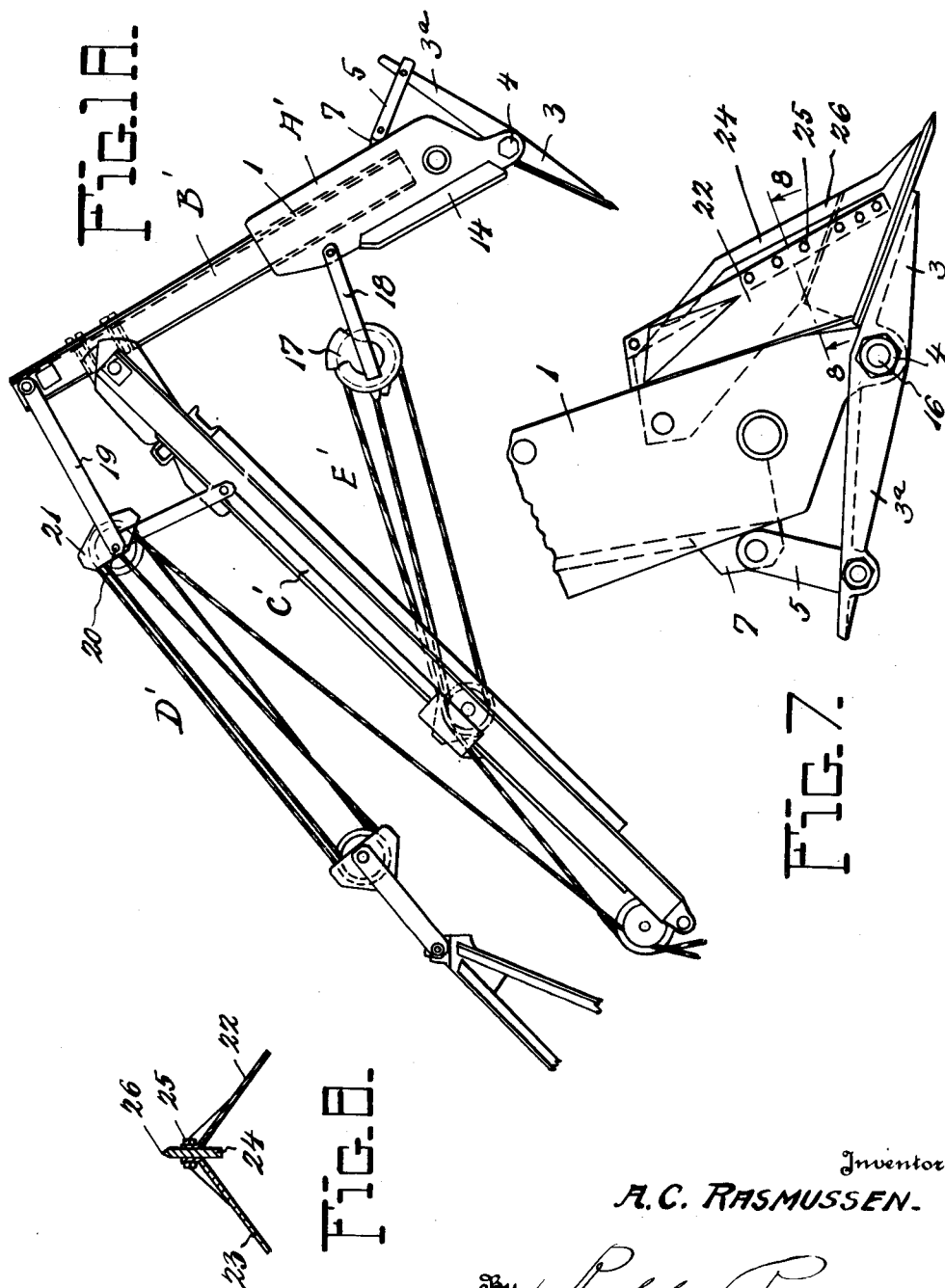
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3 Sheets-Sheet 2



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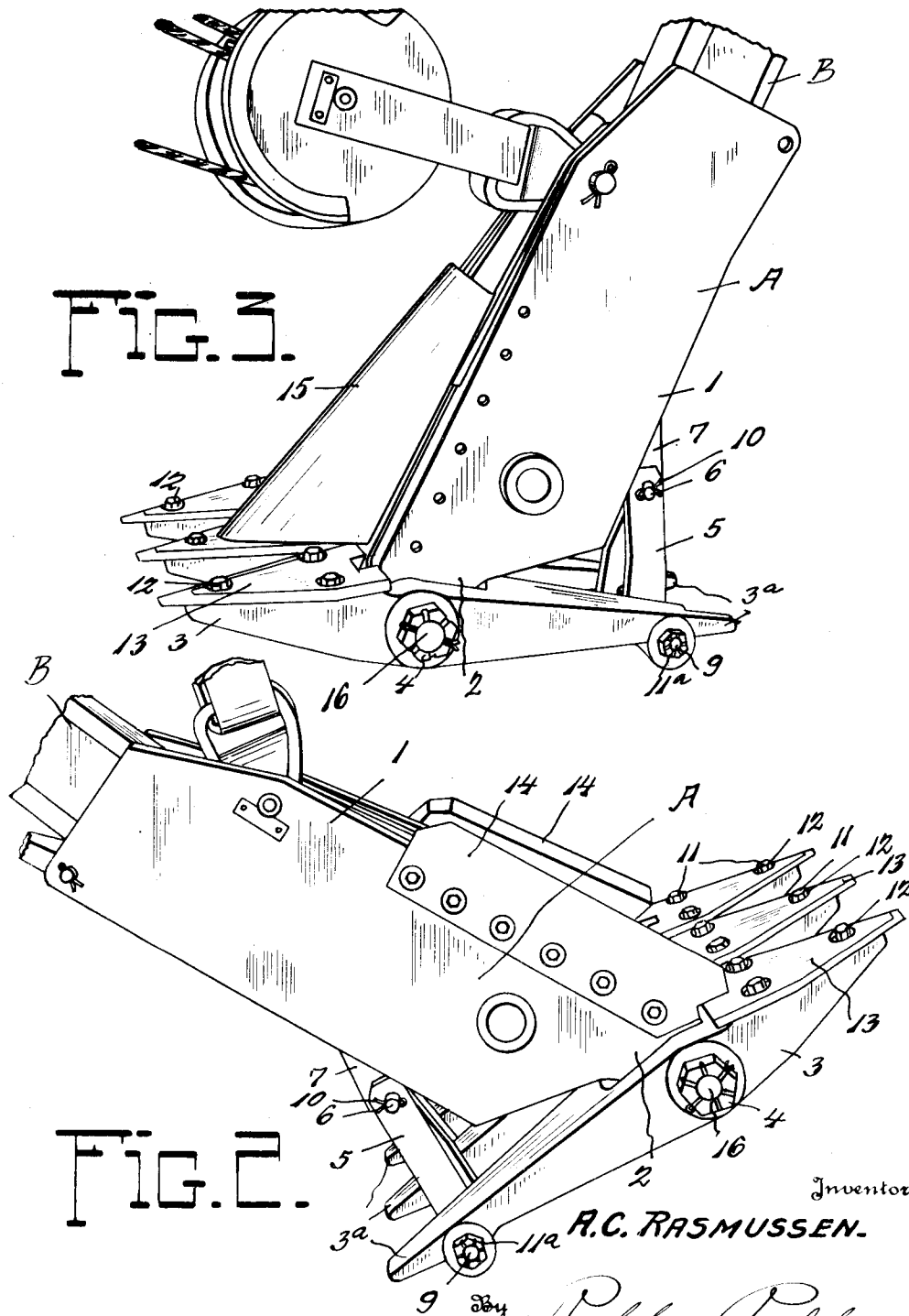
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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GRUBBING ATTACHMENT FOR EXCAVATING MACHINES

Application filed January 11, 1932. Serial No. 585,997.

A primary objective of the present invention has been to produce a machine especially designed for the purpose of grubbing what is known as mesquite, a class of bush or bushy trees found growing in Texas and other states of the union. The machine hereinafter set forth is particularly capable of digging or grubbing and uprooting growth of the above kind, as well as other growths of a similar nature, and is useful in preparing land, upon which such growth is found, for cultivation.

The present invention, therefore, provides a grubbing device which is conveniently in the form of an attachment adapted to be positioned on the end of a dipper stick of a conventional type of excavating machine, the attachment being operated by the same manipulations of the boom and dipper stick of the machine as are carried out in the usual excavating operations.

A further object of this invention lies in the provision of novel constructed teeth which are adapted to bite into a stump of a tree to facilitate the removal of the stump. A still further object is to provide the attachment with auxiliary cutting means which are adapted to cut through the soil to facilitate the pulling of the grubbing teeth there-through.

A still further object resides in the provision of instrumentalities for adjusting the angle of inclination of the grubbing teeth in order to satisfy varying conditions of operation.

Other objects and advantages of the present construction will become apparent as the detailed description hereinafter set forth proceeds, the description being clarified by the accompanying drawings, in which—

Figure 1 represents a side elevation of a standard type boom and dipper stick of a conventional excavating machine, the dipper stick having attached thereto a grubbing device instead of the usual excavating bucket.

Figure 1A represents the grubbing device of Fig. 1 applied to a ditching machine.

Figure 2 is a detailed perspective view of the grubbing device illustrated in Figure 1, and which is one form which the device of this invention may take.

Figure 3 is a perspective view of a somewhat modified form of attachment constructed in accordance with the present invention.

Figure 4 is a bottom view of the attachment of Figure 1, looking upwardly in the direction of the arrows of the line 4—4 of Figure 1.

Figure 5 is a view of a cutting plate employed in connection with the grubbing teeth of the attachment.

Figure 6 is a rear view of the plate of Figure 5, looking in the direction of the arrows.

Figure 7 is a side elevation of the attachment showing a modified form of plow or buster member from that illustrated in Figure 3.

Figure 8 is a sectional view on the line 8—8 of Figure 7, looking in the direction of the arrows.

Referring more particularly to the drawings, the invention comprises the attachment A positioned on the end of the dipper stick B operating in the boom C and provided with the usual operating cables D. The dipper stick boom and cables are the same as in the standard type excavator, and need not here be described, as their operation is in no way altered by the substitution of the novel grubbing attachment for the usual bucket excavator.

The attachment A is formed of a pair of similarly shaped plates 1 secured to each side of the dipper stick B in any desirable manner, either by welding, or, more desirably, through the provision of bolts, whereby the attachment may be removed. The plates 1 have an offset extension 2, on which are mounted the grubbing teeth 3. The mounting of these teeth may be such that their pitch may be adjusted if operating conditions render such adjustment desirable. In operation, of course, the teeth 3 are maintained secure by tightening of the nut 4.

The teeth 3 projects rearwardly forming extensions 3a to which are secured links or bars 5, there being one link on each side of the attachment, and which are removably secured in position so that any given lengths may be replaced by links of a different length so that the angle of inclination of the teeth

3 may be adjusted. The links or bars 5 are mounted on a rod 6, carried in part by the arms 7, secured by welding or other suitable means to the plates 1.

5 The teeth may be of any desired number, commensurate with the operative force available to pull the teeth through the ground, as obviously the resistance between the teeth and ground increases with the number of
10 teeth on the attachment. In operating the attachment, the maximum efficient number of teeth is usually three, although there is no necessary definite or fixed limit at which the number of teeth is placed. The teeth
15 are separated and are reinforced between each projection 3a by the adjusting bars 5, there being a pair of adjusting bars 5 between adjacent teeth. These bars are mounted on the tie rod 6 and extend to the rod 9
20 which passes through the extensions 3a of the teeth. The assembly is secured together by means of cotter-pins 10 on the rod 6, and by means of the nuts 11a threaded on the rod 9.

25 These grubbing teeth 3 are formed of very strong material, manganese steel being a suitable composition possessing requisite hardness and toughness. To each tooth is removably secured through the bolts 11 and
30 nuts 12 threaded thereon, a removable blade 13. Each of these blades 13 is made of tool steel and is hardened to maintain an extremely sharp edge, thereby serving as cutting blades that may be readily removed
35 from their mounting on the teeth so that they may be resharpened and rehardened when necessary. It will be seen that there is a groove or space between adjacent teeth so that in operation they will have an action
40 such that the sharpened edges of the blade 13 will bite into the wood of a stump or brush and will hold on to it so that the stump or brush can be pulled out of the ground by the roots through the action of the hoisting
45 lines D or digging lines E; and by making the teeth symmetrical, all parts are interchangeable.

50 As will be seen from Figures 2 and 3, supplemental cutting members are provided, the members of Figure 2 comprising cutting plates 14, each plate having sharpened cutting edges to facilitate the pulling of the teeth through the ground.

55 In the form of Figure 3, the side plates 14 are replaced by a single wedge-shaped cutting member or buster 15 which carries along its front edge a sharpened hardened steel edge. This cuts out any root structures when the attachment is being operated, and turns
60 the dirt to each side, thus making it easier for the attachment to be pulled through the ground.

65 The cutting plates 14 of the form of attachment shown in Figures 1 and 2 also effectively cut any horizontal roots.

It is believed that the operation of the device will be obvious. With the attachment in place upon the dipper stick of an excavating machine of standard type, the dipper stick is actuated so as to cause the
70 teeth 3 with the cutting plates 13 mounted thereon to enter the ground, at a point adjacent the stump or other obstruction which is to be removed. Proper operating hoist and digging cables will cause the
75 teeth 3 and cutting plates 13 to bite into the obstruction in a manner similar to the action of a claw-hammer, the blades thereby holding on to the obstruction so that the stump and roots can be pulled out upon manipulation of the dipper stick in a manner as
80 would be done were there an excavating shovel on the end of the dipper stick instead of the grubbing attachment of the present invention. The grubbing action is facilitated through the cutting edge of the plates
85 14 or the wedge-shaped buster 15, which cut through any horizontal roots and reduce the resistance of the ground against the teeth. The grubbing action is effectively accomplished, and by making the grubbing attachment detachable on the dipper stick it may be
90 replaced by an excavating bucket of standard type, and the same machine therefore is usable for a dual purpose.

95 When it is desired to demount the attachment for any purpose, the parts thereof may be released by removing the cotter-pins 10, the nuts 11a on the rod 9, and the nuts 4 on the rod 16, upon which the teeth 3 are
100 adjustably mounted, as previously described.

105 It will be understood, of course, that the cutting member or buster 15 operates with a sort of plowing or rather, breaking function, in practical use, the objective in employing the same being to enable the entire grubbing device to move more freely and easily through
110 the ground than if this buster or cutting member is not employed with its incidental plowing action. It is to be understood that this member 15 and the side cutting blades may be used together or alternatively or both dispensed with under some conditions.

115 While the invention has been described above as being applied to a standard type of shovel dipper stick and boom, it may also be applied to a ditcher type or pull shovel type of machine, as illustrated in Figure 1A. In this view the attachment A' is constructed in the same manner as the attachment already
120 described, but is mounted upon the digging arm B' of a ditcher type machine, which is mounted on the boom C', there being the usual operating tackle indicated generally at D' and E', and which need not be here specifically
125 described as it is of the usual arrangement. the arm B', together with its attachment A', are suitably connected to the digging sheave 17 by the link 18 its end being operated through the link 19 which is connected at 20. 130

to the sheave 21. Otherwise the construction of the attachment is the same as that already described.

Instead of the form of plow or earth buster 5 15 illustrated in Figure 3, there may be employed the modified form shown in Figures 7 and 8. In this modification, two converging plates 22 and 23 are secured to the side plates 1 of the attachment A, there being fitted between the converging surfaces of these two 10 plates, a cutting blade 24, the plates and blade being held together by bolts 25. This cutting blade 24 has its edge sharpened as indicated at 26 to form a sharp cutting edge. 15 This modified form functions in a manner entirely similar to the form illustrated in Figure 3, but it has the additional feature of having its cutting blade replaceable at any time desired by a similar blade.

20 Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

1. A device of the character described, comprising the combination with an excavating 25 machine having the usual boom and dipper stick, of grubbing instrumentalities mounted on the dipper stick and operative by the usual operating device for the dipper stick, the said instrumentalities comprising a plurality 30 of grubbing teeth, and cutting means mounted on each tooth for engaging and holding an object to be grubbed out.

2. A device of the character described, comprising the combination with an excavating 35 machine of standard type provided with a boom and dipper stick with the usual hoist and digging instrumentalities for operating the said boom and dipper stick, of a grubbing device mounted on the dipper stick and 40 adapted to be actuated by the said hoist and digging instrumentalities, the grubbing device comprising a plurality of teeth, and holding instrumentalities carried by the teeth for gripping into an object to be grubbed.

45 3. A device of the character described, comprising, the combination with an excavating machine of standard type provided with the usual boom, dipper stick, and operating instrumentalities therefor, of a grubbing device 50 mounted on the dipper stick comprising a plurality of symmetrical grubbing teeth, and a symmetrical cutting blade removably mounted on each tooth for holding an object being grubbed until the said object is pulled 55 out by suitable operation of the dipper stick.

4. A device of the character described, comprising the combination with a standard type excavator machine having the usual boom, 60 dipper stick, and operating instrumentalities therefor, of a grubbing device mounted on the dipper stick and adapted to grub obstructions out of the ground, the said grubbing member comprising a plurality of tapering grubbing 65 teeth, a cutting blade mounted on each tooth and adapted to penetrate into an obstruction

to hold the same for removal, and auxiliary cutting means mounted on the device for facilitating movement thereof through the ground during operation.

5. A device of the character described, comprising the combination with a standard type 70 excavator machine having the usual boom, dipper stick, and operating instrumentalities therefor, of a grubbing device mounted on the dipper stick and adapted to grub obstructions 75 out of the ground, the said grubbing member comprising a plurality of tapering grubbing teeth, a cutting blade mounted on each tooth and adapted to penetrate into an obstruction to hold the same for removal, and auxiliary 80 cutting means mounted on the device for facilitating movement thereof through the ground during operation, the said auxiliary cutting means comprising a pair of cooperating 85 plates provided with a sharp cutting edge on each plate.

6. A grubbing attachment for excavating machines comprising the combination with a 90 dipper stick and boom, together with operating instrumentalities therefor, of grubbing instrumentalities mounted on the dipper stick, the said instrumentalities comprising grubbing teeth adapted to hold an object during 95 grubbing thereof, and a supplemental cutting member carried by the grubbing instrumentalities adapted to facilitate passage of the grubbing teeth through the ground.

7. A grubbing device for excavating type machines comprising a pair of cooperating 100 plates mounted on the usual dipper stick of the excavating machine, angularly mounted cutting teeth carried by the plates, means whereby the position of the teeth relatively to the plates may be adjusted, means for reinforcing the teeth for strengthening them 105 during grubbing operations, and auxiliary cutting means for facilitating the movement of the teeth through the ground during grubbing operations.

8. A grubbing device comprising a toothed 110 unit adapted to be mounted on the usual dipper stick of a standard type excavating machine, the unit being formed of a pair of plates adapted to be secured to the dipper 115 stick, a tie rod extending between the plates, a plurality of inclined digging teeth mounted on the rod, a second tie rod carried by the plates, and a plurality of reinforcing members connecting the tie rods, the reinforcing 120 members being replaceable by other members of different length to afford adjustment of the inclination of the digging teeth.

9. A device of the character described, comprising the combination with a standard 125 type excavator machine having the usual boom, dipper stick, and operating instrumentalities therefor, of a grubbing unit mounted on the dipper stick comprising a plurality of grubbing teeth, and cutting instrumentalities for facilitating the action of 130

the teeth, comprising a pair of cooperating plates having sharp converging cutting edges to cut through and grip obstructing earth and roots in advance of the grubbing teeth.

- 5 10. A device of the character described, comprising the combination with a standard type excavator machine having the usual boom, dipper stick and operating instrumentalities therefor, of a grubbing unit
10 mounted on the dipper stick comprising a plurality of grubbing teeth, and plowing means on the unit cooperating with the teeth to cut through obstructing earth and roots for facilitating the action of the teeth on the
15 roots.

11. A grubbing machine of the class described, comprising a support adapted to be moved relatively to the ground and equipped with a plurality of grubbing blades of tapering form having coacting converging cutting edges to engage and grip roots and trunks for uprooting the same, combined with an earth busting or plowing member for breaking or separating the earth through which
25 the blades are drawn in order to cause them to engage with the roots or stumps.

12. A root grubbing machine comprising a series of spaced teeth, cutting blades mounted upon the teeth and arranged with their
30 cutting edges converging together at the rear portions to form wedge-like gripping spaces, and a support for the teeth for moving the same through the earth, combined with connecting means between the support and teeth
35 intermediate the ends of the teeth so that

the latter may be adjusted to different angularity relations with respect to the support, and link means between the rear ends of the teeth and the support for holding the teeth braced with their cutting blades operatively
70 disposed.

13. A grubbing machine of the character described, comprising the combination with a standard type excavating machine, of a grubbing unit mounted on the machine comprising a plurality of grubbing teeth, and plowing means on the unit cooperating with the teeth to cut through obstructing earth and roots for facilitating the action of the teeth on the roots, the said means including
80 a pair of converging plates mounted on the grubbing unit, a cutting blade mounted between the said plates, and instrumentalities for interconnecting the plates and blade.

14. A grubbing machine of the character described, comprising the combination with a standard type excavating machine, of a grubbing unit mounted on the machine comprising a plurality of grubbing teeth, and plowing means on the unit cooperating with the teeth to cut through obstructing earth and roots for facilitating the action of the teeth on the roots, the said means including a pair of converging plates mounted on the grubbing unit, a cutting blade mounted between the said plates, and removable securing means for fastening together the plates and cutting blade for allowing replacement of the said blade.

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