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R. J. PETZ ET AL

2,250,313

WEEDING TOOL

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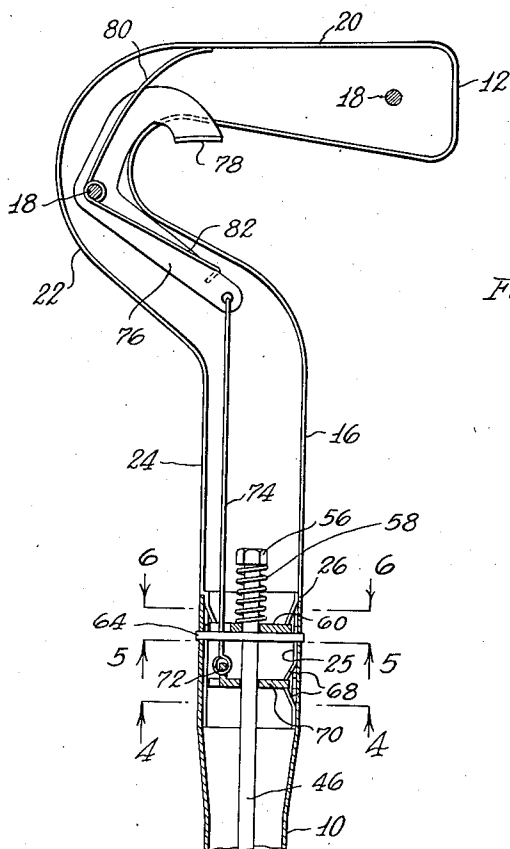


Fig. 1.

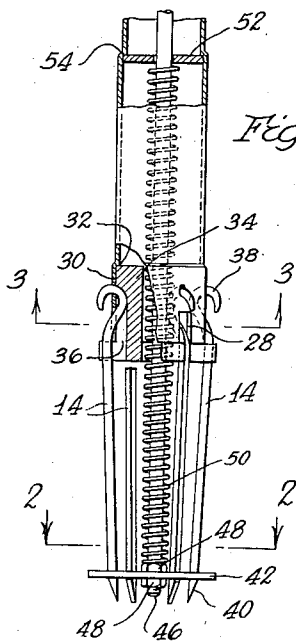


Fig. 2.

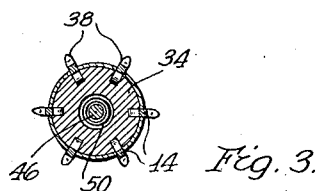


Fig. 3.

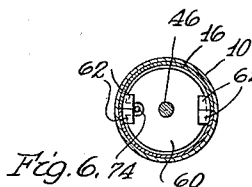


Fig. 4.

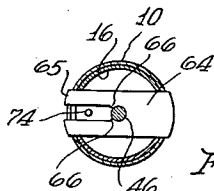


Fig. 5.

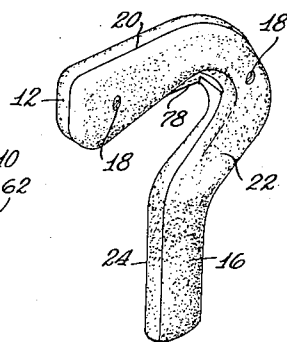


Fig. 6.

Fig. 7.

UNITED STATES PATENT OFFICE

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WEEDING TOOL

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10 Claims. (Cl. 294—50.5)

This invention relates to weeding tools and has particular reference to a new and improved form of construction of a hand operated weeding tool which is particularly adapted for removing weeds such as dandelions from turfs and gardens.

A principal object of our invention is to provide a manually operated weeding tool which is constructed and adapted to remove weeds and the roots thereof from turfs and gardens, with a minimum amount of time and effort on the part of the operator.

Another object of our invention is to provide a novel and improved form of construction for a weeding tool of the character set forth.

Another object of our invention is to provide a weeding tool of the character set forth, of such construction that parts of the same may be readily replaced in the event of injury thereto.

Further objects of the invention will be apparent from a consideration of the following specification taken in conjunction with the accompanying sheet of drawings, wherein:

Fig. 1 is an elevational view, with some parts broken away and others shown in section, of a weeding tool constructed in accordance with our invention;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1, looking in the direction of the arrows and showing the construction of the cam plate and the relationship thereof to the prongs;

Fig. 3 is a section taken in the plane along the line 3—3 of Fig. 1, looking in the direction of the arrows and showing the assembly of the prongs to the lower end of the tool;

Fig. 4 is a sectional view taken in the plane along the line 4—4 of Fig. 1 and illustrating the construction of the shaft lock;

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 2 and illustrating the construction of the detachable stop and lock bar which removably secures the handle to the remaining part of the tool;

Fig. 6 is a section taken along the line 6—6 of Fig. 1 and illustrating the construction and arrangement of the spacer and stop washer for taking the thrust of the ejecting mechanism upon the release thereof; and

Fig. 7 is a perspective view of the handle part of the tool.

In the form of the invention selected for purposes of illustration, the weeding tool comprises a tubular body member 10 having a handle 12 secured to one end thereof and a plurality of prongs 14 secured to the other end thereof. The tubular body member 10, as illustrated, consists

of a tube, which forms a housing for at least a part of the locking and ejecting mechanism. The handle 12 also preferably is hollow and is adapted to house a trigger mechanism which is connected to the locking mechanism for releasing the same. The handle 12 may comprise a pair of complementarily shaped stampings or castings 16, each of which forms approximately one half or one side of the handle, the joint between the parts 16 lying in a plane along the central longitudinal axis of the handle. The parts 16 may be removably secured together by means of screws 18 cooperating with the parts 16 in such a manner as to clamp the same together as a unit. The handle 12 is shaped to provide a hand grasp portion 20 and a curved neck 22 which connects the portion 20 with the part 24 of the handle which is removably connected to one end of the body member 10. The terminal 25 of the part 24 of the handle is of a reduced diameter relative to the remaining part of the handle, so as to provide a shoulder 26 against which the end of the tube 10 seats. The outside diameter of the terminal 25 is approximately the same as the internal diameter of the end of the tube 10, so as to provide a snug fit therebetween.

The lower end of the tube 10 is provided with a series of slots 28 and with a series of apertures 30 in line with the slots 28. The lower end of the tube just above the apertures 30 is provided with an internal shoulder 32, and a retainer lock bushing 34 is fitted within the end of the tube and seated against the shoulder 32. The bushing 34 is of annular shape and is provided with a series of axially extending slots 36 in the periphery thereof and which register with the slots 28 and apertures 30 in the lower end of the tube. Each of the prongs 14 is provided with a hook-shaped portion 38 at the upper end thereof, this portion 38 extending through the slot 28 into the slot 36 in the bushing 34 and thence through the corresponding aperture 30 for pivotally securing the prong 14 to the lower end of the tube 10. The prongs 14 are uniformly spaced in the form of a circle around the lower end of the tube 10 and in such a way that the prongs 14, when pushed straight downwardly into the earth, are adapted to telescope the root of a weed. The lower end of the prongs 14 are pointed, as indicated at 40, so as to facilitate the entry of the prongs into the soil about the root of the weed. The lower ends of the prongs are secured with respect to each other by a cam plate 42 which is provided with a series of apertures 44 therein. Each of the apertures 44 receives one of the prongs 14,

and the apertures 44 are shaped so that as the cam plate moves relative to the prongs 14 and from the position in which it is illustrated in Fig. 1 to a position closely adjacent the lower end of the tube 10, the lower end 40 of the prongs will be moved toward each other or radially inwardly so as to clamp the root of a weed between the prongs.

In operation, the tool is vertically arranged and lined up so that the root of the weed will be in line with the center of the cam plate 42. When the operator exerts a downward force upon the handle 12, the prongs 14 will be pushed into the earth around the root of the weed, and the upper surface of the soil will engage the cam plate 42 and of course prevent the same from insertion into the soil so that the prongs 14 will move downwardly relative to the cam plate 42 until the cam plate 42 is positioned closely adjacent the lower end of the tube 10, the shape of the apertures 44 of the cam plate during such relative movement causing the lower end of the prongs 14 to move together for clamping the root of the weed therebetween. Thereafter, by oscillating the weeding tool about its vertical axis, the root of the weed clamped between the prongs 14 and the soil adhering thereto may be freed from the surrounding soil, and then the prongs 14, together with the root of the weed and the soil adhering thereto, may be removed from the earth by pulling upwardly on the handle 12.

The cam plate 42 has a rod 46 secured thereto by means of nuts 48 which threadedly engage the threaded end of the rod 46 on the opposite sides of the cam plate 42, said rod extending through the central opening in the retainer bushing 34 into the tube 10. An ejecting spring 50 is confined between one of the lock nuts 48 and a collar 52 which is seated against a shoulder 54 internally provided on the tube 10. The spring 50 biases the cam plate 42 to the position in which it is shown in Fig. 1. The upper end of the rod 46 has a lock nut 56 secured thereto, and a shock-absorbing spring 58 arranged around the rod 46 is confined between the nut 56 and a spacer and stop washer 60. The spacer and stop washer 60 is arranged transversely of the reduced portion 25 of the handle and between a plurality of prongs 62 formed thereon and a detachable stop and lock bar 64. The prongs 62, of which there are four in number, are formed by bending short strips or portions of the handle 12 inwardly and form a seat against which the spacer and stop washer 60 rests. The detachable stop and lock bar 64 (Fig. 5) has one end thereof bifurcated and straddles the rod 46. The ends of the lock bar 64 are arranged in aligned slots formed in the portion 25 of the handle and the upper end of the tube 10 for locking the handle 12 to the end of the tube. The lock bar 64 is adapted to be driven in place after the end 25 of the handle is fitted into the end of the tube, and when the slots therein are in alignment. The bifurcated end 66 of the lock bar 64 is adapted to straddle the rod 46. The inner end of the slot formed by the bifurcations in the bar 64 may be provided with a circular portion for receiving the rod 46 and with a throat or restricted portion 68 which cooperates with the rod 46 for holding the lock bar 64 in the position illustrated and against accidental displacement.

The reduced portion 25 of the handle also may be provided with another series of oppositely extending fingers or prongs 68 which provide a pivotal seat for one end of a shaft locking mem-

ber 70. The member is provided with a central opening through which the rod 46 extends and also with an apertured lug 72 to which one end of a link 74 is connected. The link 74 extends through the bifurcation in the lock bar 64 and also through a slot formed in the stop washer 60. The other end of the link 74 is connected to one end of a bell crank 76 pivoted as illustrated on one of the screws 18 which hold the parts 16 of the handle together. The other end 78 of the bell crank is formed to provide a trigger and extends through a suitable opening provided in the handle 12 so as to be accessible for manipulation by a finger of the hand of an operator holding the tool by the hand grasp portion 20 of the handle. A spring 80 held in position by the screw 18 to which the lever 76 is pivoted has one arm 82 thereof engaging the lower arm of the bell crank for resiliently holding the same in the position illustrated, while the other end of the spring 80 is seated against the inside surface of the handle 12. The trigger 78, upon manipulation thereof, is designed to move the bell crank 76 in a counter-clockwise direction with respect to its pivot. The rod 46 has a fairly close fit in the central opening in the locking member 70, and the locking bar 70 is arranged so as to permit the shaft 46 to move freely upwardly through the aperture in the locking member 70. However, as soon as the rod 46 tends to return to the position illustrated and moves downwardly through the opening in the locking member 70, the edges thereof, due to the cocking of the locking member 70, will engage the rod 46 and hold the same against return movement. However, manipulation of the trigger 78 will move the free end of the locking member 70 sufficiently to free the rod 46 from the member 70 and permit the ejecting spring 50 to return the cam plate 42 to the position illustrated in Fig. 1, thereby ejecting from the prongs the root and soil adhering thereto, which were clamped between the prongs 14 and withdrawn thereby from the earth. Upon the return or downward movement of the rod 46, the shock-absorbing spring 58 will take the thrust of the rod 46 and the cam plate 42 due to the force of the spring 50.

Due to the manner in which the prongs 14 are secured to the lower end of the tube 10, it will be apparent that the bushing 34 will be retained in place by the upper part 38 of the prongs 14. By removing the lower nut 48 from the rod 46, the cam plate 42 may be removed and then each of the prongs 14 may be removed by pivoting the same in such a way as to disengage them from the slot 28 and the aperture 30.

While the invention has been described with some detail, it is to be understood that the description is for the purpose of illustration only and is not definitive of the limits of the inventive idea. The right is reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the attached claims.

We claim:

1. In a weeding tool having prongs adapted when in closed position for engaging and holding a root, means constraining said prongs toward a released position, locking mechanism associated with said prongs and operable upon movement of the same to closed position for holding such prongs in closed position, and a release for said locking mechanism, said constraining means being operable upon release of

said locking mechanism for ejecting from said prongs a root held therebetween, and means for absorbing the shock incidental to the release of said locking mechanism.

2. In a weeding tool having prongs normally arranged in open position and adapted when in closed position for engaging and holding the root of a weed, locking mechanism associated with said prongs and adapted for holding such prongs in closed position, a handle for said tool and a control for said locking mechanism arranged on said handle so as to be accessible for manipulation by a finger of the hand of an operator holding said tool by said handle, said handle including a hand grasp portion and a curved portion between said hand grasp portion and said tool, said control being arranged on the under side of said hand grasp portion adjacent said curved portion.

3. A weeding tool comprising a hollow tubular member, a plurality of prongs, one end of each of said prongs being pivotally connected to the lower end of said member, a handle secured to the other end of said member, a cam member having openings through which said prongs extend, a rod connected to said cam member and extending into said tubular member, spring means biasing said cam member toward the free end of said prongs, locking mechanism arranged within said tubular member and cooperable with said rod for holding said cam member adjacent the pivoted end of said prongs when said cam member is moved to such position, movement of said cam member from adjacent the free end of said prongs to adjacent the pivoted end of said prongs being adapted to move the free end of said prongs toward each other, and a releasing trigger for said locking mechanism connected thereto and arranged on said handle so as to be accessible for manipulation by a finger of the hand of an operator holding said tool by said handle.

4. In a weeding tool, a tube having a handle connected to one end thereof, a plurality of prongs, each having a hook portion, the other end of said tube being provided with a series of openings providing means cooperating with the hook portions of said prongs for pivotally supporting the same, a cam plate associated with said prongs and cooperable therewith for moving the same between their closed and open positions, a rod connected to said cam plate and extending into said tube, a spring biasing said cam plate to a position for holding said prongs in their open position, a pivoted shaft locking member having an opening through which said rod extends, the edges of said opening of said shaft lock member through which said rod extends being engageable with said rod for holding the same against movement in one direction responsive to said spring, and a trigger release arranged on said handle and connected to said shaft lock member for moving the same between their closed and open positions, a rod connected to said cam plate and extending into said tube, a spring biasing said cam plate to a position for holding said prongs in their open position, a pivoted shaft locking member having an opening through which said rod extends, the edges of said opening of said shaft lock member through which said rod extends being engageable with said rod for holding the same against movement in one direction responsive to said spring, and a trigger release arranged on said handle and connected to said shaft lock member

for moving the same so as to free said rod therefrom.

5. In a weeding tool, a tube having a handle connected to one end thereof, a plurality of prongs, each having a hook portion, the other end of said tube being provided with a series of openings providing means cooperating with the hook portions of said prongs for pivotally supporting the same, a cam plate associated with said prongs and cooperable therewith for moving the same between their closed and open positions, a rod connected to said cam plate and extending into said tube, a spring biasing said cam plate to a position for holding said prongs in their open position, a pivoted shaft locking member having an opening through which said rod extends, the edges of said opening of said shaft lock member through which said rod extends being engageable with said rod for holding the same against movement in one direction responsive to said spring, a trigger release arranged on said handle and connected to said shaft lock member for moving the same so as to free said rod therefrom, and another spring associated with said rod and forming a resilient stop for limiting the movement thereof responsive to said first-mentioned spring.

6. In a weeding tool comprising a tubular member, tool means associated with one end of said tubular member, a handle member associated with the other end of said tubular member, the end of one of said members being arranged in telescopic relationship with respect to the end of the other of said members, said ends of said members arranged in telescopic relationship being provided with aligned openings, and a bar removably secured in said openings for securing said handle member to said tubular member.

7. In a weeding tool comprising a tubular member, tool means associated with one end of said tubular member, a handle member associated with the other end of said tubular member, the end of one of said members being arranged in telescopic relationship with respect to the end of the other of said members, said ends of said members arranged in telescopic relationship being provided with aligned openings, a bar removably secured in said openings for securing said handle member to said tubular member, said handle member comprising a pair of complementarily shaped members forming a hollow handle, and a control arranged at least partially within said hollow handle and connected to said tool means for operating the same.

8. In a weeding tool comprising a tubular member, tool means associated with one end of said tubular member, a handle member associated with the other end of said tubular member, the end of one of said members being arranged in telescopic relationship with respect to the end of the other of said members, said ends of said members arranged in telescopic relationship being provided with aligned openings, a bar removably secured in said openings for securing said handle member to said tubular member, a rod connected to said tool means and extending through said tubular member, said bar having a resilient part thereof engageable with said rod for holding said bar against accidental displacement.

9. In a weeding tool, a tube having a handle secured to one end thereof, a plurality of prongs secured to the other end thereof, means associated with said prongs and operable for moving the same between their closed and open positions, a rod connected to said means and ex-

tending into said tube, a spring associated with said means and operable for rapidly moving the same so as to move said prongs to their open position and to eject from the prongs material held thereby, locking means associated with said rod and operable for holding said prongs in their closed position, a release for said locking means, and a second spring associated with said rod and cooperable therewith to form a resilient stop for limiting movement of said first-mentioned means responsive to said first-mentioned spring.

10. In a weeding tool, a tube, a bushing arranged in one end thereof, said end of said tube and said bushing being provided with a series of aligned slots, said end of said tube also being

5 provided with a series of openings aligned with said slots, a series of prongs, each of said prongs including a hook portion extending through one of the slots in said tube, one of the slots in said bushing, and through one of said openings in said tube for pivotally securing said prongs to the end of said tube, means cooperable with said prongs for moving the same between their open and closed positions, spring means urging said prongs toward their open positions, and manually releasable means for holding said spring against operation when said prongs are in their closed position.

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