July 5, 1949. R. G. LE TOURNEAU 2,475,146

SUBSURFACE RIPPER

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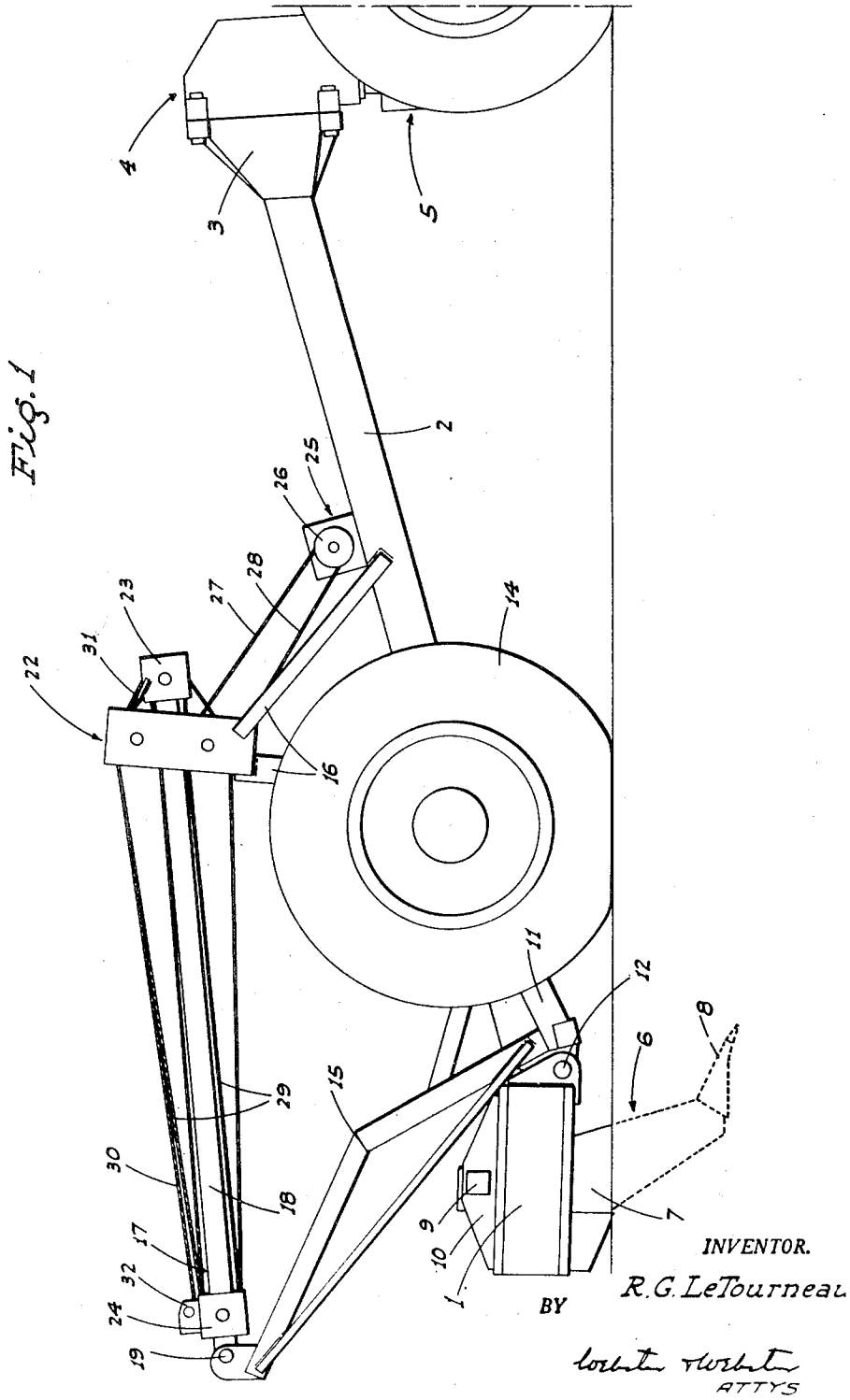


Fig. 1

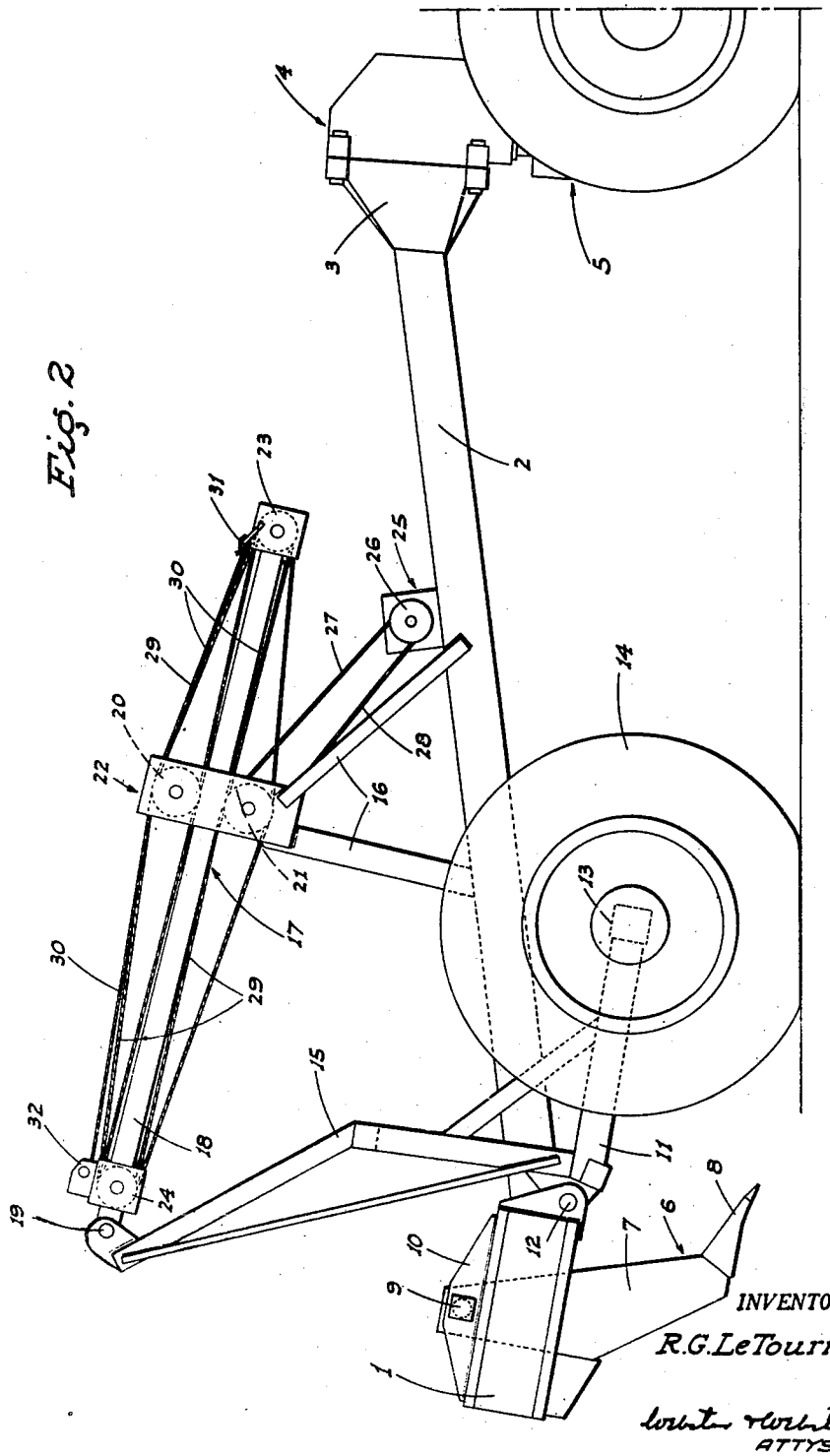
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Fig. 2



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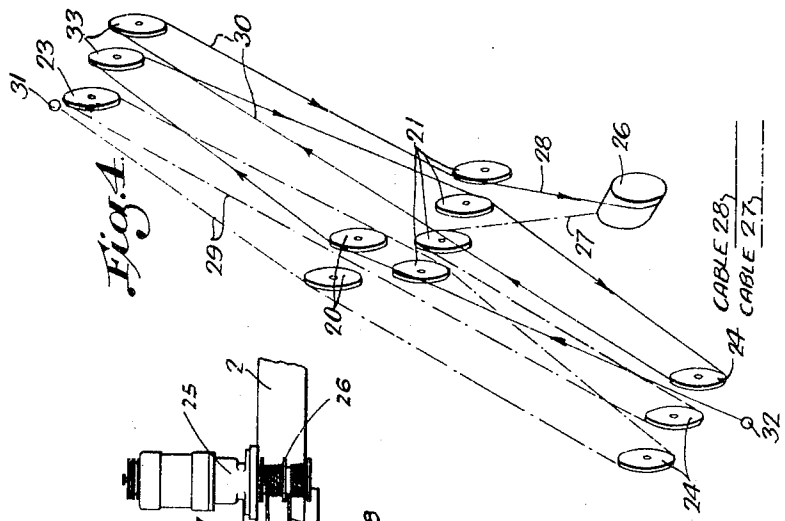


Fig. 4.

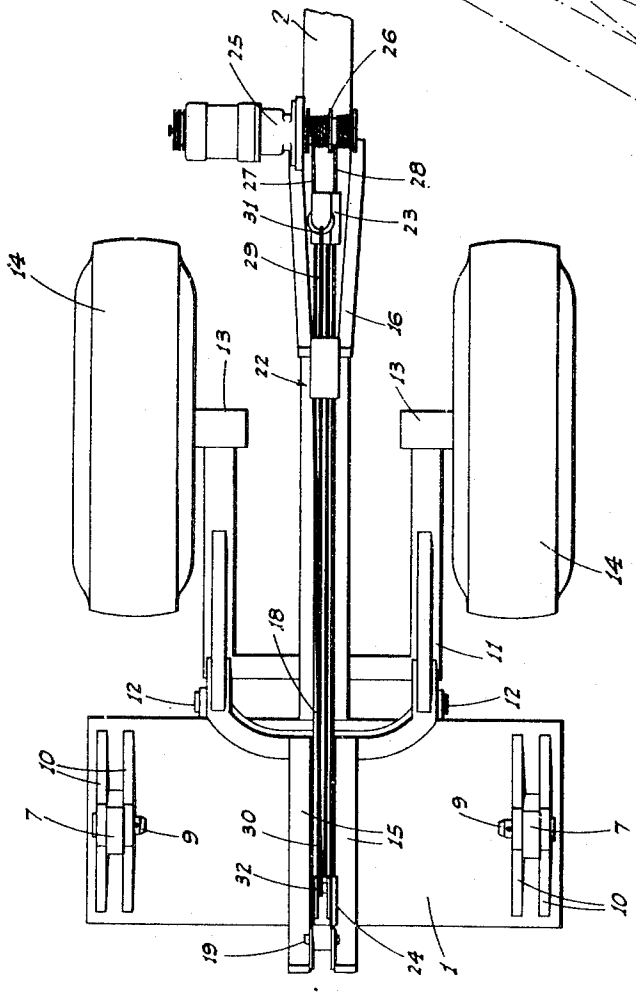


Fig. 3.

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SUBSURFACE RIPPER

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1 Claim. (Cl. 262—8)

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This invention is directed to an improved subsurface ripper of the type used to initially break hard ground, old road surfaces, rocky areas, or the like preliminary to further working thereof by push graders, scrapers, etc.

The ripper is of the type which includes a body having ripper teeth depending therefrom, and body supporting ground engaging wheels which are relatively vertically adjustably mounted whereby to vary the depth of penetration of such teeth; the present invention pertaining in the main to, and it is an object to provide, a novel power actuated control unit for such relative adjustment of the wheels.

Another object of the invention is to provide a ripper control unit, as above, which includes, between the upper body and a movable wheel mount, a novel push bar assembly operative to power actuate said mount and wheels in an up or down direction selectively, whereby to control the working depth of the teeth, or to forcefully withdraw such teeth from the ground.

A further object of the invention is to impart motion to such push bar assembly by means of a pair of opposed cable systems extending between the ends of the push bar and an intermediate multiple sheave block through which such bar extends in supported and guided relation.

An additional object of the present invention is to provide the upper control unit with a reversible electric power winch for the operation of the aforesaid push bar assembly; the two cable systems each including a pull reach, and said reaches being oppositely connected to the winch.

A further object of the invention is to produce a practical device and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claim.

In the drawings:

Figure 1 is a side elevation of a sub-surface ripper, embodying the present invention, in working position.

Figure 2 is a similar view but with the ripper in raised or transport position.

Figure 3 is a plan view of the implement.

Figure 4 is a schematic view showing the cable reeving for operating the push bar of the ripper.

Referring now more particularly to the characters of reference on the drawings, the ripper comprises a rectangular body 1 elongated transversely of the direction of travel, and a central,

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longitudinal draft tongue 2 is fixed to and projects forward from the body. At its front end the draft tongue is adapted for connection to a tractor in any suitable manner, here shown as a head 3 connected to a power steering and coupling unit 4 on the tractor 5.

A plurality of sub-surface ripper teeth, indicated generally at 6, are removably attached to and depend from the body 1; each tooth including a shank 7 and a removable point 8. The shanks extend through guideways in the body and are secured in place by cross pins 9 which are carried by pairs of ear plates 10 between which the upper ends of said shanks are disposed.

A centrally disposed wheel mounting yoke 11, of forwardly opening U shape, is pivoted at the rear, as at 12, to the front of body 1 for relative vertical swinging motion. At its forward end the yoke 11 carries spindles 13 on which heavy duty, pneumatic tired wheels 14 are mounted.

It will be understood that by adjusting yoke 11 and wheels 14 vertically relative to the body 1, the wheels of course remaining in ground engagement, the depth of penetration of teeth 6 into the ground is regulated, or the teeth can be raised clear of the ground for transport of the implement from place to place. Such adjustment is accomplished by a power actuated ripper control unit which comprises the following structural arrangement:

A throw arm structure 15 is fixed to, and upstands from the yoke 11 adjacent the pivotal axis 12, thus forming with the yoke a rigid bell-crank wheel mount.

Some distance ahead of the throw arm structure 15 the draft tongue is provided with a rigid, upstanding post unit 16, and a push bar assembly, indicated generally at 17, is connected between the throw arm structure and post unit; said assembly being constructed and operating as follows:

A push bar 18 is pivoted, as at 19, to the upper end of the throw arm structure and thence extends longitudinally forward over the post unit 16, passing in supported and guided relation between vertically spaced sheaves 20 and 21 of an intermediate multiple sheave block 22.

At its forward and rear ends, on opposite sides of the sheave block 22, the push bar 18 is fitted with a front and a rear sheave block 23 and 24, respectively.

A reversible electric motor driven winch 25, having a double drum 26, is mounted on the tongue 2 ahead of the post unit 16 and with the drum axis disposed transversely of said tongue.

Separate cables 27 and 28 are reversely attached to the drum 26 and thence lead upward to the intermediate sheave block 22. From the sheave block 22 the cables 27 and 28 are reeved back and forth between the sheaves 20 and 21, and the end sheave blocks 23 and 24 in a manner to form opposed block and tackle cable systems, one being indicated at 29 and the other at 30. The manner of such reeving is shown in Fig. 4. The cable 27, after so reeved, is dead ended at 31, and cable 28 is oppositely and adjustably dead ended at 32. Upon operation of winch 25 to cause winding in of cable 27 and simultaneously paying out of cable 28, the cable system 29 shifts the push bar 18 forward effecting relative swinging of the bell crank wheel mount in a direction to cause raising of the teeth from the ground, as in Fig. 2. Operation of the winch in a reverse direction, i. e. to wind in cable 28 and pay out cable 27, shifts the push bar 18 rearward and the wheels relatively rise so that the teeth 6 penetrate the ground as in Fig. 1 and to a selective extent.

The reversible electric winch 25 is interposed in a control circuit (not shown) energized from a generator on the tractor 5 and including a switching unit accessible to the tractor operator; said winch including a normally set, automatically releasable, holding brake which prevents penetration of the teeth into the ground below any adjusted working depth.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claim.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent is desired:

A sub-surface ripper comprising a body carrying ripper teeth, a longitudinal draft tongue fixed to the body substantially centrally of its length and projecting forwardly therefrom, means at the forward end of the tongue for attaching it to a draft vehicle, a substantially U-shaped yoke pivoted at its closed end to the body and the legs of the yoke projecting forwardly on opposite sides of the draft tongue, respectively, a wheel journaled on the outer end of each leg, a throw-arm fixed to the yoke adjacent its pivotal connection with the body and upstanding therefrom, a rigid post fixed on the draft tongue intermediate the ends of the latter, a push bar pivoted to the upper end of the throw arm and extending across the plane of the vertical axis of the post and being there supported for back and forth reciprocating movement, a block and tackle assembly supported on the post and the push bar and including two cables, the cables at one end thereof being respectively dead-ended at opposite ends of the push bar, a reversible power driven winch mounted on the draft tongue, the other ends of said cables being respectively reversely wound on the winch drum and such cables being effective to thrust the push bar in one direction or the other responsive to selective rotation of the winch drum in one direction or the other.

ROBERT GILMORE LE TOURNEAU.

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