Nov. 21, 1950 J. F. FALL 2,530,656

BRUSH RAKE

Filed Feb. 7, 1947 2 Sheets-Sheet 1

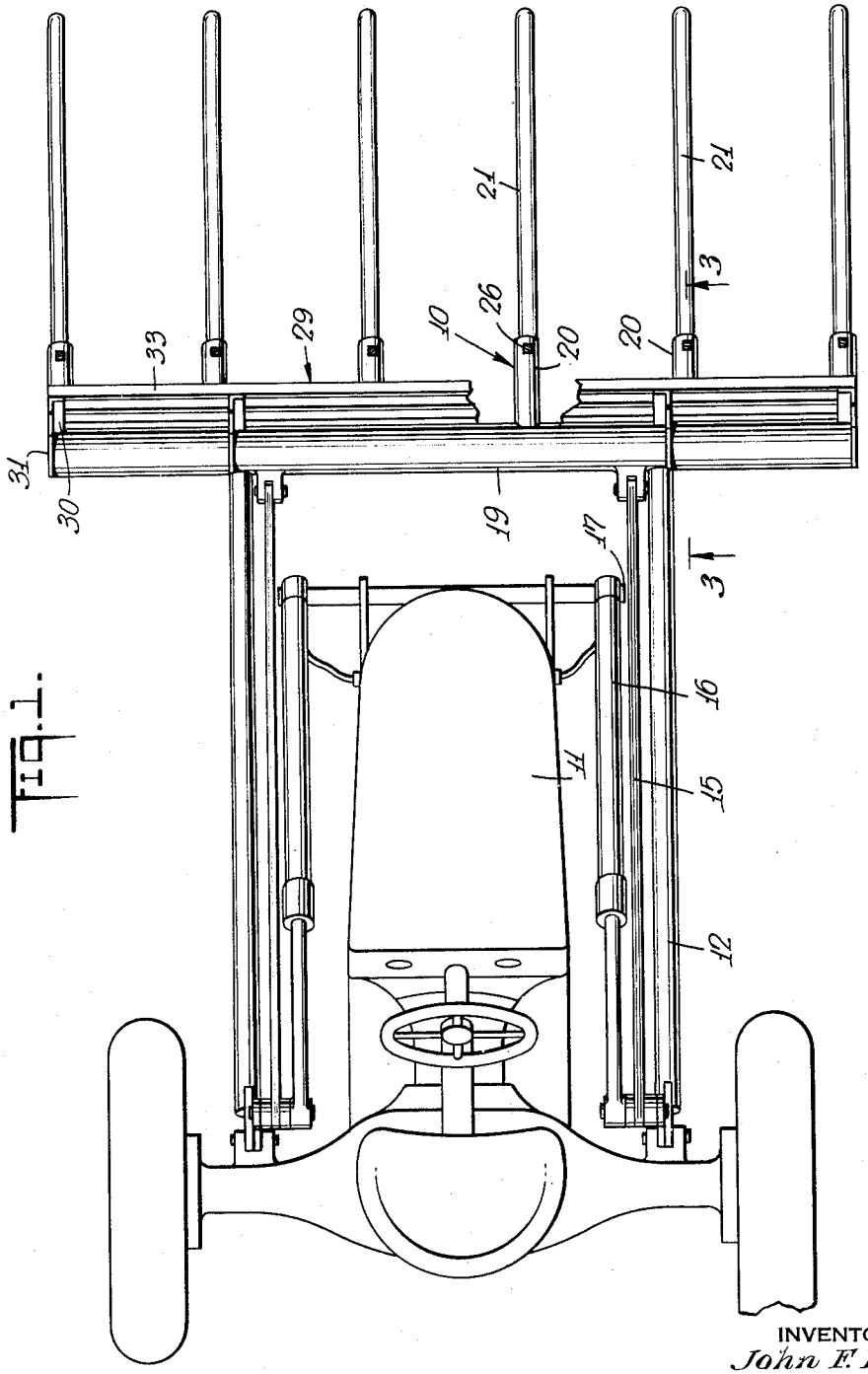


Fig. 1.

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Filed Feb. 7, 1947 2 Sheets-Sheet 2

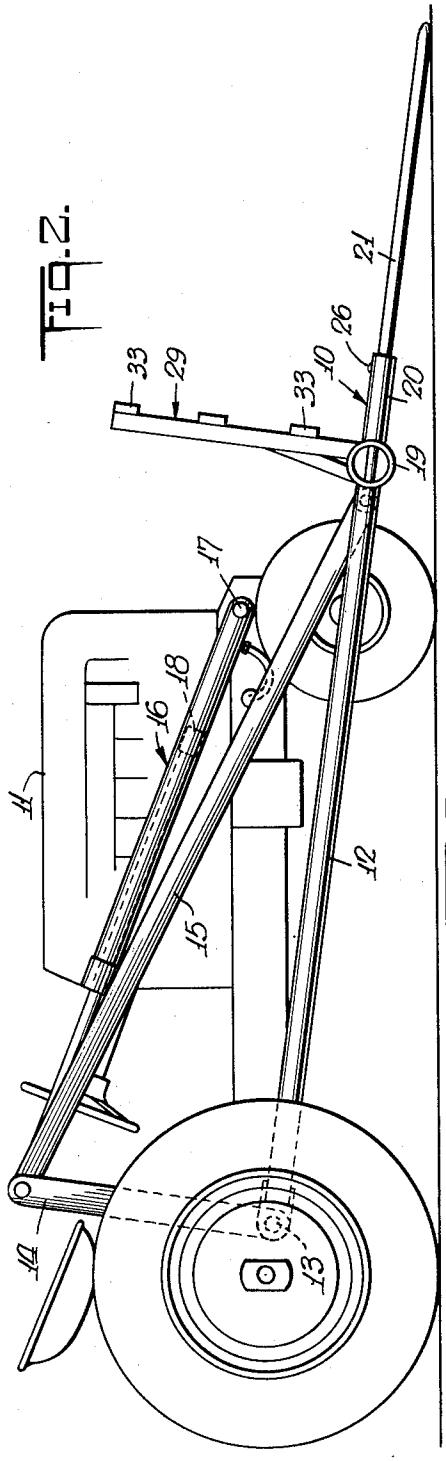


FIG. 2.

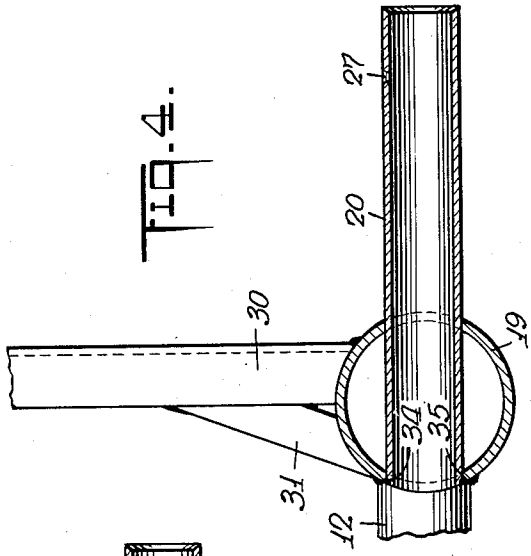


FIG. 4.

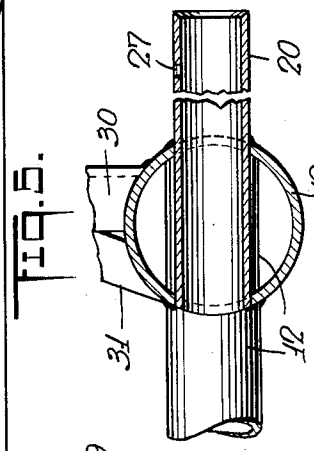


FIG. 5.

FIG. 3.

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UNITED STATES PATENT OFFICE

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BRUSH RAKE

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2 Claims. (Cl. 56—27)

1

My invention relates to loading devices and in particular to an improved brush pusher, buck rake, or the like, for hydraulic or other powered operation from a vehicle.

In presently available devices of the character indicated, construction almost entirely involves the use of such structural members as angle stock, channels, flats, and the like. Due to the high bending moments, torques, and other force factors which must be contemplated in designing these devices, it has been necessary to reinforce all joints by the employement of braces, trusses, etc. The employment of these additional members encumbers the device and presents numerous corners, cracks, and ridges in which brush, hay, or other material to be raked or pushed is prone to catch. It is thus difficult at best, if not impossible, to withdraw rakes of this kind from under a load; and, if withdrawal is possible, the discharged load is frequently strewn over an excessive and undesired area.

It is, accordingly, an object of my invention to provide an improved brush pusher, buck rake, or the like.

It is another object to provide an improved power-operated attachment for use with a tractor or other vehicle.

It is a further object to provide an improved rake construction presenting a minimum number of encumbering elements in which brush, hay, or other material may catch—in other words, it is desired to provide a device which will not foul the material it is pushing or loading.

It is a more specific object to provide an improved tooth construction for a device of the character indicated.

Other objects and various further features of the invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings.

In said drawings:

Fig. 1 is a plan view of a tractor to which a rake incorporating features of the invention has been applied;

Fig. 2 is a side view of the arrangement of Fig. 1, showing the rake in its lowered position;

Fig. 3 is an enlarged sectional view taken substantially in the plane 3—3 of Fig. 1 and illustrating a structural feature of the invention;

Fig. 4 is a view similar to Fig. 3 and illustrating an alternative construction according to the invention; and

Fig. 5 is another view similar to Fig. 3 and

2

illustrating a further embodiment of the invention.

Briefly stated, my invention in the preferred form contemplates a rake or the like construction in which tubular members are employed to sustain substantially all the high torque or bending-moment loads encountered in use of the device. More specifically, the improved construction involves the use of a transversely extending torque-tube frame member, with longitudinally extending supports and tooth members secured thereto. The supports and the tooth members are preferably tubular and intersect opposite sides of the torque tube along lines of intersection which extend over the full peripheries of these members. Welds complete the joints.

Referring to the drawings, my invention is shown in application to a buck rake 10 pivotally supported on a tractor 11 for hydraulic actuation. In the form shown, support for the rake 10 is provided by a triangular system of braces comprising a primary support member 12 pivoted as at 13 to the frame of the tractor 11, an upstanding tie piece 14, and a tension member 15. Hydraulic actuators 16 pivotally engage forward parts 17 of the tractor 11 as well as the point of juncture of the support members 14—15. It will be understood that upon actuation of hydraulic pressure beneath the piston 18 of the actuator 16, the entire rake 10 may be elevated as by rotation about the pivotal suppot 13. The elements which have thus far been described are well known in the art and therefore form no part of the present invention.

In accordance with the invention, the rake 10 is built around a single transversely extending frame member 19 which is preferably tubular. Since the purpose of the member 19 is to absorb large torques and bending-moment loads, it may referred to as a torque tube. Spaced along the torque tube 19 are a plurality of tooth members 20, which at their juncture with the torque tube 19 are preferably also of tubular construction. In the form shown, the tooth members 20 are short sockets of tubular material to replaceably receive teeth 21, which may be of wood or other material.

Although the diameter of the torque tube 19 and the diameters of tooth sockets 20 may bear any desired relation to each other, I prefer that the torque-tube diameter exceed that of the sockets 20. I also prefer that the sockets 20 completely intersect the torque tube 19 so that the line of intersection runs continuously about the

periphery of the sockets 20. Welds 22—23 on this line of intersection serve to complete the joint between the members 19—20, and these welds are preferably substantially continuous about the joint.

The principal support member 12 for the rake 10 is also preferably tubular, at least at the end at which it is secured to the torque tube 19. This supporting joint may be similar to that between the torque tube 19 and the sockets 20 and may be completed as by welds 24—25.

In accordance with a feature of the invention, means are provided for readily attaching and removing teeth 21 inserted in the sockets 20. In the form shown, a nail, screw, or other securing device 26, may be driven through an aperture 27 in the cylindrical shell of the socket 20 to hold an inserted tooth 21 in place. If, as frequently occurs, the tooth 21 should break off so as to render difficult a removal of the remaining stub, I provide means communicating generally diametrically across the torque tube 19 and into the base of the tooth socket 20 for forcibly ejecting the broken tooth stub. In the form shown, a small tube 28, appropriately secured as by welds to the tube 19, provides a suitable guide for properly aligning a rod, spike, or other implement to drive out a tooth 21.

In accordance with another feature of the invention, the rake 10 may be provided with a back 29 so as to perform the functions of a pusher. In the form shown, the back 29 comprises a plurality of upstanding frame members 30, which may be of angle stock suitably cut for juncture with the torque tube 19. The frame members 30 may be trussed as by flats 31, also cut to the curvature of the torque tube 19. I prefer that the spread between the frame members 30 and the truss elements 31 is such that when these members are secured (as by welds 32) to the torque tube 19 they derive their support from substantially diametrically spaced points on the torque tube 19. Transversely extending stringer elements 33, which may be coextensive with the torque tube 19, are secured to the frame member 30 and complete the back or pusher structure of the rake 10.

In accordance with an alternative construction, and referring particularly to Fig. 4, I show how improved support may be provided for the socket members 20 at the expense of cutting holes in the torque tube 19. In the form shown, the socket members 20 are made to span the torque tube 19 so as to intersect both sides thereof. The holes in the torque tube 19 to accommodate this joint are preferably closely cut or drilled, whereby the joint will be tight. In any case, effectiveness of the joint may be assured by employment of appropriate welds 34–35 at one or both of the intersections with the torque tube 19.

In accordance with another alternative construction (see Fig. 5), and for utmost rigidity of the entire assembly, the principal support member 12 may also be caused to intersect both sides of the torque tube 19 and may be welded thereto. This joint may be similar in all respects to that described above in Fig. 4, between a tooth socket 20 and the torque tube 19. It will be noted

that in either of the arrangements of Figs. 4 or 5, ready access is available to permit forcible dislodgment of stuck rake teeth.

It will be understood that I have described a relatively simple rake or pusher construction that is inherently capable of withstanding high stresses and torques. For a capacity equal to those of conventional rakes and pushers, my construction may be relatively light in weight. Since the device is light and presents no snagging edges for brush, hay, or the like to catch upon, it may be employed with greater ease and effectiveness than is possible with existing devices. Provision for easy access to the base of each tooth socket eliminates much wasted time in dislodging broken and stuck teeth—thus further increasing the efficiency of the attachment.

Although I have described my invention in detail for the preferred forms shown, it will be understood that modifications may be made within the scope of the invention as defined in the claims which follow.

I claim:

1. In a rake of the character indicated, a pair of transversely spaced tubular support members for pivotal attachment at one end to a vehicle, a transversely extending torque-tube frame member of diameter larger than the diameter of said support members, said torque-tube frame member having transversely spaced pairs of diametrically opposed openings, said support members each engaging separate pairs of openings and being welded to said torque-tube frame member at said openings, and a plurality of tooth-socket members of tubular material of a diameter less than the diameter of said torque-tube frame member and each engaging further separate pairs of said openings and being welded to said torque-tube frame member at said openings, said tubular tooth-socket members and said tubular support members facing in generally opposite longitudinal directions away from said torque-tube frame member, whereby said torque-tube frame member may lock said tooth members against rotation relatively to said tubular support members, so that a rigid rake framework may be elevated by pivoting from points longitudinally spaced from said torque-tube frame member.

2. A rake according to claim 1, in which a transversely extending rigid backing framework is secured to said torque-tube frame member and extends upwardly of the general plane of said tubular members.

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