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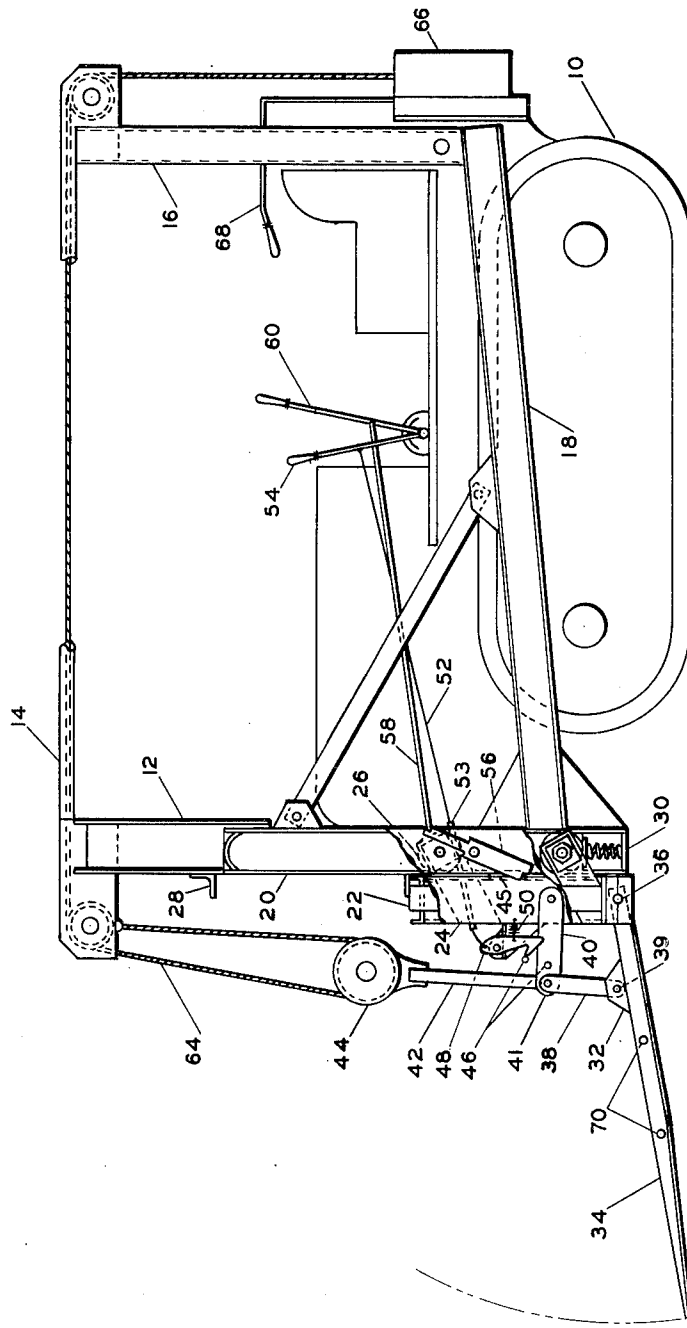
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2,658,638

WOOD GATHERING APPARATUS

Filed Feb. 18, 1949

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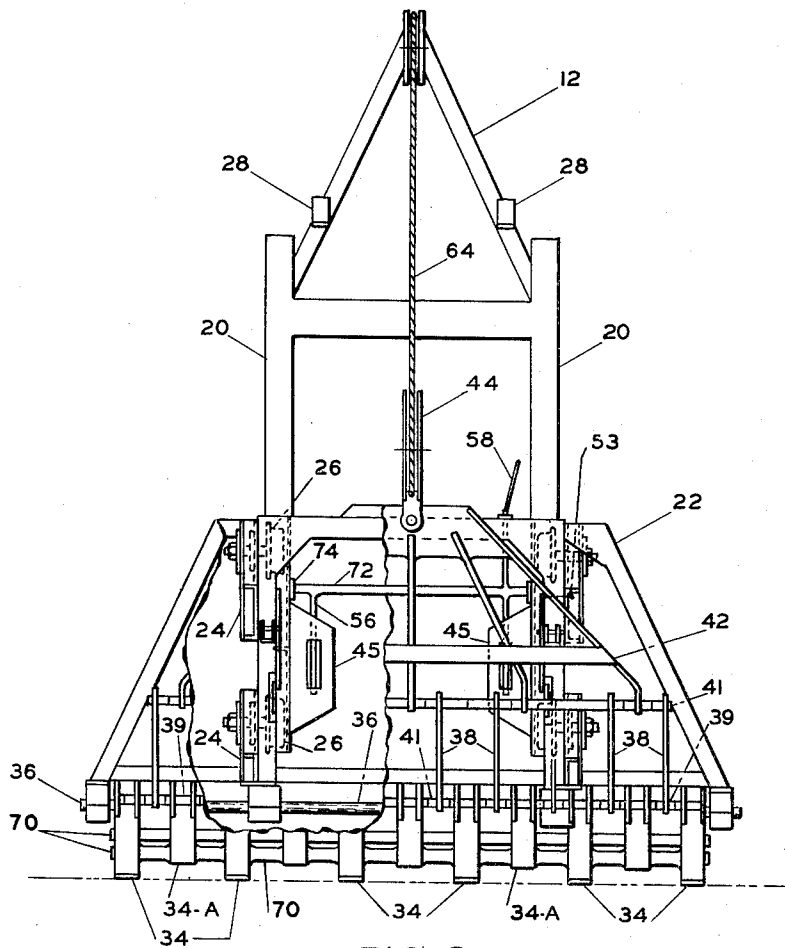


FIG. 2

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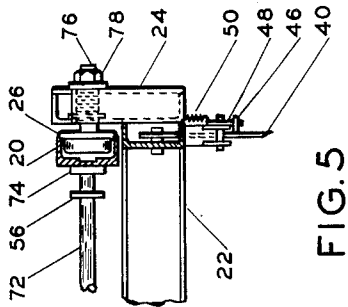
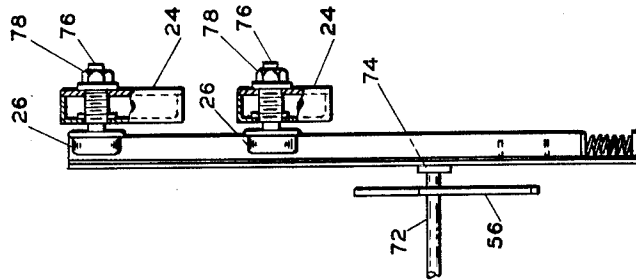
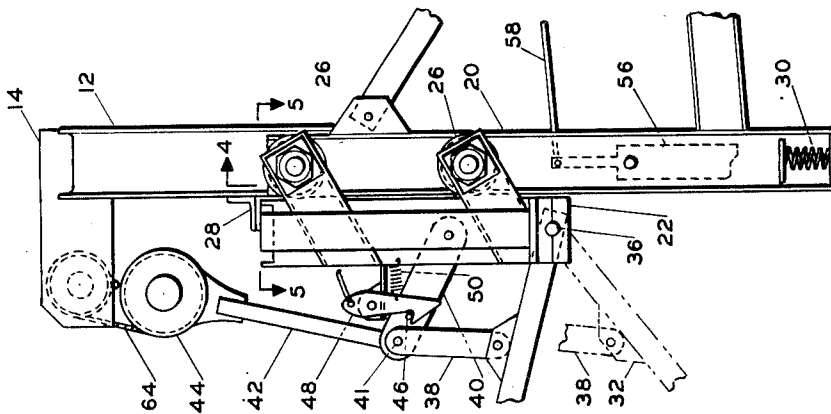
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WOOD GATHERING APPARATUS

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2 Claims. (Cl. 214-706)

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This invention relates to material handling vehicles of the elevator type, and more particularly to a vehicle capable of gathering widely distributed wood stumps and trunks lying loose on the ground or only partly buried, transporting them to a depot, and discharging them.

The economical gathering of widely scattered resinous pine wood for extraction of rosin therefrom has always presented a problem, particularly in rough terrain. Gathering by hand has been limited to smaller pieces and the occasional large pieces have been reduced in size and then removed by hand or they have been marked for removal by bulldozers. This type of gathering has necessitated a duplication of effort in locating and gathering wood in thickets, brush, and swampy land. There has been a need in the art of a more efficient apparatus capable of gathering both large and small pieces of wood in a single tour of the terrain.

It is, therefore, an object of this invention to provide an improved wood-gathering apparatus capable of gathering wood of varied sizes in a single load, transporting them to a central location, and discharging the load in a pile.

It is a further object to provide a wood-gathering apparatus that can be used in rough terrain covered with brush and thickets.

It is a still further object to provide a wood-gathering apparatus that is capable of rooting out wood covered by loose soil.

It is a still further object to provide a wood-gathering apparatus capable of lifting loads which extend beyond the confines of the apparatus above the brush and undergrowth and transporting the load freely thereover.

Other objects will be apparent to those skilled in the art from the following description taken in connection with the accompanying drawings wherein:

Fig. 1 is a side elevation of the apparatus in load-gathering position.

Fig. 2 is an end elevation view of the apparatus in load-gathering position viewed from the front.

Fig. 3 is a side elevation of the apparatus in load-transporting and in broken lines in load-releasing position.

Fig. 4 is a section on the line 4-4 of Fig. 3 viewed from the front.

Fig. 5 is a section on the line 5-5 of Fig. 3 viewed from above.

In Fig. 1 is illustrated a power driven transport vehicle 10 having mounted thereon a framework comprising the rigid supporting members 12, 14, 16, and 18 to which is rigidly attached a pair of

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vertical channel members or guide rails 20 forming the front part of said framework. Positioned vertically in front of guide rails 20 is a carriage 22 having brackets 24 carrying antifriction rollers 26 which are mounted between the vertical guide rails 20 to provide a means whereby the carriage 22 is confined in movement to vertical motion along the vertical guide rails 20. Carriage 22 is normally free to move along a vertical path from the uppermost end of the guide rails 20 which is provided with stops or limiting brackets 28 to the lowermost end of the guide rails 20 which is provided with shock absorbers or springs 30 which normally carry most of the weight of the carriage 22. To the carriage 22 at the lower end thereof is pivotally attached the rear end of a fork 32 having a plurality of tines 34 joined together by the tie rods 70. The fork normally is free to swing about the pivot shaft 36 through a vertical plane from a load-supporting position to a load-releasing position and the combination of the fork 32 and the carriage 22 forms a load-lifting cradle when the fork 32 is in load-supporting, substantially horizontal or slightly upwardly tilted position with respect to the carriage 22. A plurality of vertical links 38 is hingedly attached to the fork 32 by a shaft 39, and a pair of horizontal links 40 is hingedly attached to the carriage 22. Links 38 and 40 are hingedly connected by means of a common shaft 41 to hoist yoke 42 which in turn is attached to hoist block 44 to provide a means for moving the fork 32 through the various swinging positions about pivot shaft 36. Each horizontal link 40 is hingedly attached to carriage 22 and is provided with a catch pin 46, and the carriage 22 is provided with a hingedly attached hooklike detent 48 so positioned that detent 48 is capable of holding catch pin 46 and thereby locking fork 32 in load-supporting position so as to form a cradle with carriage 22. Detent 48 is provided with a spring 50 normally urging the detent 48 out of catch-engaging position and a cable 52 leading through spool piece 53 to lever 54 is provided for hand operation for urging the detent 48 into catch-engaging position.

A detent 56 in the form of a heavy bar is pivotally attached to guide rails 20 so as to be free to swing when urged and to normally hang vertically and is attached at one end to a rigid shaft 58 which leads to a hand-operated lever 60 whereby the detent 56 may be pivoted into a position to engage a slotted plate 45 integral with the carriage 22 to prevent upward movement of carriage 22.

Lifting action is applied to the fork 32 by power applied to cable 64 attached to hoist block 44, said power being derived from a power take off unit 66 of the power driven vehicle 10 which has the usual control devices including a lock and a clutch, the clutch manipulating handle 68 being accessible to the vehicle operator.

Fig. 2 shows a front view of the apparatus with the fork in lowered position as in Fig. 1. This figure is intended to give added detail of the front end of the apparatus. It shows the plurality of tines 34 joined together by horizontal tie rods 70 and short tines 34a ending at the foremost tie rod 70 to form a fork 32. The tines 34 are pivotally attached to carriage 22 by means of pivot shaft 36. The combination of the long tines 34 and the short tines 34a joined rigidly by tie rods 70 forms a fork 32 which pivots about shaft 36 as a unit. The combination of the plurality of vertical links 38 and the yoke 42 forms a protective framework for carriage 22 and in combination with the fork 32 forms a cradle.

The cutaway section of Fig. 2 shows the detail of a portion of the elevator and cradle-locking mechanism. In this section part of yoke 42, vertical links 38, shafts 39 and 41, to which links 38 are connected, and part of the tines 34 and 34a are removed. In this manner, pivot shaft 36, about which the fork 32 pivots, is made visible. The arrangement of the carriage rollers 26 and their relationship to the carriage 22 and the guide rails 20 is also brought out more clearly. The slotted plate 45 is integrally attached to the carriage 22 in such a position that locking bar 56 can catch in the slot when the carriage 22 is in lowered position. A locking bar 56 and a slotted plate 45 are provided on each side of carriage 22 and both bars 56 are integrally connected to a common rod 72 pivotally supported in recesses 74 in the framework of guide rails 20. An extension of one locking bar 56 is connected to actuating shaft 58.

Fig. 3 shows the relationship between the fork and carriage in load-holding and load-releasing position. In this view the carriage 22 is shown at the uppermost position in the guide rails 20 abutting the limiting bracket 28. The solid lines show the detent 48 in the position engaging catch pin 46 of horizontal link 40 and thereby holding the fork 32 in cradle-forming position. The broken lines show the fork 32 in load-releasing position. The locking bar 56 is shown hanging vertically in a position which allows the carriage to rise from lowered to elevated position when urged by hoist block 44. This view also shows the carriage 22 in close proximity to the guide rails 20. Sliding contact is eliminated by the rollers 26 contacting the walls of guide rails 20.

Further detail of the relationship of the rollers 26 of carriage 22 and the guide rails 20 in which they travel is presented in Fig. 4 which is a section 4-4 taken from Fig. 3. Only one guide rail and one set of rollers are shown. The other is of substantially the same construction. The rollers 26 are fastened by bolt 76 and nut 78 to the carriage brackets 24. The rollers are preferably of the ball-bearing type and are of such a size as to contact only one wall of the guide rail at a time. The locking bar 56 and the pivot bar 72 to which it is rigidly fixed are also shown. The end of the pivot bar 72 is pivoted in recess 74 so as to swing freely.

Fig. 5 gives more detail of section 5-5 taken from Fig. 3 to show the relationship between carriage 22, the rollers 26 attached thereto by 75

means of brackets 24, and the guide rails 20. This figure also shows the carriage locking bar 56 and the pivot shaft 72 and the recess 74 in which the shaft pivots. It also shows the detent 48 for engaging catch 46 of the horizontal link 40 to hold the fork in raised position and the detent spring 50 and the construction of the bracket by which it is pivotally attached to the carriage 22.

The apparatus is shown in Fig. 1 in normal wood-gathering position with the carriage 22 in lowered position and the tines 34 pointed downwardly at or below ground level. The tractor is driven toward a stump or log and the tines 34 are forced underneath so that the stump or log slides up on the fork at least part way toward carriage 22. The carriage 22 is locked in down position by operation of lever 60 to urge detent 56 into a position engaging slotted plate 45 of carriage 22 to prevent upward movement of the carriage 22. With a stump on the tip of the fork, power is applied to hoist block 44 by operation of clutch handle 68 so as to give a quick motion thereto. This motion is transmitted to the fork 32 through the hoist yoke 42 and coupling link 38 so that the tines 34 rise quickly in such a manner that the stump is flipped or slides back against the hoist yoke 42. The carriage 22 is prevented by detent 56 from rising during this operation and the spring 30 absorb the shock of the flipping action. With the fork 32 in the raised position resulting from the upward urging of the hoist, the detent 48 may be urged into catch-engaging position with respect to catch pin 46 to lock the fork in this position thereby forming a cradle. Normally the lock is not engaged until a full load is obtained, and the fork, with a partial load positioned on the back part of fork 32 near the yoke 42, is again lowered. By repeating the gathering action described above, more wood may be flipped back into the cradle formed by the fork 32 and carriage 22. When a full load is obtained, the fork 32 is locked by detent 48 and catch pin 46 in cradle-forming position, detent 56 is released by operation of lever 54 and is swung into its normal vertical position, leaving carriage 22 free to rise when urged. Power applied to hoist block 44 then urges the fork and carriage upwardly as a unit and the load may then be lifted well above the terrain and brush and small trees thereon so that the vehicle may carry the load over obstructions to a depot where the load may be discharged.

In Fig. 3 is shown the apparatus in elevated load-carrying position just described. In this position the cradle may be held in raised position by a locking mechanism in the power take off unit 66 to prevent upward or downward motion of the hoist. Similarly a locking device may be applied to the carriage to hold it in elevated position but such an auxiliary locking device has not been found necessary and is not shown in the drawings.

In releasing the load at the depot, the cradle is urged upward so that detent 48 may be allowed to release itself by the urging of spring 50. The upward urging of hoist 44 by the power take off is then diminished and the hoist block 44 is lowered slightly so that the weight of the load on the tines of fork 32 causes the tines to tilt downwardly independently of the carriage 22. The relationship of the carriage 22 and fork 32 in the load-releasing position is shown in broken lines of Fig. 2. After the load has slid off the

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fork 32, the fork may again be drawn into cradle-forming position and the cradle may then be lowered by gradual release of power applied to hoist 44 until the cradle drops to a position in which it rests on supporting springs 39. While traveling in search of wood, the cradle may be either in the raised position of Fig. 2 or in the lowered position of Fig. 1. A suitable traveling position is that in which the carriage is in lowered position of Fig. 1 but with the tines locked in cradle-forming position by detent 43.

It is particularly pointed out here that the success in the operation of this particular apparatus lies in its ability to flip wood, loosely held by the fork, farther back on the fork so that an accumulated load can be gathered. To one skilled in the art, many modifications in construction will suggest themselves without departing from the spirit and scope of the claims of this invention.

What I claim and desire to protect by Letters Patent is:

1. In an elevator-type material handling vehicle, the combination of an elevator carriage having a fork pivotally attached thereto and vertically swingable with respect thereto between load-supporting and load-releasing positions and forming, when in load-supporting position, a lifting cradle capable of vertical motion as a unit, manually releasable detent means for locking said carriage in lowered position, means for actuating said detent means, lifting means acting on said fork for urging said carriage upwardly and for imparting upwardly swinging motion to said fork to form a cradle while said carriage is locked in lowered position, a releasable catch for locking said fork in cradle-forming position with respect to said carriage and means for actuating said catch.

2. A material handling machine comprising a vehicle, a supporting framework having a pair of vertically disposed guide rails, a carriage mounted for vertical movement along said guide rails, a lifting fork pivotally mounted on said carriage for vertically swinging motion between load-supporting and load-releasing positions, manually releasable detent means for locking said carriage in lowered position, means for actuating said detent means, lifting means acting directly on said fork and indirectly on said carriage for urging said carriage upwardly and for imparting upwardly swinging motion to said fork to form a cradle while said carriage is locked in lowered position, control means for maintaining said fork in material-supporting position and means for actuating said last-mentioned means.

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