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E. M. WETMORE

CARRIER FOR MOUNTING HAMMER MILLS AND THE LIKE ON TRACTORS

2,659,447

Filed June 29, 1950

2 Sheets-Sheet 1

Fig. 1.

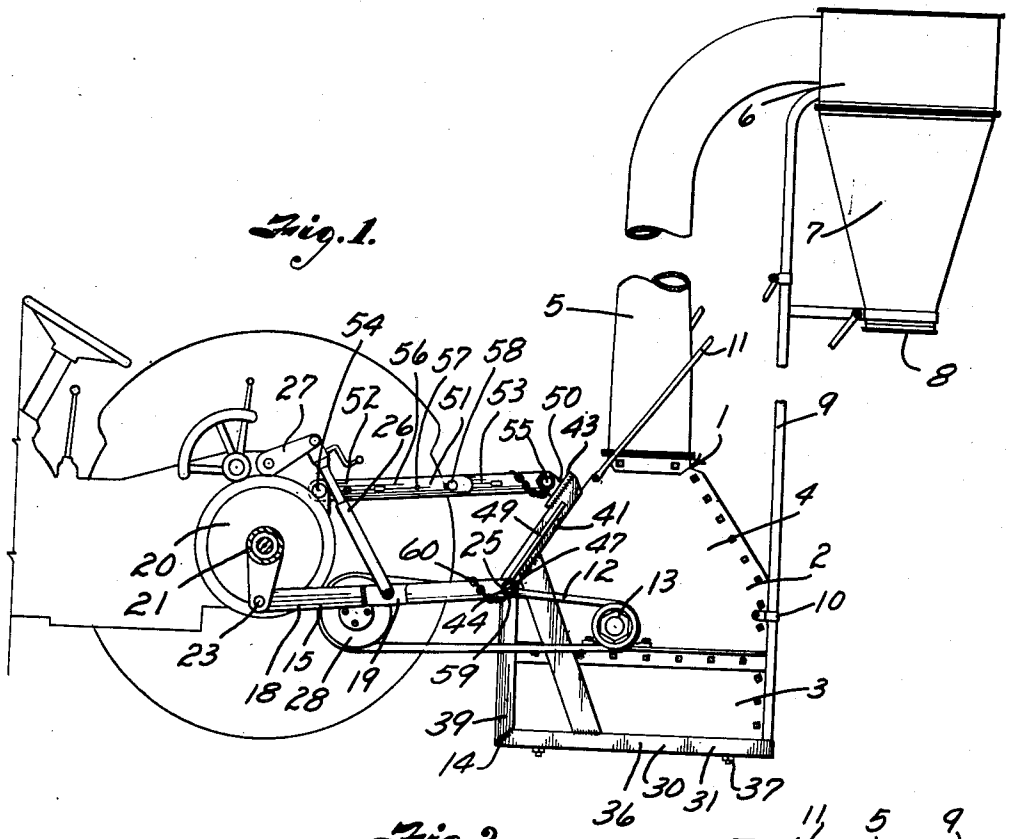
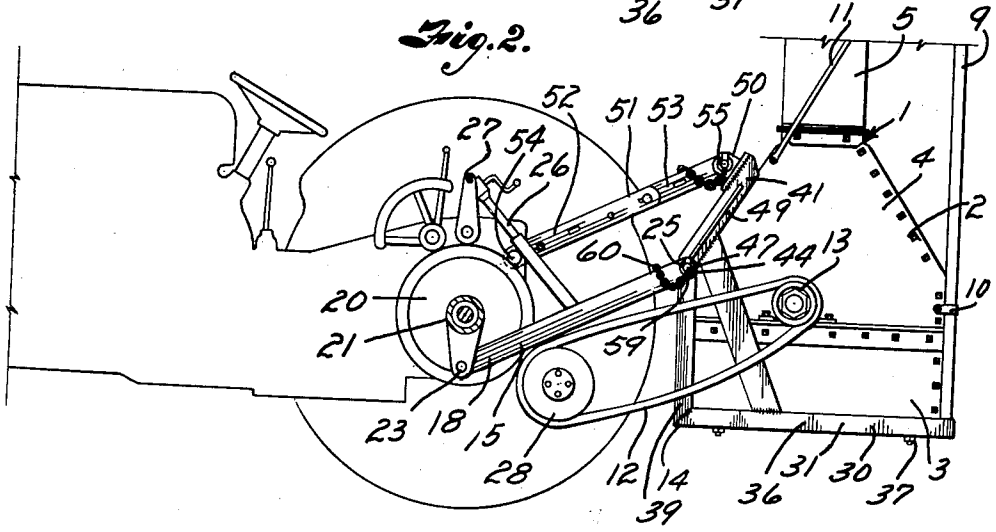


Fig. 2.



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Fig. 3.

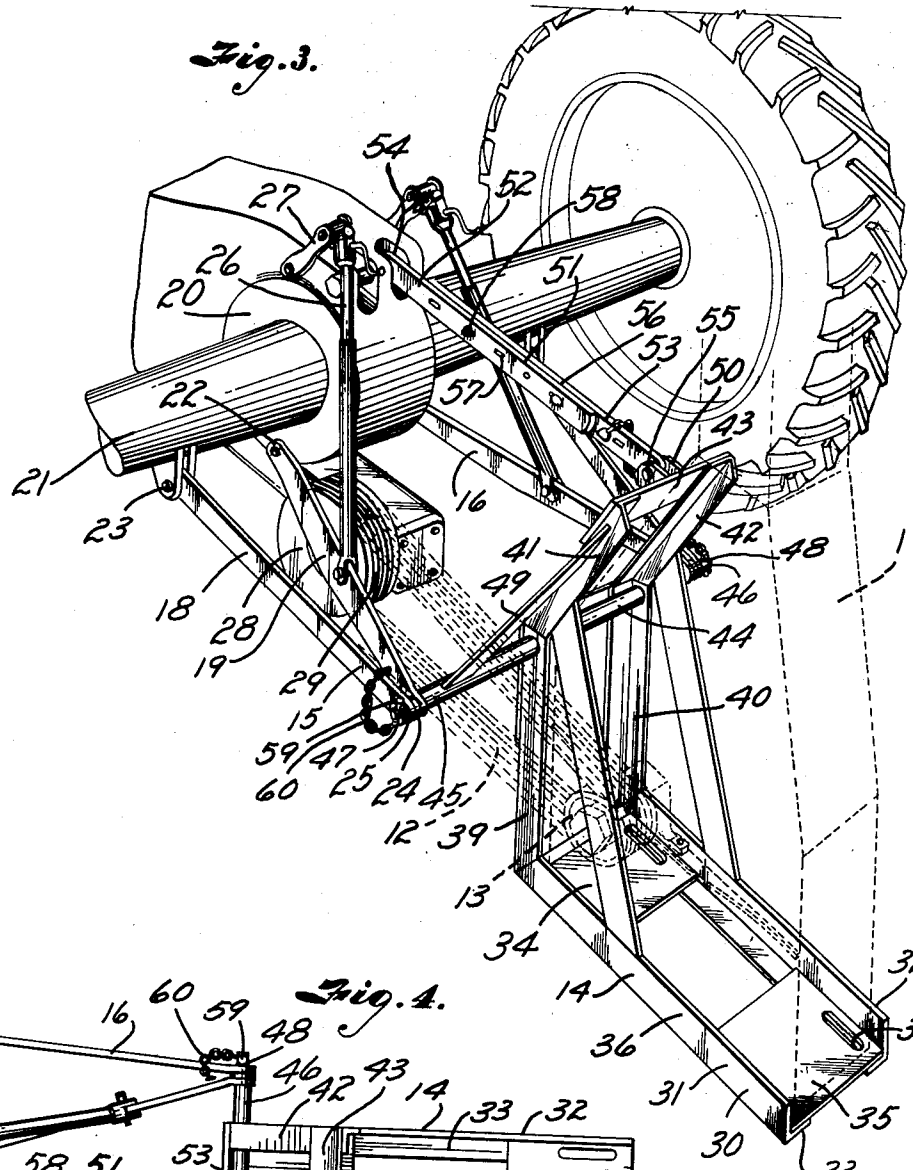
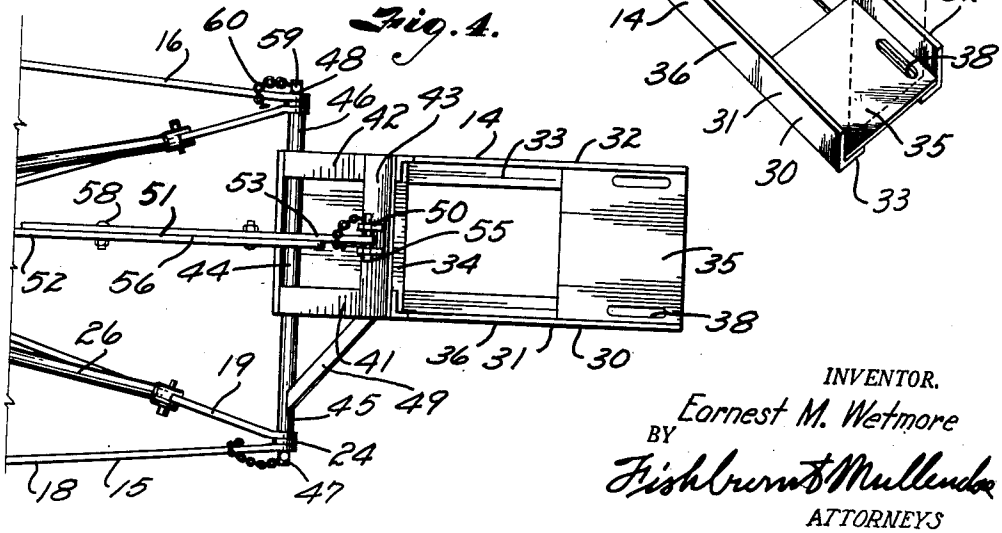


Fig. 4.



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CARRIER FOR MOUNTING HAMMER MILLS AND THE LIKE ON TRACTORS

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2 Claims. (Cl. 180—53)

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This invention relates to a carrier or transport for grinding mills and has for its principal object to provide a device of this type that is adapted for support by the hydraulic lift mechanism of a tractor and whereby the grinding mill may be readily transported from one site to another or may be transported along a shock row with a wagon trailed behind the tractor and the mill discharging ground feed into the wagon.

It is also an object of the invention to provide a carrier or mill support in connection with the lift mechanism of a tractor for maintaining fixed centers between the power take-off pulley of the tractor and the driving pulley of the mill when the mill is in operation.

Another object of the invention is to provide a driving belt connection between the power take-off of the tractor and the grinder which is automatically tensioned when the mill is lowered for use and the tension relieved when the mill is raised for transportation.

Further objects of the invention are to provide a mill carrying attachment for tractors which is of simple construction and readily connected with the hydraulic lifting mechanism of a conventional tractor.

In accomplishing these and other objects of the invention hereinafter described, I have provided improved structure the preferred form of which is illustrated in the accompanying drawings wherein:

Fig. 1 is a side elevation of the rear portion of a tractor with the rear wheel removed and illustrating a grinding mill carrier supported by the hydraulic lifting mechanism of the tractor, the carrier being shown in lowered or mill operating position.

Fig. 2 is a similar view, but showing the carrier and mill supported thereby in raised position.

Fig. 3 is a fragmentary perspective view of the rear portion of the tractor and carrier with the grinding mill and driving belt shown in dotted lines.

Fig. 4 is a plan view of the carrier before the mill is mounted thereon.

Referring more in detail to the drawings:

1 designates a conventional grinding mill including a housing 2 having a substantially rectangular base portion 3 and an upper portion 4 connected with a discharge pipe 5 that empties into a cyclone separator 6 wherein the air generated by the mill is separated from the ground material, the ground material gravitating into the cone-like bottom 7 of the separator for discharge through an outlet 8.

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The cyclone separator is supported from the housing of the grinding mill by a vertical frame 9 that is attached by brackets 10 to the body portion of the mill and retained in vertical position by brace rods 11.

The structure thus far described is conventional of any type hammer mill and specifically forms no part of the present invention. Such mills have become very popular for farm use, but when it becomes necessary to transport a grinding mill from one grinding site to another, it is difficult to load and transport in a truck or similar conveyance. It is also necessary that the grinding mill be staked in fixed position on the ground in order to maintain tightness of the driving belts 12 which operate over the driving pulley 13 of the mill. Another difficulty is that when the driving pulley of the mill is actuated by a tractor or other power unit, the power unit must be chocked to maintain tension on the driving belt.

In carrying out the present invention, I have overcome these difficulties by providing a carrier 14 for the grinding mill and which is adapted for connection with the hydraulically actuated lifting arms 15 and 16 of a tractor whereby the mill may be conveniently transported from place to place and driven from the power take-off of the tractor.

The arms 15 and 16 are the usual tractor equipment and each arm includes a pair of rearwardly converging bars 18 and 19 that are respectfully pivoted to the differential housing 20 and axle housing 21 of the tractor as indicated at 22 and 23. The rear ends of the bars carry a ball joint 24 having universal mounting by the arms and provided with a transverse bearing opening 25 for a purpose later described. The inner bar 19 of each arm is connected by adjustable links 26 with the hydraulically actuated arms 27 of the tractor as shown in Fig. 3.

Both lifting arms and the actuated mechanism therefor are of identical construction and corresponding numbers may be applied to the arms and lifting mechanism on either side of the tractor.

The tractor also includes a power take-off pulley 28 which in the present instance has a plurality of circumferential grooves 29 for accommodating the belts 12 for driving the pulley 13 of the grinding mill.

The parts of the tractor just described are generally conventional to the "Ford," "Ferguson" and "Jeep" tractors now being manufactured and which are extensively used in the farming industry.

The carrier 14 includes a substantially rectangular base frame 30 having side rails 31 and 32 comprising angle bars arranged with one of their flanges 33 extending inwardly to form support for transverse plates 34 and 35 at the respective ends of the frame, while the other flanges 36 of the angle bars extend upwardly to cooperate with the plates 34 and 35, in forming the way in which the base portion of the grinding mill is seated and secured by fastening devices 37 that extend through adjustment slots 38 in the plates 34 and 35 and through a part of the mill housing whereby the mill is adjustably anchored to the base frame and prevented from lateral movement by the flanges 36. Connected with and extending upwardly from the forward ends of the base frame are arms 39 and 40 which are also of angle cross section to provide upper continuations of the flanges of the base angle. The flanges of the angle extensions engage the corners at the forward side of the mill housing to further stabilize the mill on the base frame.

The vertical arms have upper terminals 41 and 42 that extend over the upper portion of the mill housing and are inter-connected by a cross member 43. Carried by the arms 39 and 40 is a transverse bar 44 having projecting ends 45 and 46 carrying pintles 47 and 48 which are journaled in the bearing openings 25 of the joint members 24. Owing to the fact that the pulley 13 of the mill must align with the pulley 23 of the tractor, the carrier frame is offset laterally of the center line of the tractor as best shown in Fig. 4, and a brace arm 49 is provided between the longer end of the shaft and the upper end of the adjacent arm as shown in Fig. 3.

The cross bar 43 has forwardly extending ears 50 for connecting a link or tie bar 51 which cooperates with the lifting arms 15 and 16 to support the carrier frame. The link 51 includes a pair of bar like members 52 and 53, one of which has piovtal connection with the tractor, as at 54 and the other with the ears 50 by a cross pin 55. The lapping portions 56 of the bars have a series of apertures 57 for passing fastening devices 58 to secure the bars together and for effecting adjustment of the length of the connection, relatively to the lifting arms 15 and 16.

In attaching the carrier to a tractor, the pintles 47 and 48 on the ends of the shaft 44 are mounted in the bearing openings 25 of the joints 24 wherein they are retained by captive pins 59 that are carried by chains 60 attached to the respective arms and which pins are inserted through transverse openings in the projecting ends of the pintles as shown in Fig. 3. When the carrier frame is resting on the ground the link 51 is adjusted for length and connected with the ears 50 by means of the pin 55. The grinding mill is seated on the plates 34 and 35 of the base frame of the carrier and secured by the fastening devices 37 that are inserted through the slot like openings in the respective plates. The frame is then raised to shorten the distance between the pulleys so the belts may be easily applied after which the mill is adjusted within the carrier frame to give the proper driving tension on the belts when the carrier frame is resting upon the ground or slightly thereabove.

When the mill is to be transported from one location to another, the hydraulic mechanism of the tractor is actuated to raise the arms 27 which raise the arms 15 and 16 through the links 26. Simultaneously the connecting link 51 pivots so as to maintain the mill in substantially horizontal position as it is lifted from the ground. When the mill is in raised position tension is relieved from the belts in that the distance between the centers of the pulleys is shortened incidental to the changing position and relative lengths of the lifting levers. When the new location is reached, the hydraulic mechanism is reversed so that the carrier frame is again lowered on the ground which automatically retightens the driving belts.

From the foregoing, it is obvious that the carrier has many advantages over the conventional method of transporting such mills. First, the distance between the centers of the pulleys is fixed and no staking or bolting down of the mill or chocking of the tractor is necessary. Therefore, the belts are always in alignment and sufficiently tight for efficient operation of the grinding mill.

Second, the grinding mill may be transported and set down to complete a grinding job after which it may be immediately picked up and removed to another location where it can be set down to start grinding. The tractor carrying the mill may also be backed up into drive ways or bins and the mill may be operated off of the ground, so that it may be carried along the shock row or row or bundles with a wagon trailing the tractor and the mill discharging ground feed into the wagon.

Third, the belts are readily removed by lifting the mill to a high position. The belts are then sufficiently slack so that they may be lifted off of the pulleys. This is important in disconnecting the carrier, since the belts may be first readily removed and then the carrier lowered to the ground position where the lifting arms and connecting link may be readily disconnected after which the tractor is pulled away from the carrier.

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

1. A carrier adapted for attachment to a tractor for mounting a grinding mill having a rectangular base and a laterally extending driving pulley above a longer side of the base, said tractor having a drive pulley rotatable on a transverse axis and having spaced lower connections and an upper connection for attachment of the carrier and having lift arms for raising the carrier, said carrier including a base frame conforming to the base of the mill and having longitudinal angle members extending in the direction of movement of the tractor and arranged with one of their flanges in horizontal position with their other flanges vertical to receive the base of the mill therebetween with said vertical flanges engaging the longer sides of the base of the mill and providing guides between which the mill is adapted to be moved to and from the drive pulley of the tractor, said base frame of the carrier also having transverse plates connecting forward and rear ends of the horizontal flanges, upright members fixed to the forward ends of the longitudinal members of the base frame at front corners of the mill, a cross member connecting upper ends of the upright members, arms extending laterally and outwardly from the upright members intermediate the height thereof, links having ends pivotally connected with outer ends of said lateral arms and opposite ends adapted for pivotal connection with said lower connections on the tractor, means connecting the links with the lift arms of the tractor, a link having one end pivotally connected with the cross member and

having the other end adapted for pivotal connection with the upper connection of the tractor whereby the links and lifting arms support the carrier from the tractor when the base frame of the carrier is raised from the ground upon operation of the lift arms, a belt connecting the pulleys, said transverse plates having longitudinal slots, and fastening devices extending through said slots and connected with the base of the mill to adjustably anchor the base of the mill between the vertical flanges to provide driving contact of the belt with the pulleys when the base frame of the carrier is resting upon the ground.

2. A carrier adapted for attachment to a tractor for mounting a grinding mill having a rectangular base and a laterally extending driving pulley above a longer side of the base, said grinding mill having ends substantially vertical with the ends terminating in converging portions, said tractor having a drive pulley rotatable on a transverse axis and said tractor having spaced lower connections and a rearwardly positioned upper connection for the attachment of the carrier and having lift arms, said carrier including a base frame conforming to the base of the mill and having longitudinal angle members extending in the direction of movement of the tractor and arranged with one of their flanges facing inwardly and in horizontal position and with their other flanges vertical to receive the base of the mill therebetween with said vertical flanges engaging the longer sides of the base of the mill and providing guides between which the mill is adapted to be moved to and from the drive pulley of the tractor, said base frame of the carrier also having transverse plates connecting forward and rear ends of the horizontal flanges, upright members fixed to the forward ends of the longitudinal members of the base

frame at front corners of the mill and having upwardly and rearwardly angling terminal portions conforming with the angle of the converging portion of the mill, a cross member connecting said terminal portions of the upright members, arms extending laterally and outwardly from the upright members near the angling terminal portion thereof, links having ends pivotally connected with ends of said lateral arms and opposite ends adapted for pivotal connection with the lower connections of the tractor, means connecting the links with the lift arms of the tractor, a link having one end pivotally connected with the cross member and having the other end adapted for pivotal connection with said upper connection of the tractor whereby said links are of substantially the same length to maintain the base of the mill substantially horizontal when the carrier is raised and lowered upon operation of the lift arms of the tractor, a belt connecting the pulleys, said transverse plates having longitudinal slots, and fastening devices extending through said slots and connected with the base of the mill to adjustably anchor the base of the mill between said vertical flanges to provide driving contact of the belt with said pulleys when the base frame of the carrier is resting upon the ground.

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