

May 16, 1950

H. G. WELLMAN
LADLE-HANDLING MECHANISM

2,507,583

Filed March 30, 1948

4 Sheets-Sheet 1

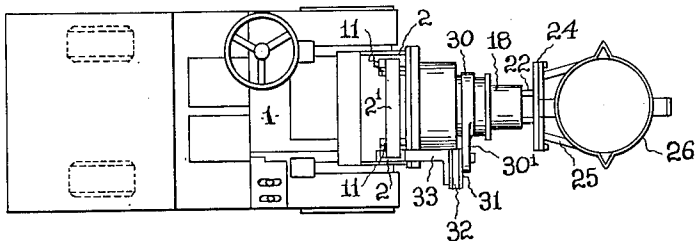


FIG. 2

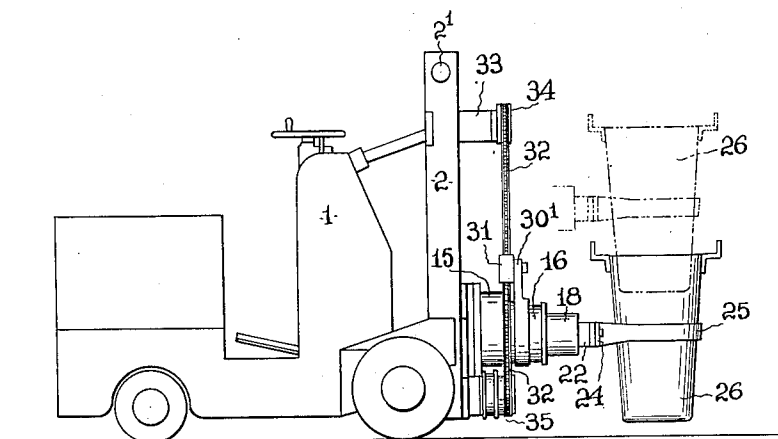


FIG. 1

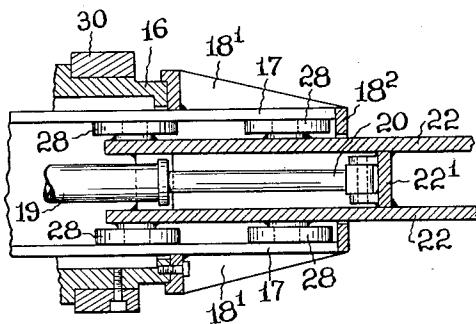


FIG. 5

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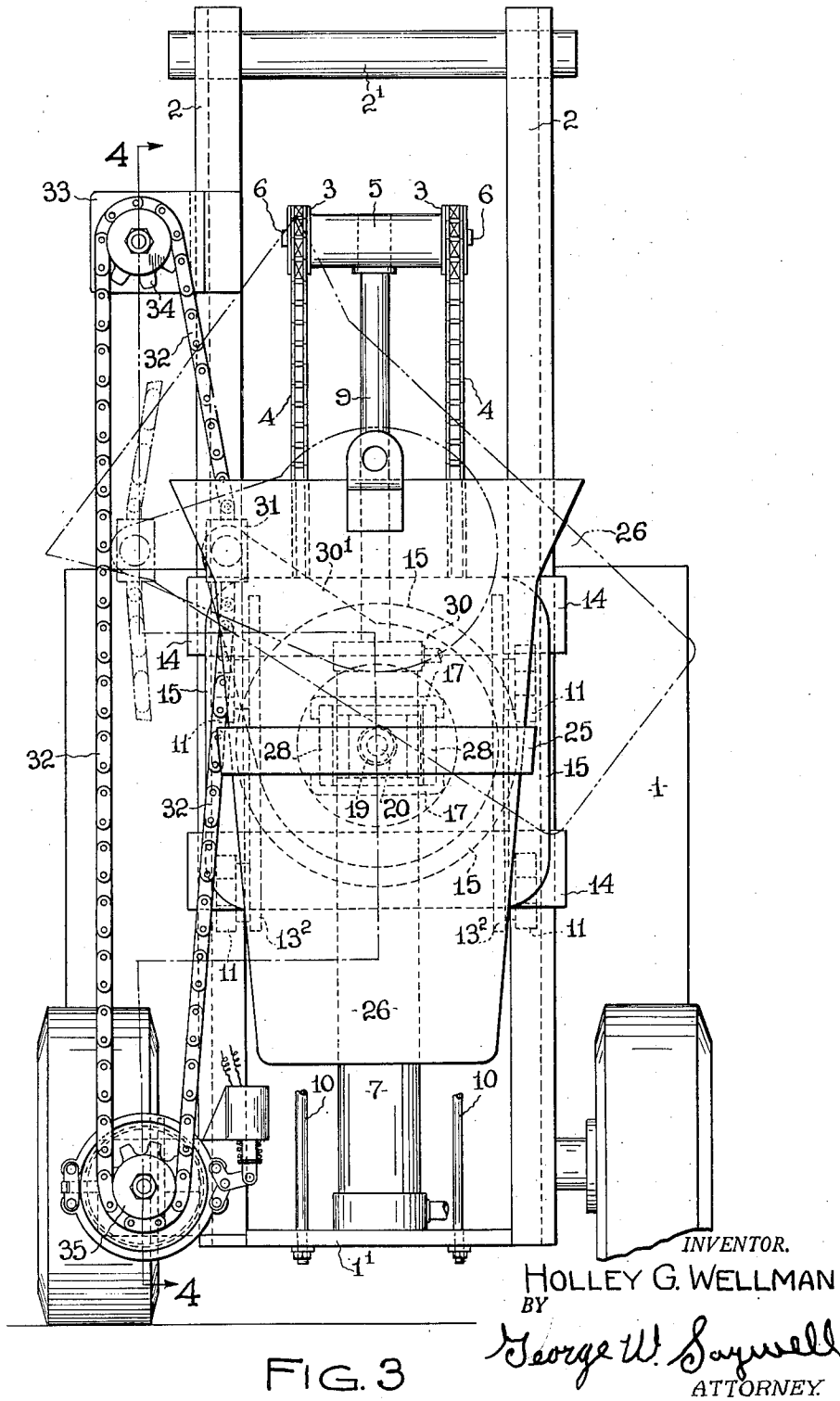
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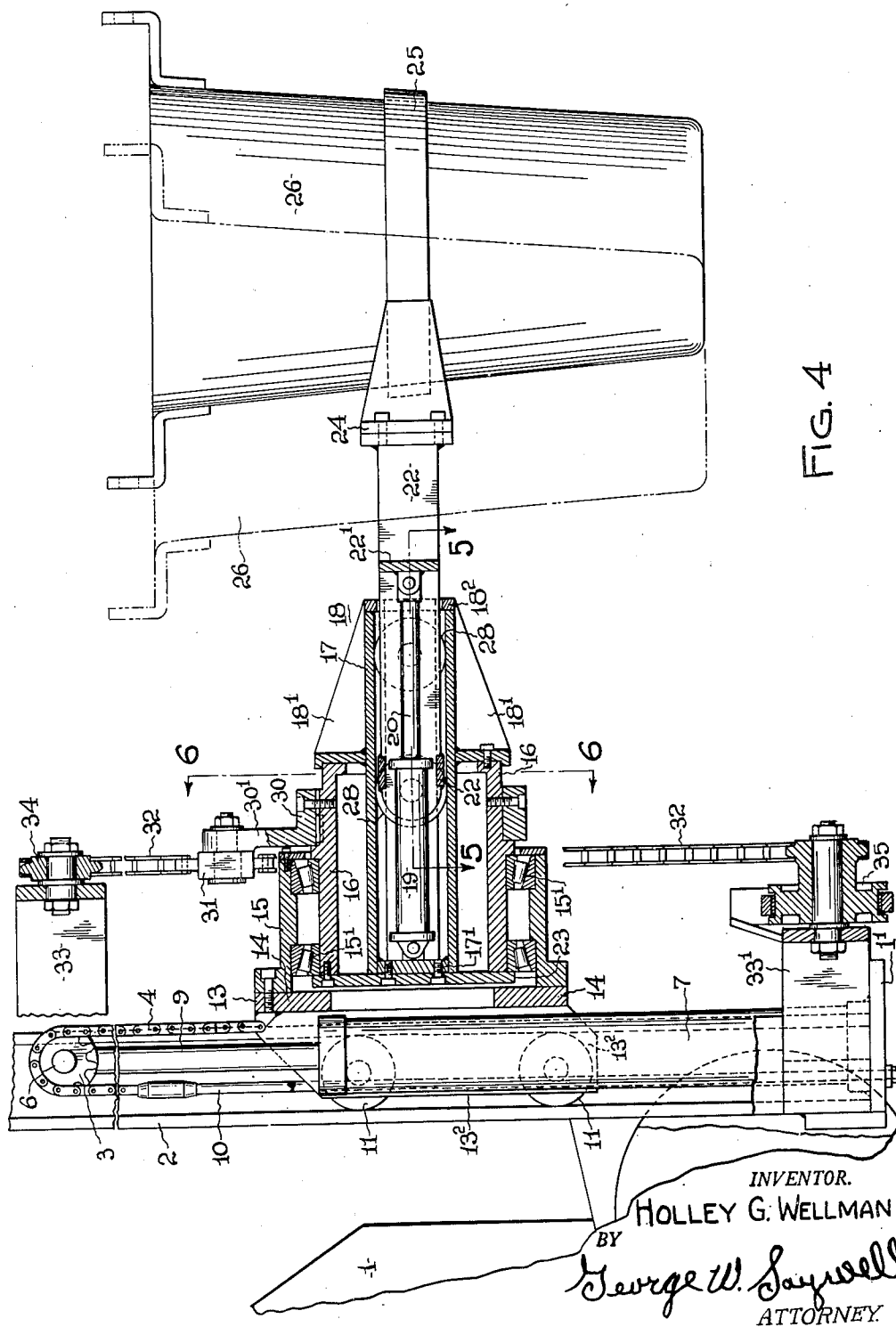
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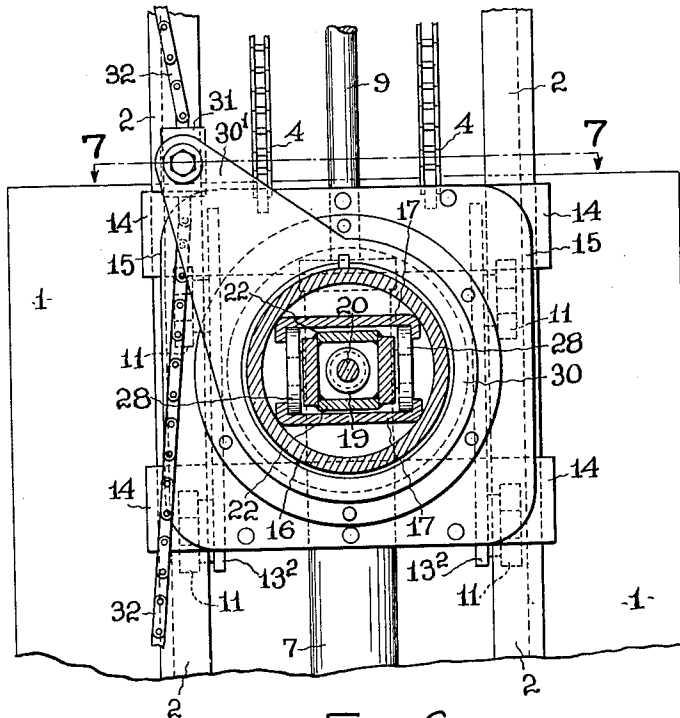


FIG. 6

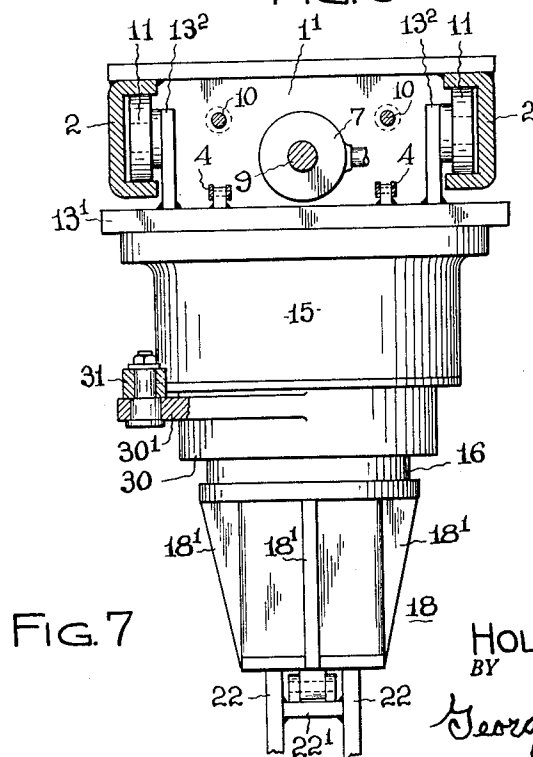


FIG. 7

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LADLE-HANDLING MECHANISM

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6 Claims. (Cl. 214-65)

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The invention relates to handling mechanism, and particularly to mechanism of the character adaptable for transporting, manipulating, and tilting containers for a molten metal, for instance, magnesium. The invention is illustrated in the accompanying drawings and hereinafter described as applied to ladle-handling mechanism. The invention is particularly important as applied to the handling of ladles of molten magnesium since this is an exceptionally difficult product to handle safely. The invention is designed to effect its various transporting and manipulative functions speedily and without presenting much opportunity for spilling the molten metal due to faulty structure or functioning of the mechanism or due to carelessness of the operators.

The annexed drawings and the following description set forth in detail certain means illustrating my improvements in ladle-handling mechanism, the same presenting, however, only one of the various forms in which the principle of the invention may be embodied.

In said annexed drawings:

Figure 1 is a side elevation of an automotive truck carrying means forming the ladle-handling mechanism, a ladle mounted in the mechanism being shown, and an elevated position of the ladle being also shown in dot-and-dash lines;

Figure 2 is a plan view of the structure shown in Figure 1;

Figure 3 is a front elevation, upon an enlarged scale, certain parts of the handling mechanism and a ladle handled thereby being also shown in dot-and-dash outline in ladle-pouring position;

Figure 4 is a longitudinal vertical section taken in the planes indicated by the line 4-4, Figure 3, a laterally-shifted position of the ladle being also shown in dot-and-dash outline;

Figure 5 is a fragmentary horizontal section taken in the plane indicated by the line 5-5, Figure 4;

Figure 6 is a vertical transverse section taken in the plane indicated by the line 6-6, Figure 4 and;

Figure 7 is a longitudinal horizontal section taken in the plane indicated by the line 7-7, Figure 6.

Referring to the annexed drawings in which the same parts are indicated by the same respective numbers in the several views, a pair of opposed side channels 2 are erected on a base 1¹ secured to and adjacent the front of a truck body 1, which channels 2 are braced and secured together adjacent their top ends by cross member 2¹. Also

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erected on the base 1¹ adjacent the front of the truck body 1 between the channels 2 is a cylinder 7 engaged by a piston 9 actuated by any suitable means, pneumatic or hydraulic (not shown). Mounted on the top of the piston 9 is a cross-head 5 having end trunnions 6 upon which a pair of sprockets 3 are rotatably mounted. These sprockets 3 are respectively engaged by chains 4 which are coupled at one end to upright rods 10 bolted at their lower ends to and erected upon the base 1¹, the opposite ends of the chains 4 being secured to a casting 13 comprised of front upper and lower cross members 13¹ and 14 and rearwardly-extended spaced inclined vertical plates or wings 13². Rotatably mounted on and exteriorly of the plates 13² are two pairs of upper and lower rollers 11 which engage the opposed side arms of the channels 2, the latter thus forming tracks or runways for the rollers 11.

From the description thus far given, it is evident that actuation of the piston 9 will result in vertical movements of the chains 4 and, hence, of the casting 13.

Bolted to the front faces of the cross members 13¹ and 14 is a housing 15 within which is rotatably mounted on taper bearings 15¹ a drum 16 to the forward face of which is secured a forwardly-tapered vaned head 18 secured to opposed interiorly disposed elongated horizontal channels 17, Figures 3, 5, and 6. The channels 17 extend at their forward ends to the plane of the forward ends of the vanes 18¹ of the head 18 and at their rear ends abut a plate 23 which is slightly spaced from the front faces of the cross members 13¹ and 14 and which serves as the rear end of the drum 16 to which it is bolted. A rear end plug 17¹ is secured to the two channels 17 and this end plug 17¹ is also bolted to the plate 23. The rear end of a cylinder 19, disposed between the channels 17, is pivoted to the front face of the plug 17¹, the cylinder 19 having a forwardly-extended piston 20, the extreme forward end of which is pivotally secured to a cross rib 22¹ of a box-like frame 22 which at its forward end has a head 24 bolted to a strap 25 adapted to encircle and support a tapered ladle 26. The cylinder 19 and piston 20 are centrally disposed within the frame 22 and the latter is longitudinally slidable through a front end member 18² of the vaned head 18 which abuts the front ends of the channels 17.

The rear end of the frame 22 is provided with two pairs of opposed laterally-extended rollers 28 which engage the channels 17 which thus form tracks or runways for the rollers 28 whereby, upon

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actuation of the piston 20, the frame 22 is caused to move forwardly or rearwardly and, thus, to move the ladle 26 forwardly or rearwardly as illustrated in Figure 4. The piston 20 is actuated by any suitable means, pneumatic or hydraulic (not shown).

Secured to the forward end of the drum 16 is an annulus 30 having a laterally-extended eccentric arm 30¹ the outer end of which is pivotally mounted on a block 31. Pivotally secured to the top and bottom of the block 31 are the respective ends of a chain 32 which engages a sprocket 34 rotatably mounted upon a bracket 33 bolted to and adjacent the top of one of the upright channels 2. The chain 32 also engages the sprockets of a combination brake and end-sprocket assembly 35 secured to a second bracket 33¹ and carried by the channel 2 adjacent its lower end. The brake portion of the assembly 35 provides means whereby the chain 32 can be restrained from moving when the drum 16 is lifted by the chains 4 and, consequently, any movement of the drum vertically will cause a horizontal rectilinear movement of the block 31 and push or pull the chain 32 outwardly or inwardly, as indicated in the showing thereof in Figure 3, whereby any burden secured to the rotatable drum 16, to which the annulus 30 is bolted, will be tipped as illustrated in Figure 3 by the pouring position of the ladle 26.

The operation of the aforescribed mechanism is as follows:

Adjacent the furnace where the metal is melted the ladle 26 is manipulated by means well known to those skilled in the art, usually by means of a carrying rod passed through the laterally-extended opposed upper brackets or ears with which the ladle is provided, to receive its burden of the molten mass from the furnace, and then the ladle is lowered into the strap 25 which is secured to the frame 22. By means of the cylinder 7, piston 9, and chains 4, the casting 13 and, hence, the loaded ladle 26 is lifted to any height suitable for the transportation thereof to the casting floor, the chain 32 idling. By means of the truck 1 the loaded ladle 26 is transported to the casting floor and, at any suitable height for the purpose, is pulled inwardly toward the truck 1 by means of the cylinder 19, piston 20, and frame 22. Then, according to the conditions of the foundry floor and the pouring platform, the ladle 26 is brought to the proper height and, then, the brake of the assembly 35 applied so as to stop the movement of the chain 32, when the continued movement of the piston 9 will effect a turning movement of the drum 16 which is communicated to the frame 22 and, hence, to the ladle 26 to effect pouring therefrom into the mold, as indicated in dot-and-dash lines in Figure 3. This procedure is merely illustrative, inasmuch as probably it would be advisable also to pull the ladle 26 in toward the handling mechanism before transporting the ladle to the casting floor and, also, traveling and floor conditions, heights of platforms, etc., will dictate the proper sequence of operations.

What I claim is:

1. An automotive-truck-supported mechanism for manipulating a burden carrier comprising a support secured to the truck body and provided with a runway, a carriage movable on the runway, means for reciprocating the carriage, a drum rotatably supported by the carriage, a sliding frame securable at its outer end to a burden carrier, the drum being provided with an interior runway engaged by the frame, means for moving

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the frame outwardly and inwardly of the drum comprising a cylinder pivotally secured to and within the drum and a plunger pivotally secured to the frame, means for reciprocating the plunger, an arm eccentrically secured to the drum, and a manually-operable control member mounted on the support for selectively regulating the turning movements of the arm.

2. An automotive-truck-supported mechanism for manipulating a burden carrier comprising a support secured to the truck body and provided with a runway, a carriage movable on the runway, means for reciprocating the carriage, a drum rotatably supported by the carriage, an elongated housing secured to and within the drum, a frame provided with wheels and securable at its outer end to a burden carrier, the housing being formed with a runway for the frame wheels, means for moving a burden carrier outwardly and inwardly of the housing comprising an extensible member within the frame and pivotally secured to the drum and the frame, respectively, means for effecting the extensible action, an arm eccentrically secured to the drum, a chain secured at its respective ends to opposed sides of the arm, a sprocket for the chain mounted on the support, and a manually-operable control member for the chain movements selectively regulating the turning movements of the arm.

3. An automotive-truck-supported mechanism for manipulating a burden carrier comprising a support secured to the truck body and provided with a runway, a wheeled carriage movable on the runway, a cylinder and reciprocating plunger means for moving the carriage, a housing secured to the carriage, a drum rotatably-mounted within the housing and having a hooded cap open-ended portion extended outwardly of the housing, a frame secured at one end to the drum and extended at its opposite end substantially flush with the open end of the hooded cap, a member for moving a burden carrier outwardly and inwardly of the frame and provided with wheels for which the frame provides a runway, and extensible means for moving the member comprising a cylinder pivotally secured to the frame and a plunger pivotally secured to the member, an arm eccentrically secured to the drum exteriorly of the housing, a chain secured at its respective ends to opposed sides of the arm, sprockets for the chain mounted on the support, one of said sprockets being formed with a brake control member whereby the turning movements of the arm can be selectively regulated.

4. In an automotive-truck-supported mechanism for manipulating a burden carrier, a sub-combination for vertically moving and rotating the carrier comprising a support secured to the truck body and provided with a pair of spaced runways, a casting provided with wheels engaging the respective runways, a cylinder mounted on the support, a plunger for the cylinder formed with a cross-head provided with spaced sprockets, rods erected on the support, chains engaging the sprockets and secured at their respective ends to the casting and the respective rods, a housing secured to the casting, a drum rotatably mounted within the housing, a connecting frame pivotally secured to the drum and to the burden carrier, and means for rotating the drum.

5. In an automotive-truck-supported mechanism for manipulating a burden carrier, a sub-combination for rotating the burden carrier and tilting the same into selective tilting position comprising a support secured to the truck body,

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drum-mounting means secured to the support, a drum rotatably mounted in the mounting means, means for rotating the drum, an arm eccentrically secured to the drum, means for supporting the burden carrier from the drum, a chain secured at its respective ends to opposed sides of the arm, and sprockets for the chain mounted on the support, one of said sprockets being formed with a brake control member whereby the turning movements of the arm can be selectively regulated.

6. In an automotive-truck-supported mechanism for manipulating a burden carrier having a support, and a rotatable drum mounted thereon, a sub-combination for varying the distance at which the burden carrier is positioned from the support comprising an extended forwardly-projected hood for the drum, a housing secured to the drum and hood, extended through and interiorly of the drum, and disposed substantially flush at its outer end with the forward end of the drum hood, the hood and housing being formed with registering end openings, a frame

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having wheels, the housing providing a runway for the frame, a cylinder pivotally secured at one end to and within the drum, a plunger for the cylinder, means for actuating the plunger, the plunger being pivotally secured at its opposite end to the frame, the frame and plunger playing through the aforesaid registered openings of the hood and housing, and means for securing the frame to the burden carrier.

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