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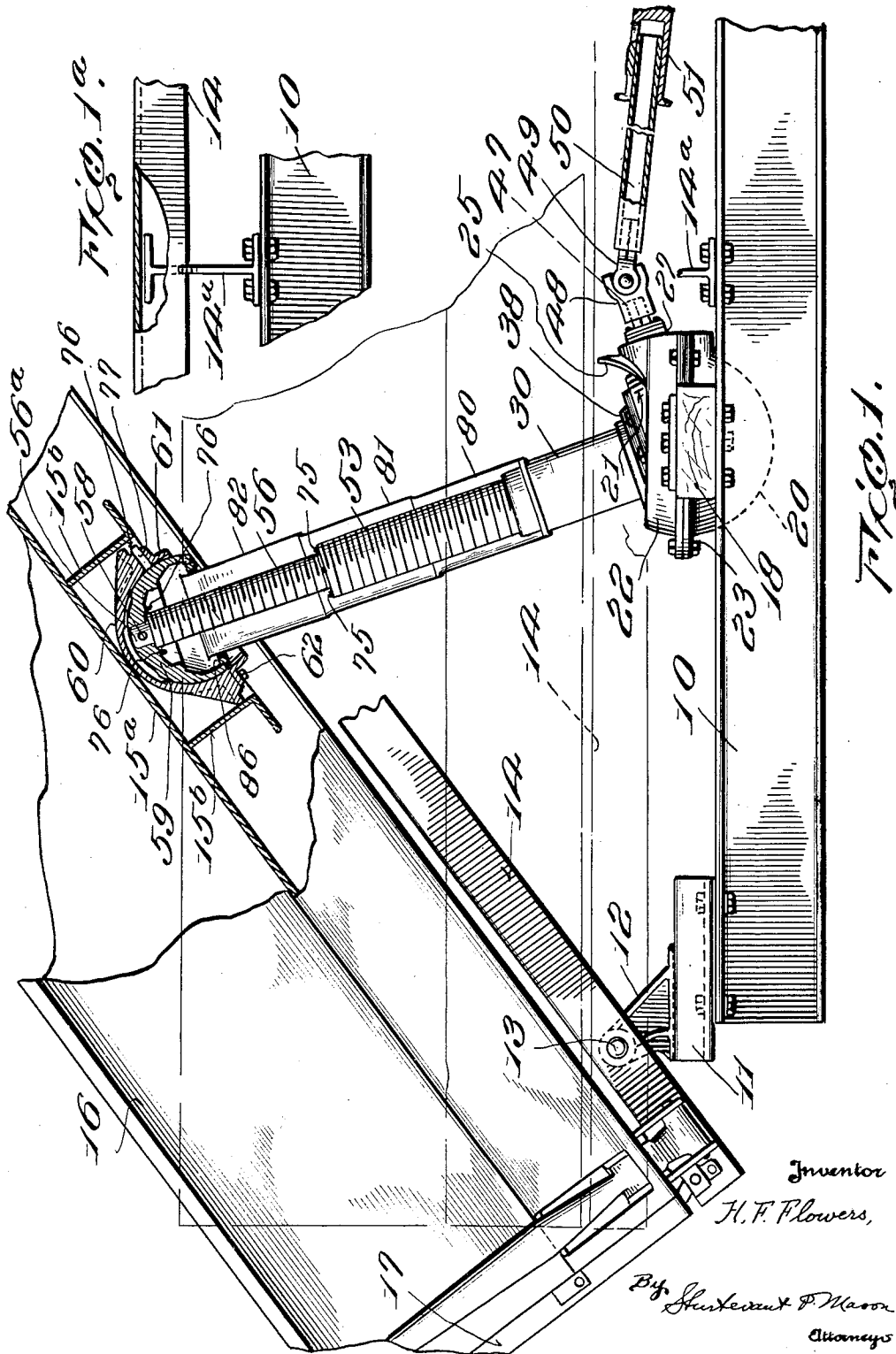
H. F. FLOWERS

1,787,342

RAISING MECHANISM

Filed Nov. 23, 1926

3 Sheets-Sheet. 1



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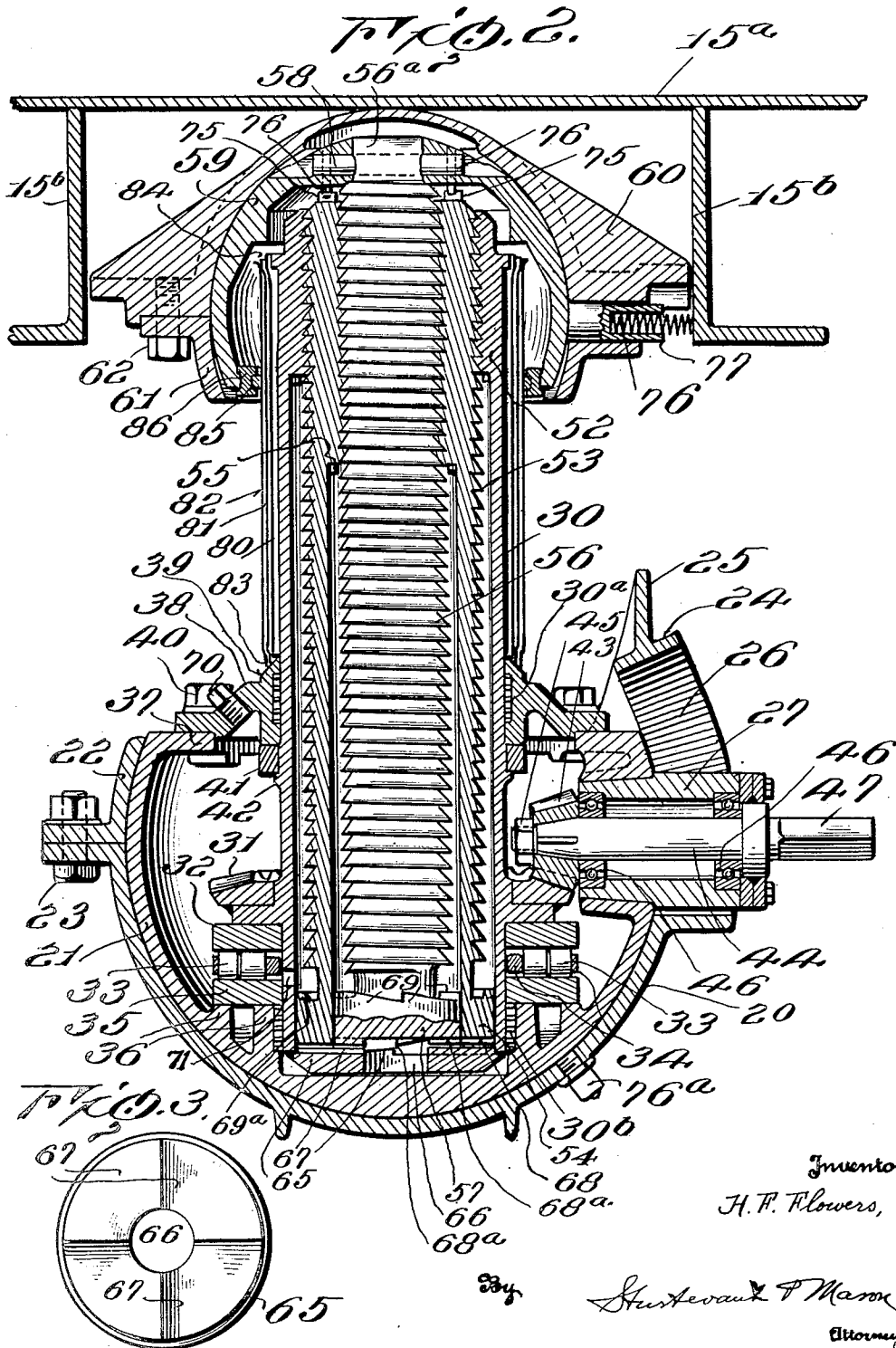
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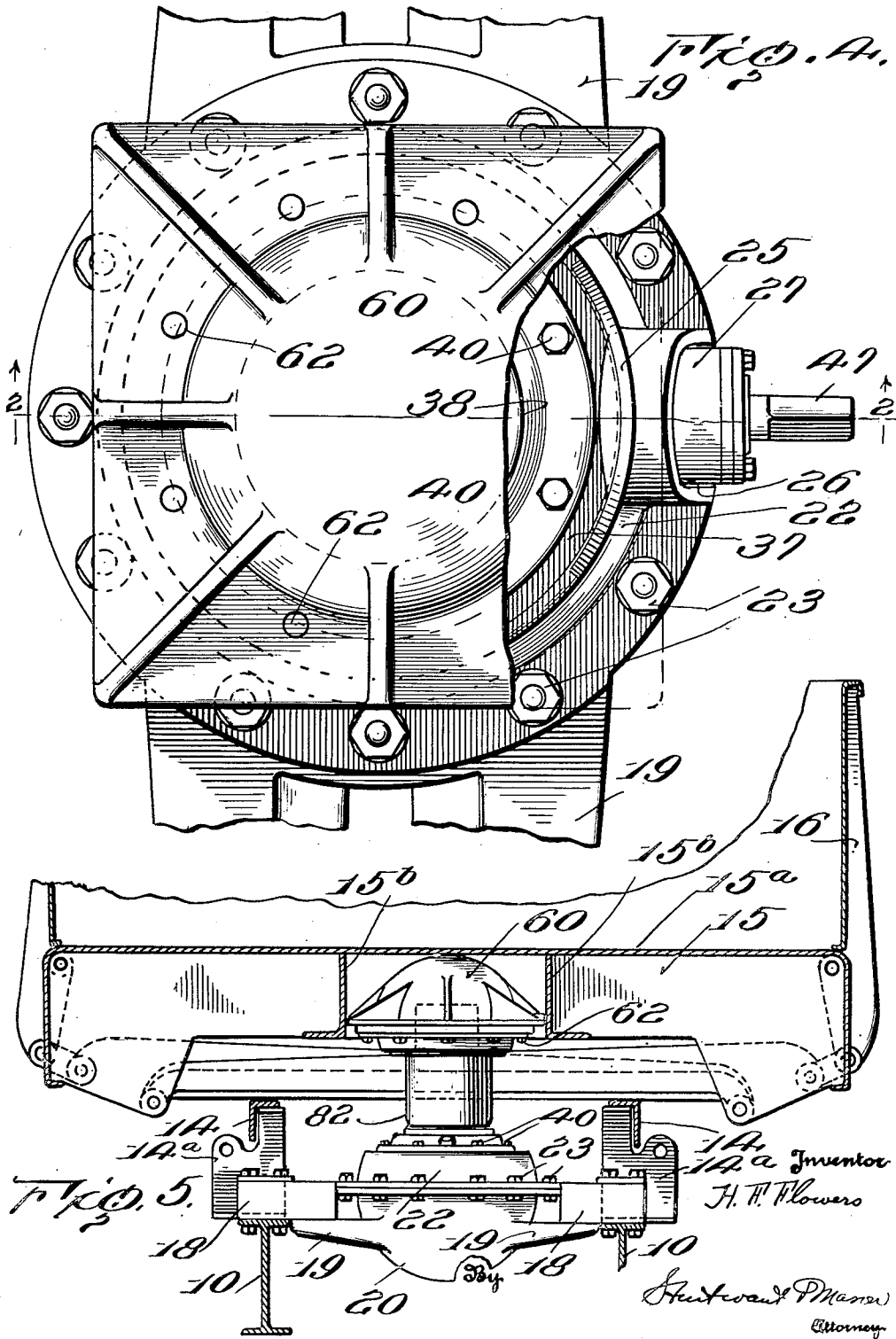
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UNITED STATES PATENT OFFICE

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RAISING MECHANISM

Application filed November 23, 1928. Serial No. 150,329.

This invention concerns improvements in raising mechanism and is particularly adapted for tilting the dump body of a vehicle.

It has heretofore been proposed to assemble such mechanism in various constructions, and screw devices have been employed which are actuated from the prime mover such as the automobile engine when the mechanism is employed on a dump truck.

The present invention presents a structure which is compact and is easily located in the space between the vehicle framing and the body floor, without projecting parts which might interfere with the passage of the vehicle over an uneven route. To this end, a plurality of screws are threaded one into another for progressive extension.

Another feature is the provision of an automatic oiling system for the mechanism whereby lubrication of all working surfaces is assured.

A further feature is the provision of a structure which may be relieved from all transmitted strain of the body load during transport.

Again, all moving parts are enclosed and protected during transport; and extensive bearing surfaces are provided on the screw threads so that a positive support of the body and its load is assured.

A further feature is the permissive slipping of elements when the fully extended position is reached, so that no breakage of the driving system occurs; and this slippage occurs at the point of application of the raising effort to the body, so that the provision and maintenance of sensitive driving clutches is eliminated.

This structure is well adapted for employment with the tilting and door operating structures disclosed in my copending application, Serial No. 740,307, filed Sept. 27, 1924.

With these and other objects in view, as will appear in the course of the following specification and claims, there is shown on the accompanying drawings:

Fig. 1 is a side elevation with partial sections, showing the raising mechanism in place on the underframe of a vehicle, with the dump body in a tilted position.

Fig. 1a is a detail view in partial section.

Fig. 2 is a section through the raising mechanism in a collapsed position, substantially on line 2—2 of Fig. 4.

Fig. 3 is a detail plan view of the bottom disk of the raising mechanism.

Fig. 4 is a top view of the raising mechanism, with the vehicle body removed.

Fig. 5 is a transverse section through the vehicle body and frame, showing the raising mechanism in the lowered position.

The raising mechanism according to the present invention comprises a plurality of screws, threaded one into the other, and with the outer screw threaded within a rotatable sleeve carried on the frame and with the inner screw in raising relation to the body. By the actuation of the sleeve, the screws are caused to extend themselves and to tilt the vehicle body, and upon reversal of the direction of such rotation, the vehicle body is permitted to return gradually to its lowered or transport position.

On the drawings, the underframe of the vehicle is represented by the channel beams which carry the spacer plates 11 having the pivot brackets 12 thereon to support the fulcrum 13 about which the sub-frame beams 14 tilt during dumping toward the rear. A vehicle body 15 is mounted on this sub-frame, and may include the side doors 16, and has an end door 17 which may be opened in an appropriate manner for discharging the load contained within the body during rearwise dumping.

Mounted on the channel irons 10 of the underframe are the wood blocks 18 which support the bracket arms 19 of a socket casting 20. This socket casting 20 has a hemispherical seat opening to its upper surface to receive the lower ball member 21. An annular retaining collar 22 is secured rigidly to the socket 20 by the bolts 23, and prevents the lower ball 21 being pulled out of its engagement with the socket. At the front portion of the socket, the latter and its collar 22 are provided with a boss 24 having a stiffened flange 25, with a slot 26 therein; this slot extends substantially in a vertical plane parallel to the length of the vehicle. The ball 21

has a guide sleeve 27 fastened thereto and received within the slot 26, so that it is guided thereby and serves to prevent a rotation of the ball 21 about a substantially vertical axis, while permitting the ball to rock laterally about an axis concentric with the sleeve 27, and in the plane defined by the slot 26, and in any direction which is a resultant of such movements. The outer surface of the lower ball 21 may be lubricated with respect to the lower casting 20 through the oil cup 76a.

Rotatably mounted in the lower ball 21 is an outer sleeve 30 which has the toothed ring 31 welded thereto. A raceway 32 surrounding the sleeve 30 serves to support the latter upon the end-thrust bearing rollers 33, which are held in position by the cage members 34. These rollers 33 rest upon the second race member 35 which is supported by the rings 36 on the inner surface of the lower ball 21, and permit a free rotation of the outer sleeve 30 even under heavy load.

The lower ball 21 is cut away at its top portion so that it is not a complete sphere and has thereat an inwardly projecting flange 37 for supporting a collar 38, which presents the bearing 30a in close engagement when the sleeve 30, to guide this sleeve for rotation about its own axis. This collar 38 is held in place by a series of bolts 40 which pass into the flange 37. To assure the sleeve 30 against an upward movement in the lower ball, a seating ring 41 is disposed between the lower surface of the collar 38 and an outwardly projecting peripheral flange 42 on the collar 30 itself. A guide bearing 30b is likewise provided in a recess of the lower ball 21 to guide the extreme lower end of the sleeve 30 and for rotation about its own axis.

A pinion 43, in meshing engagement with the toothed ring 31 is splined to the inner end of a stub shaft 44 and is held thereon by a lock nut 45. This stub shaft 44 is supported within the guide sleeve 27 by the ball bearings 46. The squared outer end 47 of the stub-shaft 46 is secured in one member 48 of a universal joint, whose other member 49 is fastened in a shaft 50 which is in telescoping and splined driving relation with an extending hollow shaft 51, which in turn is connected through a suitable gearing with a power plant. This gearing and power plant are not represented on the drawings, but it will be understood that when the device is employed on an automobile truck, the internal combustion engine on this truck may serve as the power plant, and an auxiliary gearing be employed to couple this engine to the shaft 51.

The recess in the outer sleeve 30 at its upper end is reduced in size to present a shoulder 52, and the wall of the reduced portion of the recess is threaded to receive the corresponding external threads of a telescoping sleeve 53, which at its bottom end has an outwardly projecting flange 54; this flange 54

serves to guide the telescoping sleeve 53 during its movement with relation to the outer sleeve 30, and by its engagement with the shoulder 52 of the sleeve 30, furnishes a positive stop against the complete upward removal of the telescoping sleeve 53 from the outer sleeve 30.

This telescoping sleeve 53 is likewise hollow and its recess is reduced in diameter adjacent the upper end to provide a shoulder 55; and the reduced portion of the recess is threaded interiorly to receive a threaded spindle 56. The spindle 56 carries at its lower end a disk 57 which is of substantially the same diameter as the lower portion of the recess in the telescoping sleeve 53 so that it is guided thereby; at the upward limit of travel of the spindle 56 with relation to the telescoping sleeve 53, this disk 57 presents its notched upper face into contact with the shoulder 55 of the telescoping spindle 56 and prevents a complete upward withdrawal of the threaded spindle out of the telescoping sleeve 53.

The upper end of the threaded spindle 56 projects beyond the end of the telescoping sleeve 53 and has an aperture therein at right angles to its own axis, through which passes a retaining pin 58. The upper ball 59 is of spherical shape, but is cut away at its bottom so that it is not a complete sphere. It has a cavity at its top to receive the projecting end 56a of the spindle 56, and a cross aperture to receive the retaining pin 58, so that the upper ball 59 and the spindle 56 are held fixedly together under all operative conditions.

The floor 15a of the vehicle has the stiffening beams 15b, on which is carried the upper socket casting 60, which has a spherical hollow which opens to its downward surface to receive the upper ball 59. The upper ball is prevented against a complete removal from the upper socket casting 60 by a collar 61 which is secured to the casting 60 by the bolts 62. It will be noted that the interior of the collar 61 is spherically formed about a center point removed downwardly from the center point of the spherical recess in the upper socket casting 60. In this way, when the screw device has been entirely collapsed, the upper ball 59 may be withdrawn slightly from contact with the inner walls of the upper casting 60, so that no strain is transmitted from the body of the vehicle to the lifting mechanism in a transport position.

The lower end of the outer sleeve 30 is preferably closed by a disk member 65 (Fig. 3), which has an aperture 66 therein to permit the passage of lubricant for balancing the pressures inside and outside the sleeve 30. This disk 65 likewise has a number of pins 67 with inclined tops formed therein to receive the corresponding stop pins 68 on the lower end of the doubly threaded sleeve 53 and the

pins 68a formed on the lower end of the spindle 56. The contact of these pins 68 and 68a with the pins 67, after the two threaded members 53 and 56 have substantially reached their lowermost position, prevents a further downward movement of the parts and thus avoids the possibility of injury to mechanism, or a sticking of the several screw threaded members with respect to each other. The bottom disk 65 has been represented as connected to the outer sleeve 30 by welding.

At the upper end of the raising mechanism, a plurality of projecting lugs 75 have been formed on the doubly threaded sleeve 53. A similar number of pins 76 are embedded in the upper ball casting 59 for engagement with these lugs when the doubly threaded sleeve 53 reaches its predetermined uppermost position, for the similar purpose of forming stops to prevent sticking of the sleeve 53 in its uppermost position. For a similar purpose, the lower end of the spindle 56 has been shown as having a flange which serves not only to carry the downwardly projecting teeth 68a for engagement with the teeth 67, but also to have the upwardly projecting teeth 69 for engagement with the shoulders 55 within the threaded sleeve 53, whereby an easy separation of these members is afforded. Similar teeth 69a may be formed on the similar flange 57a, of the sleeve 53 for engagement with the shoulder 52 of the outer casing or sleeve 30.

In employment, the chamber within the hollow lower ball 21 usually contains a considerable quantity of lubricant which may be placed therein through an aperture closable by the plug 70. As the threaded members 53 and 56 move up and down, this lubricant may flow from the space around the sleeve 30 through the aperture 71 into the interior of the sleeve 30, and pass downwardly through the apertures 66 to fill the space between the disk 65 and the inner wall of the lower ball 21, and to rise to a desired level within the outer sleeve 30. During the succeeding downward movement of the threaded members 53 and 56, the lubricant is forced upwardly along the walls and threads of the members 30, 53 and 56, so that during the next outward and upward movement, all of the threads are thoroughly lubricated, and maintained with surfaces having a low frictional constant. In order to permit the passage of the lubricant through the disk 57, the latter is provided with an aperture 72. The upper surface of disk 57 is cut away to prevent sticking in its upper position by the binding effects between it and the shoulder 55.

An oil cup 76a is provided to facilitate an oiling of the meeting surfaces of the lower ball 21 and the ball socket 20 and the collar 22.

In order to protect these screw threads from the entry of dust and dirt while in their

extended position, a telescoping dirt jacket is provided. As shown in Figs. 1 and 2, this dirt jacket comprises the sleeves 80, 81, 82 which fit successively over each other and for that purpose have the inwardly projecting flanges 83 at their respective lower ends, and the outwardly projecting flanges 84 at their respective upper ends. The innermost sleeve 80 is fixed on an upwardly extending collar 39 of the collar 38 which closes the lower ball. The outer sleeve 82 is guided for movement by a felt packing washer 85 which is held in a grooved link 86 carried at the open end of the upper ball 59.

The method of operation of this raising mechanism is as follows:

During transport, the dump body is in a lowered position as shown in Fig. 5 and by the thin dash lines on Fig. 1, and its subframe 14 rests on the support 14a secured to the frame 10 (Fig. 1a). Upon arriving at the selected point for dumping, the shaft 51 is connected by the aforementioned clutch to the source of power, so that the shaft 51 and therewith the shaft 50 are caused to rotate, and by means of the universal joint 49, 48 to drive the stub shaft 44 of this raising mechanism. The pinion 43 then rotates the toothed ring 31 and causes a rotational movement of the outer sleeve 30. This sleeve 30 revolves on its bearing, and attacks by its internal threads the external threads on the telescoping sleeve 53 at a point which is of lesser diameter than the diameter of the upper ball 59. Likewise the telescoping sleeve 53 attacks the threads of the threaded spindle 56, at a diameter which is less than that at which it itself is attacked. The tendency is for the upper ball 59 to remain stationary with regard to its socket casting 60, owing to the greater frictional effect occurring between them in proportion to the friction occurring at the several threaded engagements. The threaded spindle 56 is held stationary with the upper ball 59, so that a relative rotation occurs between it and the outer sleeve 30, which causes the threaded spindle 56 and the telescoping sleeve 53 to be successively moved upward, and to thrust with them the upper socket casting 60, which being operatively associated with the vehicle body, will cause this vehicle body to move upward at the point of attack. Since the vehicle body is pivoted at the point 13, it will tilt rearwardly, under the conditions stated, into the position shown in full lines in Fig. 1. During this tilting, the lower ball 21 will rock about an axis transverse to the vehicle frame members 10 into the position shown in Fig. 1, and the stub shaft 44 will move therewith and the sleeve 27 will be guided in the slot 26, so that although the lower ball 21 rocks, it cannot rotate about an axis substantially in the line of the collar 30. At the same time, the universal joint 48, 49 and the

telescoping shafts 50, 51 will compensate for this rocking movement and allow a continuity of power delivery to the pinion 43, whatever be the position of the lower ball 21.

5 The upper ball 59 is permitted during the tilting movement to rock in a similar manner in its upper casting 60.

As the dump body is constructed, as usual, for dumping either to the rear or to the side, as shown for example by the body construction of my copending application Serial No. 740,307 filed Sept. 27, 1924, then when the body is tilted about its lateral fulcrum, the lower ball 21 may rock about the axis of the stub shaft 44, and in this case the telescoping shafts 50 and 51 remain substantially in extension of this axis, and no movement of the universal joint 48, 49 occurs, since under such conditions the stub shaft 44 is substantially parallel to the underframe members 10. During such lateral tilting, the same effect occurs between the upper ball 59 and its casting 60 as before, and this ball 59 is permitted to rock within its casting 60—though laterally in this instance—to accommodate itself to the changing positions of the dump body. In Fig. 5 is shown the employment of the device with the body holding and door controlling mechanism of my aforesaid application, to which reference is made for the method of operation of such features. The transverse floor stiffeners 15b in this figure also constitute the gusset plates for the trunnions; and are connected to longitudinal stiffeners, which form in conjunction therewith a rectangular pocket to receive the upper casting 60 and to prevent its rotation with regard to the body.

It will be noted that the upper casting 60 is cut away at 75 adjacent its pole of symmetry so that, in the event of wear thereon, the diameter at which the upper ball 59 acts upon the casting 60 will not be substantially changed, and the frictional resistance between these two remains constantly greater than the resistance at the threaded engagements.

As the threaded spindle 56 and the telescoping sleeve 53 continue to move outwardly, their bottom flanges and plates 54 and 57 finally come into contact respectively with the shoulders 52 and 55, and finally the device is held against any further extension. If the power from the prime mover has not been shut off, the upper ball 59 may slip in its frictional engagement in the casting 60, so that no damage occurs to any part of the system.

During this raising movement, the upward motion of the upper ball 59 causes the felt 85 to slide on the outer sleeve 82 of the dirt jacket, or else to cause a relative movement between the several sleeves, according to the respective frictional resistance. In either event, a progressive extension of the

sleeve occurs, with the final result that when the raising mechanism has been so extended, the several sleeves 80 will likewise have extended until the flanges engage each other and prevent a further movement in succession, until the entire dirt jacket is in the position shown in Fig. 1. During this entire movement, the screw has been assured against the impact of dirt thereagainst even during loading with very dusty material or in the event of discharge of material thereagainst.

When it is desired to return the vehicle body to its normal horizontal position, the direction of rotation of the shafts 51, 50 is reversed, and a reverse effect occurs. The upper ball 59 is again held by its greater frictional resistance, and the threaded spindle 56 and the telescoping sleeve 53 retire within each other and within the outer sleeve 30 until the device has returned substantially into the position shown in Fig. 2. The bottom of the telescoping sleeve 53 encounters the disk 65 and is prevented from a further downward movement. The stop pins 68 and 67 come into contact with each other, and a further downward movement of the threaded spindle 56 is prevented. During the latter portion of these movements, however, the upper ball 59 is slightly withdrawn from the casting 60, so that no shocks or weight are imposed upon the raising mechanism during the normal transport, since the body 15 and its subframe 14 rest upon the beam 14a of the underframe 10 during transport.

During this return movement, as the upper ball moves down, the felt washer 85 slides on the upper section 82 of the dirt jacket until this section comes in contact with the inward surface of the upper ball 59, or else, the frictional engagement between the several flanges of the sections of the telescoping dirt jacket being less, these sections move with respect to each other. In either event, these sections of the dirt jacket collapse one into the other and downwardly onto the casing 30 until the entire jacket has collapsed, and now occupies a position wherein it adds nothing to the encumbrance of the raising mechanism, as shown in Fig. 2.

Any appropriate form of thread may be employed for the threaded spindle 56 and the telescoping sleeve 53, and the parts, either single or multiple, are designed so that the prime mover plant may raise and tilt the body. More than one telescoping sleeve 53 may be employed if desired.

If at any time, by reason of some peculiar condition, the upper ball 59 fails to establish a frictional contact with the casting 60 to be held stationary with respect thereto, so that the threaded members may function in the manner described above, the plunger

pin 77 located in an aperture extending from the outer to the inner surface of this casting and its closing collar 61, and which is constantly forced inward by the spring 76 received at one end in a cavity of the pin 77 and bearing at its other end against one of the stiffening members 15b, engages with sufficient frictional resistance against the surface of the ball 59 to cause it to remain stationary. It is found in practice that this is seldom required, and when required for use, is only needed for an instant during the raising movement, prior to the engagement of the upper ball 59 with its casting 60: it being understood that during transport the ball is normally lowered out of engagement with the casting 60. When the pin is thus engaged with the outer surface of the ball 59, the relative frictional relation between the ball and casting is increased so that the aforesaid threaded movement of the threaded spindle 56 and sleeve 53 may occur.

It is obvious that the form and arrangement of the several parts may be modified in any wise without departing from the spirit of this invention which is expressed within the scope of the appended claims.

I claim:

1. In a raising mechanism for the tiltable dump body of a vehicle having a frame, a lower socket member on said frame, a lower ball movable in said socket member, a rotatable sleeve journaled in said ball and having screw threads therein, a threaded spindle engaging the threads of said sleeve and adapted to tilt said body, means including a shaft to rotate said sleeve, a bearing for said shaft on said lower ball, and a guide on said socket member for said shaft, said guide serving to prevent rotation of said ball about the axis of said sleeve and to permit movements thereof in a plane including said axis.

2. In a raising mechanism for the tiltable dump body of a vehicle having a frame, interengaging threaded members of said frame, an upper ball connected to one of said threaded members, an upper socket member adapted to raise and tilt the dump body, said ball being received in said socket member, said ball and socket member having cavities therein adjacent the intersection of the axis of said threaded members with the peripheral surface of said ball and socket member in the transport position.

3. In a raising mechanism for the tiltable dump body of a vehicle having a frame, interengaging threaded members supported on said frame and adapted to extend upwardly upon a relative rotation, an upper socket member, an upper ball received in said upper socket member, means to fixedly secure said upper ball to one of said threaded members, stiffening beams fastened to said dump body beneath its floor transversely and longitudinally thereof to define a chamber within

which said socket member is disposed, said beams preventing said socket from rotational movement, and blocking means supported by the upper socket and engaging said upper ball and one of said beams to frictionally hold said upper ball against relative rotation in said upper socket.

4. In a raising mechanism for the tiltable dump body of a vehicle having a frame, telescoping members mounted on said frame, an upper socket member mounted on said dump body, an upper ball disposed in a hemispherical cavity in said socket member, a collar fastened to said socket member to retain said ball against entire withdrawal from said socket member and collar, the inner surface of said collar having a spherical curvature about a center point removed from the center point of the spherical curvature of the cavity of said socket member so that said ball in the telescoping position of said telescoping members may be withdrawn from contact with said socket member, and means fixedly securing said ball to one of said telescoping members.

5. In a raising mechanism for the tiltable dump body of a vehicle having a frame, telescoping threaded members mounted on said frame, a supporting member mounted on said dump body, a thrust member secured to one of said telescoping members, and frictionally engaging said supporting member, and means to increase the frictional resistance to relative movement between said thrust member and said socket.

6. In a raising mechanism for the tiltable dump body of a truck having a frame and a prime mover plant, a lower socket member fastened to said frame, a lower ball movable in said socket, a rotatable sleeve journaled in said socket for movement about an axis passing substantially through the center of the ball and socket; driving means for said rotatable sleeve including a shaft having its axis at right angles to the axis of the sleeve, means on said socket to permit said shaft to rock about the intersection of its axis with the axis of the sleeve and to prevent a rotational movement of said ball about the axis of the sleeve, a plurality of threaded members engaging in each other and in said sleeve and adapted to be extended and telescoped with respect to said sleeve, an upper ball secured to one of said members, an upper socket member mounted on said body and receiving said ball for frictional engagement therewith, and means for driving said shaft to said prime mover plant so that said upper ball may be raised by the relative rotation of said threaded members and sleeve during the frictional retention of said upper ball immovable with said socket, and so that said upper ball may move in said socket upon the full extension of said telescoping members whereby to prevent breakage of the parts.

7. In a raising mechanism for the tiltable dump body of a vehicle having a frame, a lower socket member fastened to said frame, a hollow lower ball movable in said socket, a rotatable sleeve journaled in said ball, a closing collar for the upper portion of said lower ball to form therewith an enclosed lubricating chamber, interengaging threaded members in threaded engagement with the interior of said sleeve, means carried by one of said members to raise and tilt the dump body, and means to rotate said sleeve, said sleeve and members having lubricating passages therein leading from the chamber of said ball to the bearing surfaces, said interengaging threaded members forming a pump and serving during the extension and collapsing to force and bring the lubricating material to such contacting surfaces.
8. In a raising mechanism for the tiltable body of a vehicle, a frame, a screw hoisting mechanism mounted on said frame and adapted to tilt said body upon extension, means to drive said screw mechanism whereby to produce such tilting, said screw mechanism having a frictional connection with the dump body of a resistance greater than the resistance of threads during the relative movement, and means in said screw mechanism to block further relative movement of said threads at the limit of extension of said screw mechanism whereby said threads turn as a unit, said frictional connection permitting such rotation as a unit.
9. In a raising mechanism for the tiltable dump body of a vehicle having a frame, telescoping members mounted on said frame, an upper socket member mounted on said dump body, an upper ball disposed in a hemispherical cavity of said socket member, a collar fastened to said socket member to retain said ball against entire withdrawal from said socket member and collar, the inner surface of said collar being spaced from the ball when the latter is engaged in the hemispherical cavity, so that said ball in a telescoping position of said telescoping members may be withdrawn from the contact with said socket member, and means fixedly securing said ball to one of said telescoping members.
10. In a raising mechanism for the tiltable dump body of a vehicle having a frame, telescoping threaded members mounted on said frame, a supporting member mounted on said dump body and held against rotation about the axis of said threaded members, a thrust member secured to one of said telescoping members and held fixedly thereto for rotation therewith, said thrust member frictionally engaging said supporting member, means to limit the rotational movement of said threaded members, and positive means to move said thrust member through said threaded members, whereby the positive driving means will cause the extension of said threaded members and the raising of the dump body until the limiting means operates, and thereafter will cause a slippage between the supporting member and thrust member at the frictional engagement between the same.
11. In a raising mechanism for the tiltable dump body of a vehicle having a frame, interengaging threaded members carried by said frame and adapted to rock in longitudinal and transverse planes relative to the vehicle, an upper ball carried by one of said members and adapted to be raised during the relative rotation of said threaded members, an upper socket member carried by the body and engaging said upper ball so that the ball may rock and rotate with respect thereto, said upper ball and socket including means to maintain the frictional resistance between the upper socket and upper ball greater than the frictional resistance to movement between said interengaging threaded members during the normal movement thereof, means to limit the relative threading movement of said members, said friction producing means permitting the relative rotation of said upper socket and upper ball after said threaded members have reached their limit of travel.
12. In a raising mechanism for a tiltable dump body of a vehicle having a frame, a screw hoisting mechanism mounted thereon, said hoisting mechanism including telescoping parts to raise and lower the dump body, a socket member attached to the body and a ball carried by one of the telescoping members held in rotatable engagement in said socket, means for frictionally holding said ball against rotation in the socket member when the hoisting mechanism is subjected to normal turning stress, and means for limiting the movement of said telescoping members, said frictional means being adapted to yield to permit the ball to rotate in said socket should the telescoping parts reach either limit of their movement.
13. In a raising mechanism, a support, a rotatable sleeve on said support and having internal threads, a first threaded member engaging in said threaded sleeve and itself having internal threads, a second threaded member engaging in the internal threads of said first threaded member, a closing plate for the bottom of said sleeve, a first stop pin mounted on said closing plate eccentric to the axis of said sleeve and threaded members, and a second stop pin on said second threaded member similarly eccentric to said axis and adapted to engage said first stop in the collapsed condition of said members and sleeve to prevent a further relative rotational movement between said sleeve and said second threaded member.
14. In a raising mechanism for the tiltable dump body of a vehicle having a frame, a lower socket member fixedly mounted on

form a lubricant reservoir and having an aperture at its top and being rockable in said socket, an internally threaded rotatable sleeve passing through said aperture and mounted in said ball, thrust bearings for said sleeve in said ball, and radial bearing members in spaced relationship to one another carried by said ball and engaging said sleeve above and below said thrust bearing, one of said guide members forming a closing collar at the aperture of said ball whereby to close the reservoir, said sleeve having an aperture to permit the passage of lubricant from the reservoir into the sleeve, a threaded member engaged with the threads of said sleeve and adapted to perform a movement of extension and collapsing during rotations of said sleeve, said threaded member operating in said sleeve to move the lubricant therein.

15. In a raising mechanism for the tiltable dump body of a vehicle having a frame, a screw hoisting mechanism mounted on said frame and comprising threaded interengaging and relatively extensible members and means to limit the relative rotational threading movement of said members when collapsed and when extended, and a rotatable connection between a first one of said members of the screw mechanism and said body having frictional resistance against relative rotation of its parts which is greater than the frictional resistance between the threaded members against relative rotational and threading movement at all intermediate positions of the screw mechanism between full extension and full collapsing, whereby said rotatable connection prevents the turning of said first member with respect to said body at such intermediate positions but permits such turning at the limits of movement of said members whereby breakage of parts at said limits of travel is avoided.

16. In a raising mechanism for the tiltable body of a vehicle having a frame, a screw hoisting mechanism mounted on said frame and including interengaging threaded members adapted to extend and collapse by relative rotational threading movement, means to prevent relative rotation of said members at a predetermined limit of extension whereby they are coupled positively together, a connection between a first one of said members and a prime mover plant whereby to produce a rotation of said first member, and a connection between a second one of said members and said body including frictional means to hold said second member against movement with respect to said body during the relative rotational movement of said members, said frictional connection permitting the relative movement of said second member with respect to said body after the operation of said rotation preventing means.

In testimony whereof I affix my signature.

HENRY FORT FLOWERS.