H. MAYER.

TILTING AUTOTRUCK.

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1,045,579. Patented Nov. 26, 1912.

Fig. 1.

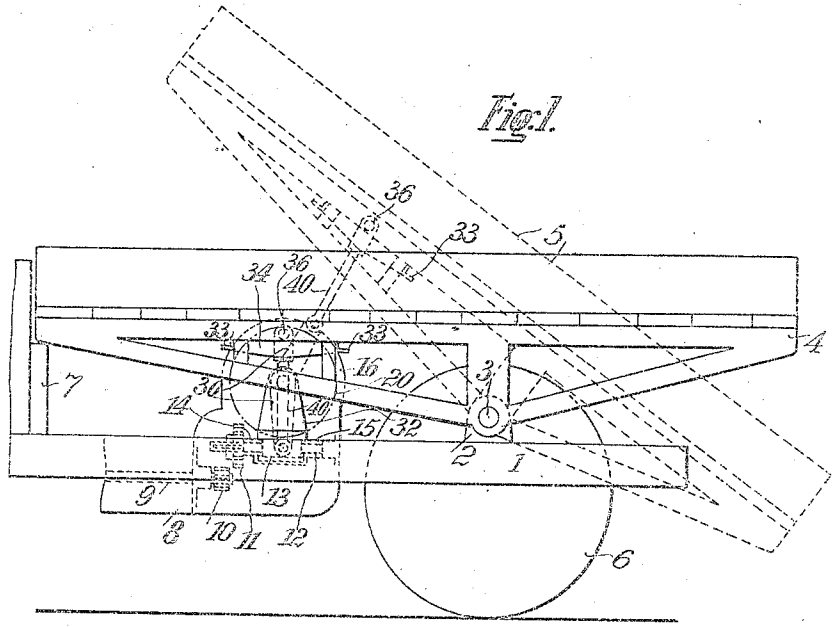


Fig. 2.

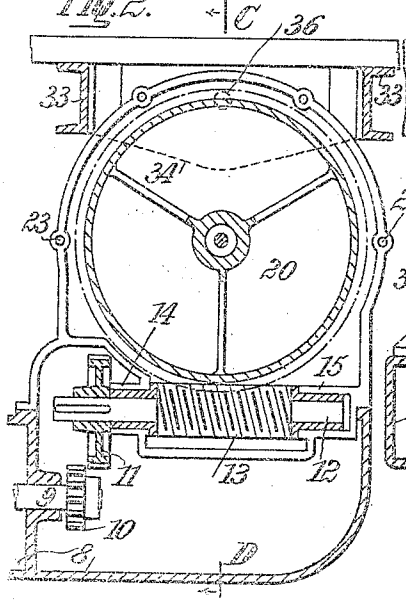
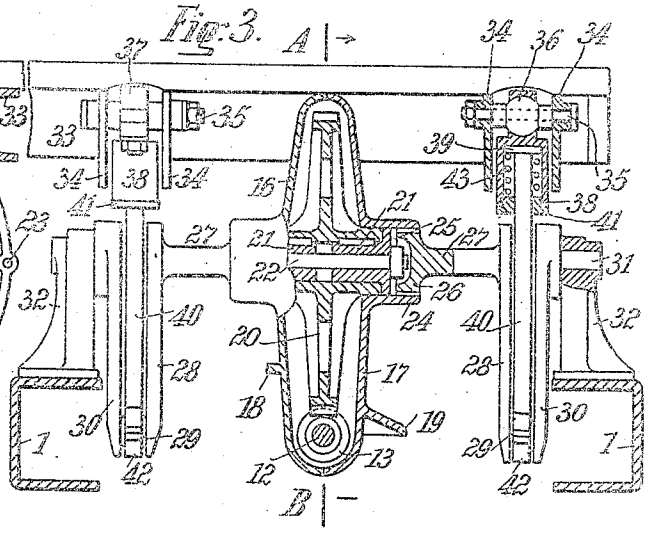


Fig. 3.



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TILTING AUTOTRUCK.

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To all whom it may concern:

Be it known that I, HEINRICH MAYER, a citizen of the Republic of Switzerland, residing at Arbon, in Switzerland, have invented a new and useful Tilting Autotruck, of which the following is a specification.

There are known tilting-trucks, the box of which can be manually turned through a convenient angle by means of a hand-crank and suitable gearing, so that the hand-crank requires to be turned in one direction for slowly turning the box from the horizontal position to the extreme inclined position, while for returning the box from this inclined position to the initial horizontal position it is only necessary to turn the hand-crank in the opposite direction. It is evident, that it is very easy for the operator to operate the box by hand, since he can in watching the motion of the box and the sliding off load stop his hand-crank at any moment. If the gearing connected with the tilting-box were to be driven mechanically in a similar manner, that is in one direction for inclining the box and in the other direction for returning the box into its horizontal position, it would be necessary to provide a special device for automatically stopping the transmission of the motion from the motor to the box at the proper moment, since otherwise the continuously running motor might overstrain the gearing and thus cause a breakdown. Moreover means would be required for reversing the motion transmitted from the motor to the box, so as to return the box to its initial position. Such a mechanism, however, would turn out to be most complicated and yet unsafe.

My invention consists of a mechanism for automatically rocking the movable box of a tilting-autotruck, which mechanism is remarkable for its simplicity and absolute reliableness. I employ a worm wheel fastened on a horizontal crank-shaft and meshing with a worm, which can at will be connected with and disconnected from a shaft in the gearing-box. The said crank-shaft is by means of its crank-pins and connecting rods pivotally connected with the rocking frame supporting the box and is adapted to be driven in one direction only, whereby a reversing gear or the like is saved. When assuming the crank-shaft to constantly run, the effect produced would consist in slowly turning the box from its normal horizontal position to its extreme inclined position and again back to the initial position, thereupon repeating this rocking motion as long as the transmission of the motion from the motor to the worm wheel continues, so that every breakdown is avoided. The transmission of the motion can be interrupted at any moment without any danger of the box moving further, which means, that the tilting box can be secured in any position, either in the normal horizontal or in the extreme inclined position or in any intermediate position. Preferably the connecting rods are made in two parts, which are pressed together by means of springs and abutments are provided on the carriage frame for stopping the rocking frame, so that for the lowest position of the crank-pins of the crank-shaft the springs at the same time by means of the connecting rods press the front end of the rocking frame from above against the abutments, so as to prevent the rocking frame from vibrating during the drive. Moreover the crank-shaft is preferably made in two parts, which are connected with the worm wheel by means of clutches and the pins for connecting the connecting rods with the rocking frame are preferably provided with globular surfaces, so as to free the whole mechanism from all objectionable influences of any distortion of the carriage frame.

I will now proceed to describe my invention with reference to the accompanying drawing, in which—

Figure 1 is an elevation of a part of the tilting-autotruck, only so much being shown as is sufficient for the understanding of the invention. Fig. 2 is a vertical longitudinal section on an enlarged scale through the line A—B in Fig. 3 and shows the worm and the worm wheel, and Fig. 3 is a vertical cross section through the line C—D in Fig. 2, seen in the direction of the arrows, the casing for the gearing-box being omitted and a part of the casing for the worm wheel being broken away.

Similar characters of reference refer to similar parts throughout the several views.

The carriage frame 1 of the autotruck is provided with bearings 2, in which the pivots 3 of the rocking frame 4 are mounted to rock. The rocking frame 4 is adapted to

support the box 5. I do not specifically describe the construction of the carriage frame 1 nor that of the rocking frame 4 or of the box 5, as they are immaterial to my invention and may be varied at pleasure. In Fig. 1 the rear wheel at the front is omitted in order to better show the invention, while the other rear wheel 6 is merely indicated by a circle. Suitable abutments 7 are provided on the carriage frame 1 and the front end of the rocking frame is adapted to bear against these abutments under the action of the overweight of the rocking frame 4 and the box 5, also of the load, when the box occupies the horizontal position shown in full lines.

8 denotes a gearing-box of any approved construction, which gearing-box is secured in the carriage frame 1 in any known manner and is shown to contain a longitudinally shiftable shaft 9, which is driven from the motor shaft (not shown) in any known manner and can be shifted from the driver's seat in any approved manner (not shown). The rear end of the shaft 9 has fastened on it a gear wheel 10, which is adapted to mesh with another gear wheel 11 keyed upon the shaft 12 of a worm 13. This shaft is mounted to turn in bearings 14, 15 forming parts of two casing halves 16, 17, which are made in one with projections 18, 19 that are adapted to be connected with the casing 8 in any known manner. The two casing halves 16, 17 are to inclose a worm wheel 20, which meshes with the worm 13 and is mounted to turn in tubular annular projections 24, 24 of the casing halves. Two clutches 21, 21 engage from opposite sides in the nave of the worm wheel 20, are prevented from turning by splines shown and are connected together by means of a central bolt 22. The two casing halves 16, 17 are connected together by means of several bolts 23, 23 in the periphery. The clutches 21, 21 have on their sides claws 25 which engage between similar claws on flanges 26 of two crank-shafts 27, 27. Each crank-shaft 27 is made in one with two parallel cranks 28, 30, a crank-pin 29 between them and a pivot 31. The two pivots 31 are mounted to turn in two suitable bearings or supports 32, 32 fastened on the carriage frame 1.

The rocking frame 4 is shown to comprise two cross beams 33, 33, between which two pairs of parallel shields 34, 34 in the vertical central planes of the crank-pins 29, 29 are secured. Through each pair of shields 34, 34, passes a bolt 35, on which a globular pin 36 is secured. On the globular part of this pin a two-part head 37 is mounted to move in all directions and the lower part of the head 37 is made in one with a tubular casing 38, in which the head 39 of a connecting rod 40 engages. The tubular casing 38 is closed with a screw-threaded disk 41 through which the connecting rod 40 passes. The two-part head 42 at the lower end of the connecting rod 40 is made to encircle the corresponding crank-pin 29. A helical spring 43 surrounding the upper end of the connecting rod 40 is inclosed in the tubular casing 38 and is compressed by the disk 41, so that it is strained and bears with its upper end against the head 39 and with its lower end against the disk 41. In this manner the crank-pin 29 is elastically connected with the globular pin 36 and thereby with the rocking frame 4. It is evident, that the connection of the worm wheel 20 with the two crank-shafts 27, 27 by means of the clutches and that the globular shape of the two pins 36 free the whole mechanism from all objectionable influences of any distortion of the carriage frame 1.

The mechanism described operates as follows: Assuming the box 4 to occupy its normal horizontal position shown in full lines in Fig. 1 and the motor to be running, then by longitudinally shifting the shaft 9 from the driver's seat the gear wheel 10 is made to engage the other gear wheel 11, so that thereby the worm 13 is made to rotate. In consequence of this the worm wheel 20 is set to slowly rotate, so that by means of the clutches 21, 25, 26, the crank-shafts 27, 28, 29, 30, 31, the connecting rods 40, 39, the heads 37 and the globular pins 36 the rocking frame 4 with the box 5 is slowly turned from the horizontal position to the extreme inclined position. When the driver at this moment withdraws the gear wheel 10 out of engagement with the other gear wheel 11, the rocking frame 4 with the box 5 will of course stop. The said extreme inclined position is, however, so adjusted, that the angle thereby made with the normal horizontal position is a little larger than the smallest angle of friction of any material, which may be loaded into the box 5. Then the driver need not watch the motion of the box 5, but simply start the mechanism by pushing the gear wheel 10 into engagement with the gear wheel 11, after the respective trap-door (not shown) or the like at the rear end of the box 5 has been opened, so that before the box 5 reaches the extreme position the load will commence to slide down the box-bottom to the ground. When the tilting-box has reached the extreme inclined position, all of the load may be expected to have slid off. As the worm wheel 20 continues turning, the rocking frame 4 with the box 5 will soon slowly turn back into the initial position. The driver watching the motion of the box will at the proper moment withdraw the gear wheel 10 out of engagement with the gear wheel 11, so that the rocking frame with the box will remain in the said horizontal position. The two connecting rods 40, 40 have such a length, that the front end of the rocking frame 4

comes in contact with the abutments 7 before the crank-pins 29, 29 attain their lowest position, so that when the two crank-pins attain their lowest position, in other words, when the two connecting rods 40, 40 attain their vertical position shown in dotted lines in Fig. 1 the two helical springs 43 will have been compressed through a certain small distance and attain a little more strain. In consequence of this the front end of the rocking frame 4 will be pressed from above against the abutments 7, so that the rocking frame 4 with the box 5, also the load, if any is there, will be prevented from vibrating during the drive.

The pitch of the worm 13, in other words the angle of its turns, and the friction between the worm 13 and the respective bearing 14 or 15, also the friction between the worm shaft 12 and the bearings 14, 15 should be so adjusted as to prevent the worm 13 from inadvertently moving during the drive after the gear wheel 10 has been withdrawn from the gear wheel 11.

It is evident, that where so preferred the gear wheel 10 may be prevented from longitudinal motion, while the other gear wheel 11 is made longitudinally movable on the worm shaft 12 and is prevented from turning thereon, in which case some known means should be provided for moving the gear wheel 11 from the driver's seat.

The mechanism can be varied in many respects without departing from the spirit of my invention.

I claim:

1. In a vehicle, a carriage frame, a tilting-box mounted to rock in said carriage frame, abutments on said carriage frame for supporting one end of said tilting-box in its normal position, a crank-shaft mounted to turn in said carriage frame, connecting rods in two parts connecting the crank-pins of said crank-shaft with said tilting-box between its fulcrum and the end normally supported by said abutments, springs for pressing together the two parts of said connecting rods and adapted to press the end of said tilting-box from above against said abutments for the lowest position of the crank-pins of said crank-shaft, and means for driving and stopping said crank-shaft.

2. In a vehicle, a carriage frame, a tilting-box mounted to rock in said carriage frame, abutments on said carriage frame for supporting one end of said tilting-box in its normal position, pins on said tilting-box having globular surfaces, a crank-shaft mounted to turn in said carriage frame, connecting rods in two parts connecting the crank-pins of said crank-shaft with said pins, springs for pressing together the two parts of said connecting rods and adapted to press the end of said tilting-box from above against said abutments for the lowest position of the crank-pins of said crank-shaft, and means for driving and stopping said crank-shaft.

3. In a vehicle, a carriage frame, a tilting-box mounted to rock in said carriage frame, abutments on said carriage frame for supporting one end of said tilting-box in its normal position, globular pins on said tilting-box, a crank-shaft in two parts mounted to turn in said carriage frame, clutches connecting the two parts of said crank-shaft, connecting rods in two parts connecting the crank-pins of said crank-shaft with said pins, springs for pressing together the two parts of said connecting rods and adapted to press the end of said tilting-box from above against said abutments for the lowest position of the crank-pins of said crank-shaft, and means for driving and stopping said crank-shaft.

4. In a vehicle, a carriage frame, a rocking frame in said carriage frame adapted to support a box, abutments on said carriage frame for supporting one end of said rocking frame in its normal position, a crank-shaft mounted to turn in said carriage frame, connecting rods in two parts connecting the crank-pins of said crank-shaft with said rocking frame between its fulcrum and the end normally supported by said abutments, springs for pressing together the two parts of said connecting rods and adapted to press the end of said rocking frame from above against said abutments for the lowest position of the crank-pins of said crank-shaft, and means for driving and stopping said crank-shaft.

5. In a vehicle, a carriage frame, a rocking frame in said carriage frame adapted to support a box, abutments on said carriage frame for supporting one end of said rocking frame in its normal position, globular pins in said rocking frame between its fulcrum and the end normally supported by said abutments, a crank-shaft mounted to turn in said carriage frame, connecting rods in two parts connecting the crank-pins of said crank-shaft with said globular pins, springs for pressing together the two parts of said connecting rods and adapted to press the end of said rocking frame from above against said abutments for the lowest position of the crank-pins of said crank-shaft, and means for driving and stopping said crank-shaft.

6. In a vehicle, a carriage frame, a rocking frame in said carriage frame adapted to support a box, abutments on said carriage frame for supporting one end of said rocking frame in its normal position, globular pins in said rocking frame between its fulcrum and the end normally supported by said abutments, a crank-shaft in two parts mounted to turn in said carriage frame, clutches connecting the two parts of said

crank-shaft, connecting rods in two parts connecting the crank-pins of said crank-shaft with said globular pins, springs for pressing together the two parts of said connecting rods and adapted to press the end of said rocking frame from above against said abutments for the lowest position of the crank-pins of said crank-shaft, and means for driving and stopping said crank-shaft.

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Witnesses:
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EUGENE N BEL.