Aug. 10, 1937. A. W. AITKEN 2,089,591

ROAD ROLLER

Filed Dec. 27, 1934 2 Sheets-Sheet 1

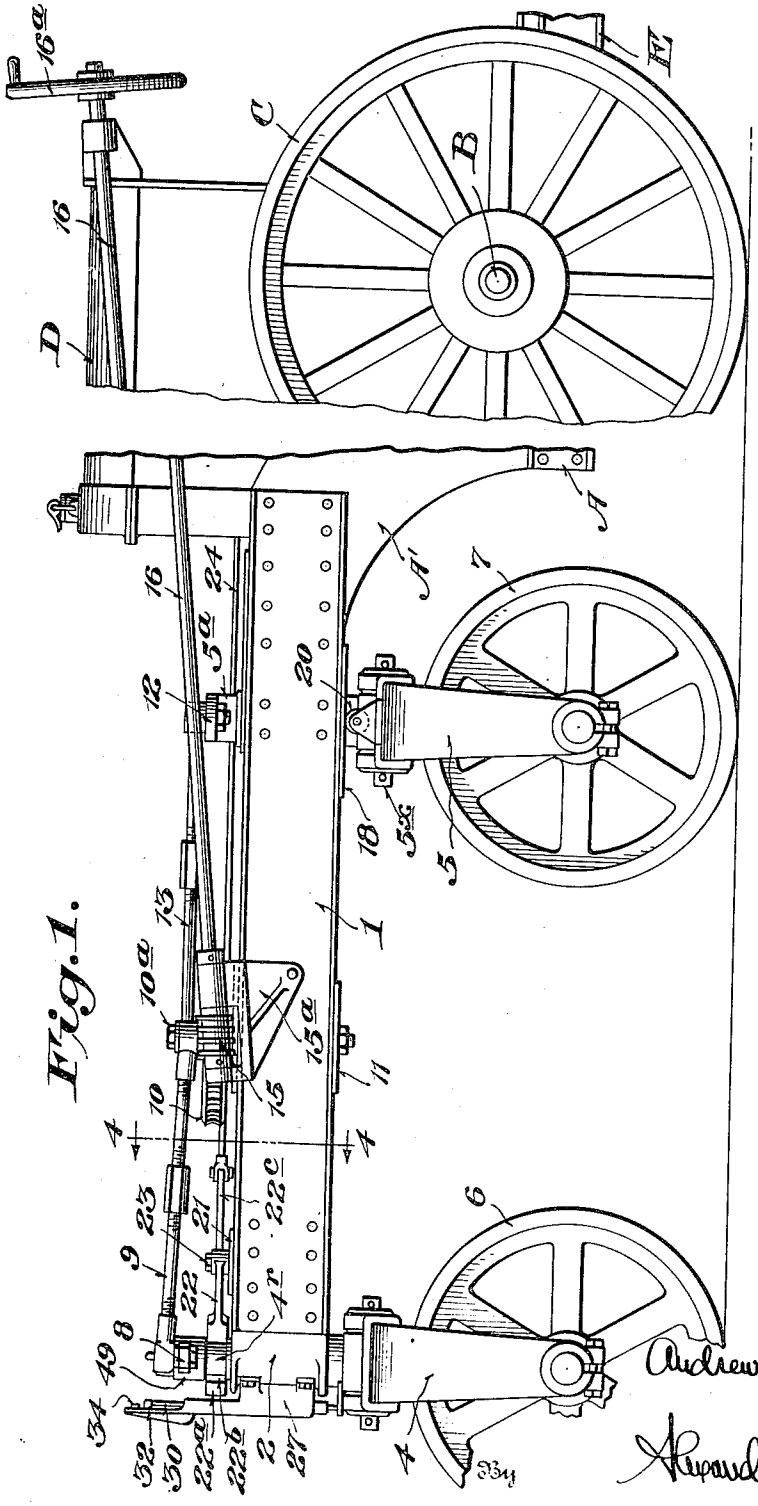


Fig. 1.

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Fig. 3.

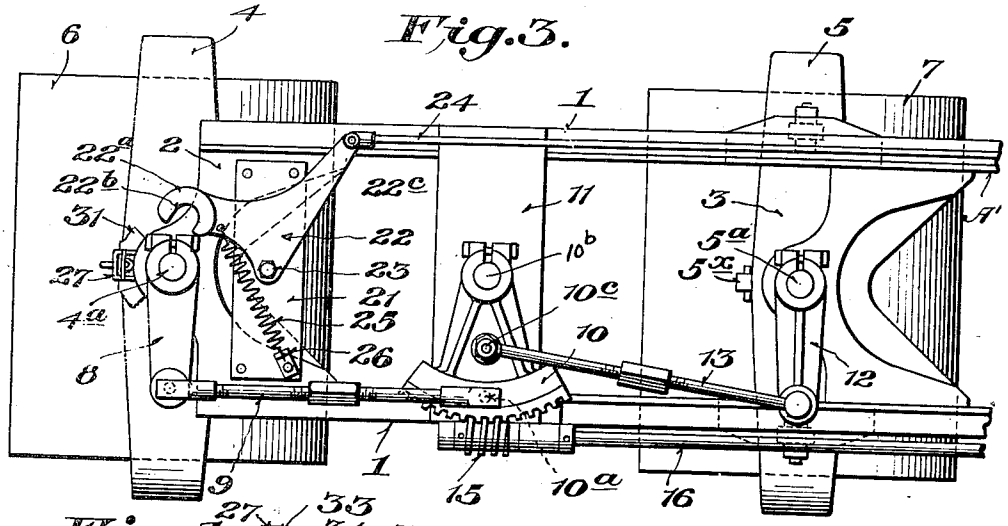


Fig. 4.

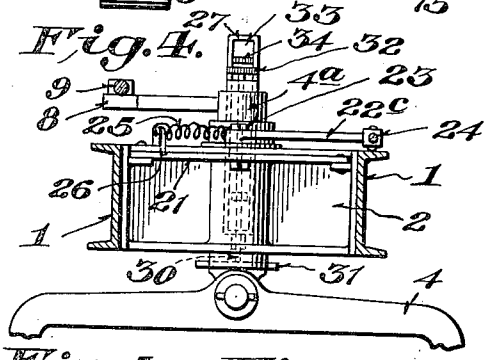


Fig. 2.

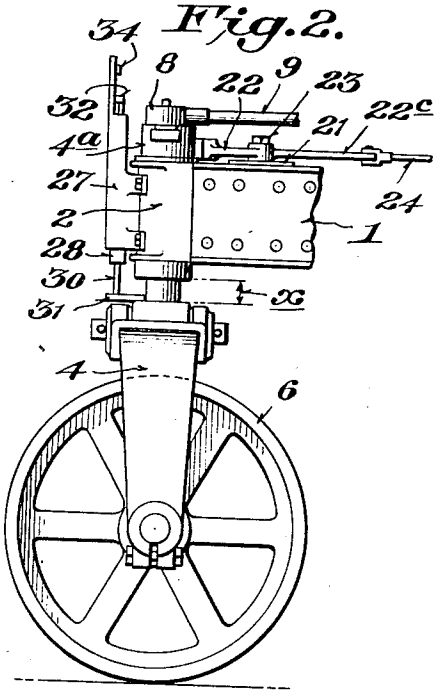


Fig. 5.

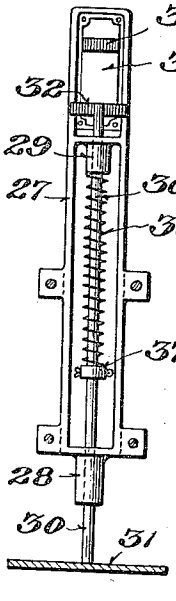
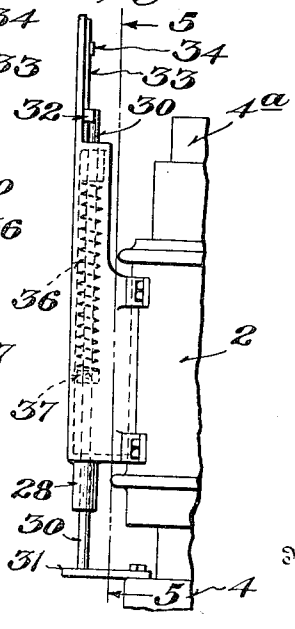


Fig. 6.



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UNITED STATES PATENT OFFICE

2,089,591

ROAD ROLLER

Andrew W. Aitken, Springfield, Ohio, assignor to The Buffalo-Springfield Roller Co., Springfield, Ohio, a corporation of Ohio

Application December 27, 1934, Serial No. 759,391

11 Claims. (Cl. 94—50)

This invention is a novel improvement in road rollers of the type shown in the copending joint application of Carl F. Greiner and Andrew W. Aitken, Serial No. 754,166 filed November 21, 1934, which application disclosed a road roller of the three-axle type having a rear wheeled driving axle, and having front and intermediate rolls both arranged for simultaneous steering. The king pin of the yoke for the front roll was provided with a removable collar normally maintaining the yoke in such position that the lower periphery of the front roll was disposed in a plane tangent to the lower peripheries of the intermediate roll and rear wheels, but when the collar was removed the front yoke was permitted to shift vertically with respect to the vehicle frame so that the front roll could rise and fall with respect to the said plane when the vehicle was operated upon uneven roads, for otherwise in such three-axle type road rollers the intermediate roll when engaging a crest or raised portion in the road would act as a fulcrum, and as it would have to carry the weight of the front roll the road roller frame would tend to tilt forwardly thereby removing the requisite weight on the rear driving roll or wheels for propulsion.

The principal objects of my present invention are to provide a horizontally disposed lever pivoted adjacent the king pin (in place of the removable collar disclosed in said joint application), said lever having a recess in one edge and being adapted to be swung into position to engage a reduced portion of the king pin of the front yoke, and when so engaged to maintain the lower periphery of the front roll in the plane of the lower peripheries of the intermediate roll and driving rolls or wheels; also to provide an operating rod attached to the lever adapted to engage and disengage the lever and king pin; also a spring normally urging the lever to swing towards the king pin, whereby when the road roller is operating on a plane surface, the lever will be or may be engaged with the reduced portion of the king pin, thus preventing any relative vertical movement between the front roll and the vehicle frame, but when the road roller is operating on an uneven road surface, the lever may be readily disengaged from the king pin by operation of the rod, permitting the front roll to rise and fall to suit the unevenness of road surface, thus relieving the front end of the frame of the necessity of supporting the weight of the front roll when the intermediate roll is operating on a raised portion of the road.

Another object of my invention is to provide a novel road surface indicator by which the operator may readily and visually determine when he has rolled a plane surface or rolled a surface to conform with specifications, said indicator comprising a vertical rod having its lower end resting on a plate fastened to the king post of the front yoke, so that same will rise and fall by and with the front roll, said rod being slidably mounted in bearings provided in an indicator frame mounted at the front end of the road roller frame. An indicator plate within the frame marked with indicia cooperates with a plate on the upper end of the rod whereby if the lever is disengaged from the king pin the operator may visually determine by the position of the plate of the rod with respect to the indicia plate of the frame whether or not the road surface has been rolled to a plane surface, or whether or not the road surface is irregular; and hence by watching the indicator after the road surface is rolled, the operator will know the condition of the road, i. e. whether or not the rolling is according to road specifications, or whether more material will have to be distributed in places and such places re-rolled.

I will explain the invention with reference to the accompanying drawings which illustrate one practical embodiment thereof to enable others familiar with the art to adopt and use the same; and will summarize in the claims the novel features of construction and novel combination of parts for which protection is desired.

In said drawings:

Fig. 1 is a side elevation of a road roller (foreshortened) showing the lever engaged and all the rolls and wheels operating on a plane surface.

Fig. 2 is a fragmentary view of the front roll yoke with lever disengaged and the front yoke dropped in its trunnion.

Fig. 3 is a top plan view of the forward portion of the road roller.

Fig. 4 is a section on the line 4—4, Fig. 1.

Fig. 5 is an enlarged front elevation of the road surface indicator.

Fig. 6 is a side elevation of the indicator.

As shown, the road roller is of the three-axle type and comprises parallel side frames A, carrying journals adjacent their rear ends for the rear axle B which carries the driving wheels or rolls C, and in rear of the driving rolls or wheels C is the operator's platform E. Motor D is mounted in the side frames A and drives axle B in the usual manner. The forward ends of side frames A are arched upwardly as at A' over the intermediate roll 7, and parallel extension frame members 1, 1, are secured to the forward ends

A' of the side frames, said members 1, 1, carrying the trunnion castings 2 and 3 arranged in tandem relation and which receive the king pins 4a, 5a of the yokes 4 and 5 for front roll 6 and intermediate roll 7.

Both yokes 4 and 5 are arranged for simultaneous steering. As shown on the upper end of king pin 4a of the front yoke 4 is an arm 8 connected by a link 9 to a pin 10a on a worm gear segment 10 mounted on a pivot pin 10b journaled in cross-plates 11 extending between the frame members 1. Similarly the upper end of king pin 5a of the intermediate yoke 5 carries an arm 12 connected by link 13 to a pin 10c on the worm gear segment 10, the arrangement of links and levers being such that movement of the segment 10 will pivot both yokes 4 and 5 simultaneously, but as the pin 10c is disposed nearer the pivot 10b of the gear segment than is the pin 10a the turning movement of the front yoke 4 will be proportionately greater than that of the yoke 5. Journaled in bracket 15a on the frame member 1, and meshing with the worm gear segment 10, is a worm 15 on a steering rod 16 which extends upwardly and rearwardly to a position above the operator's platform E, said rod having a hand crank 16a on its upper end whereby worm 15 may be rotated to turn the gear segment 10.

The intermediate roll 7 under ordinary working conditions is not permitted any vertical or tilting movement with respect to the road roller frame, and for this purpose the upper face of yoke 5 is provided with removable rolls 20 (Fig. 1) engaging removable rubbing plates 18 mounted on the undersides of the frame members 1, 1, or with other means for normally holding the horizontal plane of the axle of the intermediate roll 7 parallel with the driving axle B; however when transporting the road roller over rough roads, or when turning the road roller around, the rolls 20 and plates 18 may be removed to permit the intermediate roll 7 to pivot or tilt laterally on its horizontal pivot pin 5x (Fig. 1) in order to minimize strains in the road roller frame, or in the yoke 5 or trunnion 3.

Adjacent the front trunnion casting 2 is a horizontally disposed bell-crank lever 22, pivoted as at 23 to a plate 21, said bell-crank lever having one arm 22a provided with a recess 22b in its side adapted when the arm is swung towards king pin 4a to engage a reduced portion 4r of the king pin as shown in Fig. 1 disposed between the top of trunnion casting 2 and the steering arm 8, the thickness of the arm 22a at the recess 22b being slightly less than the length of the recessed portion 4r of the king pin in order to prevent vertical movement of the king pin 4a with respect to trunnion 2 when the lever 22a is thus engaged. The other arm 22c of the bell-crank lever 22 is attached to an operating rod 24 extending rearwardly to a position accessible from the operator's platform E and the rod may be provided with a catch (not shown) for holding the lever arm 22a out of engagement with the king pin 4a. A spring 25 attached to the arm 22a and to a bracket 26 on the plate 21 normally yieldably urges the bell-crank lever 22 to swing so as to engage its recess 22b with the king pin 4a, in which position the lower peripheries of the front, intermediate, and rear rolls lie in the same plane, and no vertical movement of the front roll 6 with respect to the frame of the road roller will be permitted. The spring 25 normally urges the bell-crank lever 22 to engage the king pin when the reduced portion 4r of the king pin is disposed opposite the recessed arm 22a, i. e., between the upper face of the trunnion casting 2 and the underside of the steering arm 8, and the spring 25 holds the lever 22 in such position until the bell-crank lever is manually shifted through rod 24 by the operator and the catch (not shown) at the operator's platform actuated to hold the lever 22 in such disengaged position.

Fig. 2 shows the position of the front roll 6 relative to the frame 1, 1 of the road roller when the lever 22 is disengaged on the roller operating on an uneven road surface, the front yoke and roll being shown disposed at a lower level than the position shown in Fig. 1, the king pin 4a of the yoke having dropped in the trunnion casting 2 an amount equal to the distance marked x in Fig. 2. Hence when lever 22a is disengaged from the king pin 4a the extension members 1 of the vehicle frame will not have to carry the weight of the forward yoke and roll in event the intermediate roll 7 should encounter a high point in the road surface.

I also provide a novel road surface indicator to enable the operator to readily and visibly determine whether or not he has rolled a plane surface, or rolled to required specifications. The indicator consists of a casing 27 bolted or otherwise secured to the front of the trunnion casting 2, said casing consisting of a rectangular frame as shown in Figs. 5 and 6 having a lower bearing 28 and an upper bearing 29 receiving a vertically disposed rod 30 which is slidably mounted in the bearings 28, 29, the lower end of the rod 30 resting on a plate 31 secured to the king pin 4a, the plate 31 being of such shape and dimensions that the lower end of rod 30 will rest thereon throughout the steering movement of the yoke 4. Thus the upper end of rod 30 will rise and fall with the front roll 6 while the casing 27 has a fixed relation to the road roller frame. On the upper end of rod 30 is a plate 32 preferably colored black, which plate moves vertically with the rod 31 across a plate 33 forming a background at the upper end of the casing 27. A spring 36 around rod 30 within the bracket frame 27 bearing against the bearing 29 and against a collar 37 on the rod 30 normally tends to maintain the rod 30 depressed upon the plate 31. The background 33 is preferably of general white or light color but is provided with a black or darkened field 34 which stands out visibly on the white background 33, the black area 34 being of size and shape similar to the plate 32 carried by rod 30, and being disposed in such elevation on the background 33 that when the plate 32 overlies the black field 34 the lower peripheries of the three rolls 6, 7 and wheels B all lie in the same plane. When the three rollers do not lie in the same plane part of the white background 33 will be visible between the black plate 32 and the black field 34, which occurrence will denote that the surface being rolled is not a plane surface.

The indicator feature is important in that when the road surface has ben rolled to a plane, with arm 22a disengaged from the king pin 4a, no white will appear on the indicator between the black field 34 and black plate 32 while the road roller is moving. If a fluctuating width of white appears on the indicator between the black areas or fields the operator will know that the road surface is irregular or not a plane surface. Thus by watching the indicator the operator may visibly determine the condition of the road surface, and if more white shows on the indicator between the black fields than the road specification allows,

then loose material will have to be distributed and re-rolled until none or but little white background **33** appears between the black fields **32—34**.

I do not limit my invention to the exact form shown in the drawings, for obviously changes may be made therein within the scope of the claims.

I claim:—

1. In a road roller, a frame supported upon two rollers and provided with a vertically movable third roller; means for locking the third roller in such position that its lower periphery lies in the plane of the lower peripheries of the supporting rollers whereby the road roller may roll a plane surface; and indicating means associated with the third roller for indicating high and low spots in the road surface when said locking means is disengaged to permit the third roller to shift vertically.

2. In a road roller as set forth in claim 1, said indicating means comprising a plate carried by the frame; a member slidably mounted on the plate and operated by and with the rise and fall of the third roller; and indicia on the plate co-operating with a portion of said member.

3. In a road roller as set forth in claim 1, said indicating means comprising a bracket mounted on the frame; a rod slidably mounted in the bracket and operated by the rise and fall of the third roller; and indicia on the bracket cooperating with the upper end of the rod.

4. In a road roller, a frame; a wheeled rear driving axle journaled therein; a pair of trunnions mounted in the frame in tandem relation in advance of the axle; steering yokes pivoted in the trunnions; ground rollers carried by the yokes; means adapted to engage the front yoke for maintaining the lower periphery of the front roller in the plane of the lower peripheries of the other roller and wheels, said means when disengaged permitting the front roller to shift vertically with respect to said plane; means for operating said maintaining means; and means to indicate to the operator high and low spots in the road surface when the maintaining means is disengaged.

5. In a road roller as set forth in claim 4, said maintaining means comprising a lever pivoted on the frame adapted when swung to engage a reduced portion on the pivot of the front yoke to prevent vertical movement of the pivot in said trunnion.

6. In a road roller as set forth in claim 4, said maintaining means comprising a lever pivoted on the frame having an open recess adapted to engage a reduced portion on the pivot of the front yoke to prevent vertical movement of the yoke in said trunnion.

7. In a road roller as set forth in claim 4, said indicating means comprising a bracket carried by the frame adjacent the front yoke; a member vertically slidably mounted in the bracket and having its lower end engaging the front yoke; and indicia on the bracket cooperating with the upper end of said member, for indicating the rise and fall of the front roller with respect to the frame.

8. In a road roller as set forth in claim 4, said front roller maintaining means comprising a bell-crank lever pivoted on the frame having one arm provided with an open recess adapted when the lever is swung to engage a reduced portion on the pivot of the front yoke to prevent vertical movement of the pivot in said trunnion; an operating rod connected with the other arm of said lever; and means for yieldably urging the recessed arm into engagement with the yoke.

9. In a road roller, a frame; a wheeled rear driving axle journaled therein; a pair of trunnions mounted in the frame in tandem relation in advance of the axle; steering yokes pivoted in the trunnions; ground rollers carried by the yokes; a lever pivoted on the frame adapted when swung to engage a reduced portion on the pivot of the front yoke to prevent vertical movement of the pivot in said trunnion while maintaining the lower periphery of the front roller in the plane of the lower peripheries of the other roller and wheels, said lever when disengaged permitting the front roller to shift vertically with respect to said plane; and means for operating said lever.

10. In a road roller as set forth in claim 9, said lever having an open recess adapted to engage the reduced portion on the pivot of the front yoke.

11. In a road roller as set forth in claim 9, said lever comprising a bell-crank lever pivoted on the frame having one arm provided with an open recess adapted to engage said reduced portion on the pivot of the front yoke; and said lever operating means comprising an operating rod connected with the other arm of said lever; and means for yieldably urging the recessed arm into engagement with the yoke.

ANDREW W. AITKEN.