April 29, 1941. A. W. AITKEN 2,240,236

TRENCH ROLLER

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Fig. 1.

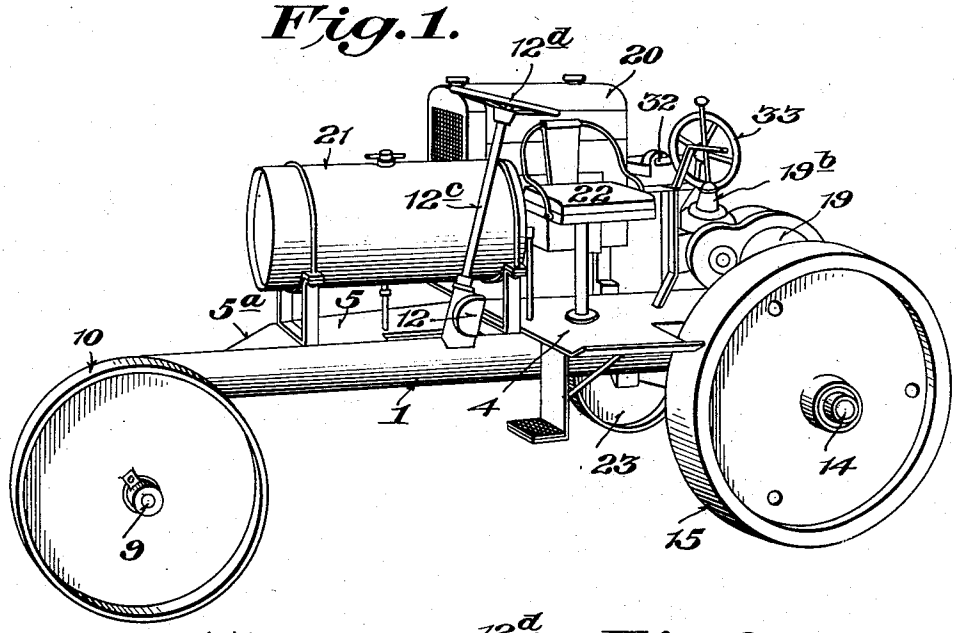
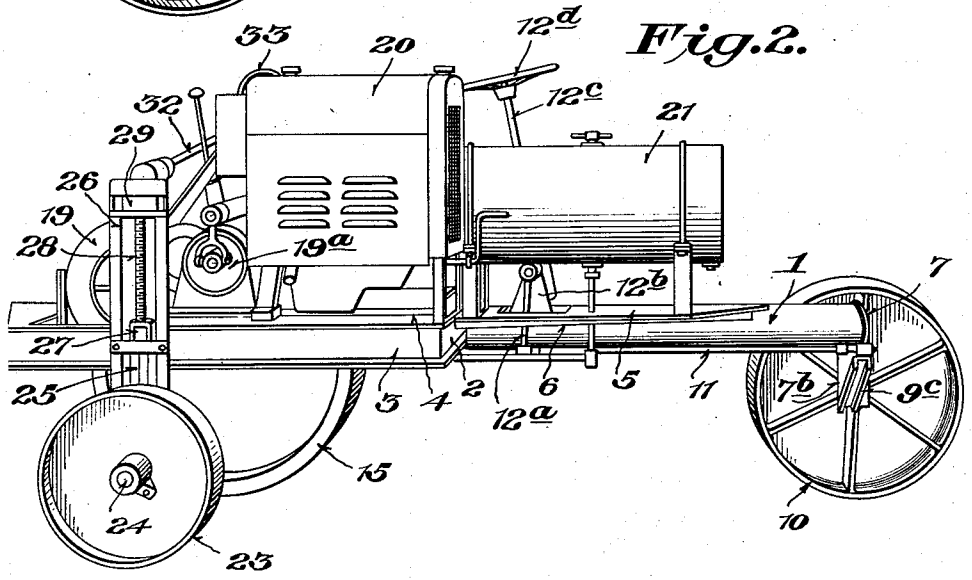


Fig. 2.



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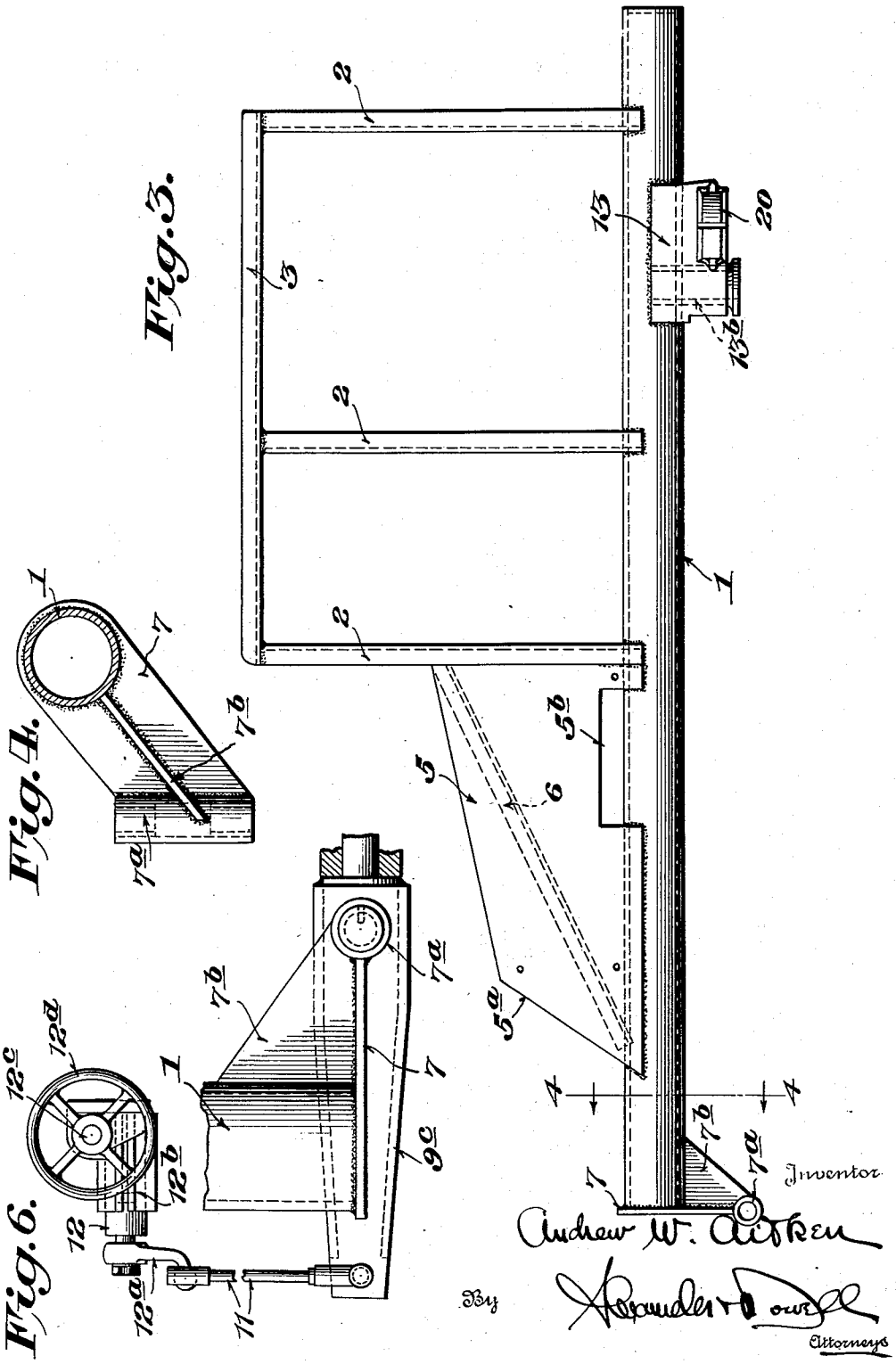
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Fig.5.

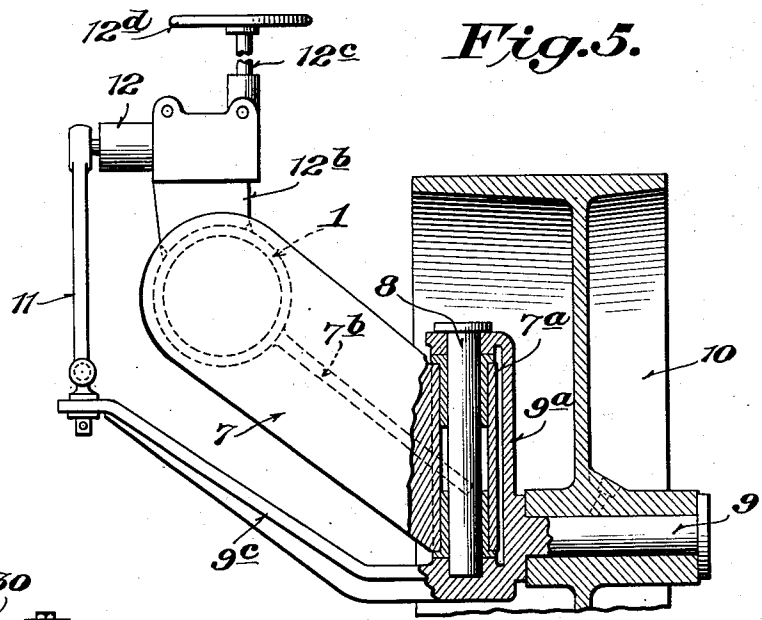


Fig.8.

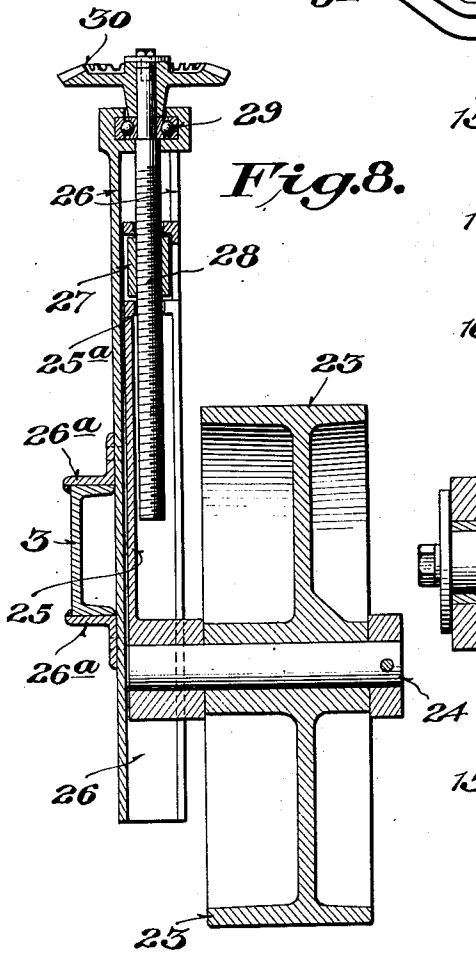
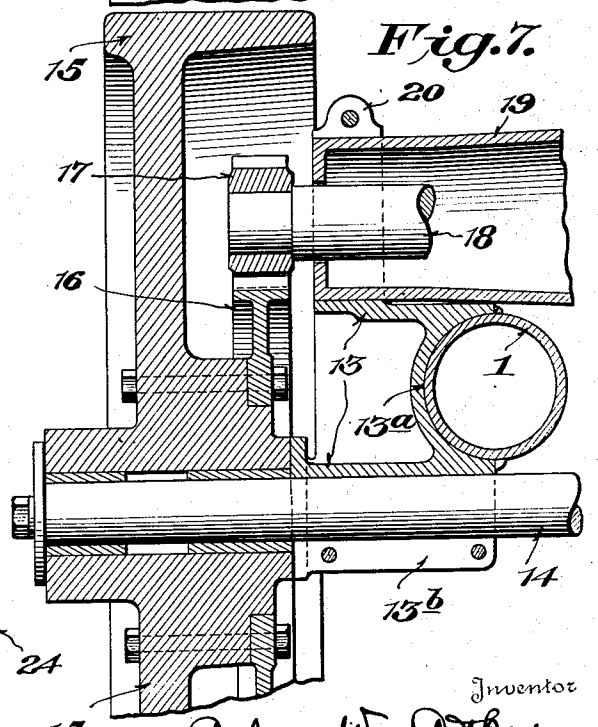


Fig.7.



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UNITED STATES PATENT OFFICE

2,240,236

TRENCH ROLLER

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

Application January 8, 1940, Serial No. 313,012

8 Claims. (Cl. 61—63)

This invention is a novel improvement in trench rollers adapted to compact road building material placed in trenches at the sides of a roadway; and the principal object of the invention is to provide a novel motor driven three-wheel roller having a drive roll and a steering roll disposed at one side of the vehicle frame and adapted to operate in the trench to compress the material therein, and said roller having a vertically adjustable leveling roll at the other side of the vehicle frame for the purpose of maintaining the frame in substantially horizontal position irrespective of the depth of the trench.

Heretofore, in operating the above type of roller it has been found that when the steering roll is being forced into or out of the trench, severe torsional strains have been set up in the frame often causing serious wracking or distortion tending to weaken the frame and cause the steering roll axle to become disaligned with respect to the drive roll axle. Another object of the invention is to provide a novel frame for such rollers in which the main longitudinal member consists of a relatively large extra-heavy tube or pipe disposed along the side of the frame adjacent the drive and steering rolls, said tube forming the main backbone of the frame and serving to resist torsional stresses and to prevent disalignment of the parts, said frame having cross beams and plates welded thereto to form an integral structure in which all the parts coact to resist torsional stresses in the frame.

Other minor objects of the invention will be hereinafter set forth.

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 combinations of parts, for which protection is desired.

In said drawings:

Fig. 1 is a perspective view of my novel trench roller looking at the drive roll side.

Fig. 2 is a perspective view thereof looking at the opposite side.

Fig. 3 is a plan view of the vehicle frame, detached.

Fig. 4 is a section on the line 4—4, Fig. 3.

Fig. 5 is an enlarged vertical transverse section through the steering roll, and showing in elevation the steering gear.

Fig. 6 is a top plan view of the parts shown in Fig. 5, with the steering wheel removed.

Fig. 7 is a vertical transverse section through the drive roll, and adjacent parts.

Fig. 8 is a vertical transverse section through the frame leveling roll and its adjusting mechanism.

As shown, the trench roller preferably comprises a frame consisting of an extra heavy tube or pipe 1 of relatively large diameter, forming one side member of the frame and the main backbone thereof. Extending laterally of tube 1 are a series of relatively heavy members 2, preferably channel irons, having their inner ends welded to the tube 1 and their outer ends welded to a similar channel iron 3 which forms the opposite side member of the frame. Members 1, 2 and 3 support the main platform 4 of the vehicle upon which the driving and operating units are mounted, said platform embracing substantially the rear half of the length of tube 1. Preferably the channels 2 and 3 are of substantially the same depth as the external diameter of tube 1, and the welded connections rigidly unite the members 1, 2, 3 into a unitary structure.

Extending from the forward cross-channel 2 is a plate 5 of substantially rectangular shape forming a continuation of the platform 4 and having its rear edge spotwelded to the front channel 2 and its outer edge spotwelded to the upper periphery of tube 1. Plate 5 terminates short of the forward end of tube 1, and preferably has its forward edge 5a cut obliquely. On the underside of the plate 5, extending diagonally from the forward tip adjacent tube 1 to the inner rear corner, is an angle bar 6, preferably spotwelded to the underside of plate 5 and serving to stiffen said plate, whereby the members 5 and 6 will assist in resisting torsional strains or stresses which may be set up in the tube 1.

The forward end of tube 1 is closed by a plate 7 welded thereto and extending laterally and downwardly with respect to the axis of tube, plate 7 carrying at its outer end a vertically disposed bearing sleeve 7a in which the king pin 8 (Fig. 5) of the yoke 9a of the steering axle 9 for the relatively wide steering roll 10 is mounted. Preferably a reinforcing plate 7b is disposed axially of the plate 7 but in a plane normal thereto, said bracket plate 7b being welded to plate 7, to the sleeve 7a, and to the tube 1 so that plate 7 will rigidly maintain the axis of bearing sleeve 7a in fixed relation with respect to the axis of tube 1.

The yoke 9a of steering roll 10 is provided with an arm 9c (Figs. 5 and 6) connected by a link 11 with the steering arm 12a of steering gear 12, the casing of which extends down through an opening 5b in plate 5, and is secured to a bracket 12b welded onto the top of tube 1. Steering gear 12 has a steering shaft 12c operated by a hand wheel 12d disposed adjacent the front end of platform 4.

Adjacent the rear end of tube 1 is an axle bracket casting 13 (Fig. 7) having a semi-cylindrical recess 13a in its inner face receiving the outer side of tube 1, said casting being welded throughout its full length to the top and bottom peripheries of the tube 1, and said casting hav-

ing a split bearing 13b on its underside below tube 1 adapted to receive the axle 14 of the rear or drive roll 15, which is disposed in substantial alignment with the front or steering roll 10. Roll 15 is provided with a main driving gear 16 at the inner end of its hub meshing with a pinion 17 on a drive shaft 18 journaled in a transmission casing 19 mounted upon platform 4 and having its end adjacent roll 15 seated upon the top of axle bracket casing 13 and secured in place by means of split clamps 20 to maintain pinion 17 in mesh with gear 16. Shaft 18 is driven, through a suitable clutch 19a and change speed mechanism 19b, by an internal combustion engine 20 mounted upon the platform 4. Preferably an operator's seat 22 is provided on platform 4 adjacent the steering wheel 12d. The particular types of motor 20, clutch 19a, and speed change gear 19b, form no part of my present invention.

The side of the vehicle frame opposite from tube 1 is supported by a vertically adjustable roll or wheel 23 (Fig. 8) having a stub axle 24 mounted on a cross-head 25 vertically movably mounted in cross-head guide 26 secured by clips 26a to the top and bottom faces of the frame side member 3. Cross-head 25 carries a fixed nut 27 in a vertical bore 25a receiving a screw shaft 28 journaled in a bearing 29 at the upper end of guide 26, said shaft having a gear 30 (Fig. 8) on its upper end meshing with a pinion carried by an inclined shaft 32 extending towards the operator's seat 22, said shaft 32 having a hand wheel 33 thereon whereby rotation of said shaft will raise or lower the roll 23.

By the above construction, a rigid vehicle frame is provided which will maintain the axes of the steering roll 10 and drive roll 15 in substantial alignment at all times, and said frame will resist and prevent wracking or twisting of the parts of the frame primarily because of the ability of tube 1 to resist torsional stresses. Thus when the steering roll 10 is being forced into or out of a ditch at the side of the road, the severe torsional stresses, which would normally be set up in the frame and which would tend to twist the frame and disalign the axes of the steering roll 10 and driving roll 15, are effectively resisted, the tube 1 containing no openings in its side walls throughout its entire length and same being reinforced by the channel members 2, 3 and the reinforced plate 5, all of which parts are welded together to form a unitary structure of sufficient strength and rigidity to prevent undue twisting of the tube and the frame irrespective of the force required to drive the steering roll 10 into or out of a trench at the side of the road.

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

I claim:

1. In a trench roller, a frame comprising a relatively long heavy torsion-resisting tube forming one side member of the frame; a plurality of cross beams extending laterally from said tube adjacent its rear end; a longitudinal member connecting the outer ends of said cross beams and forming the opposite side member of the frame; a platform on said cross beams; a plate connected with the foremost cross beam and with the tube and forming a continuation of said platform extending substantially to the front end of the tube; a steering roll bracketed to the front end of said tube; means adjacent said platform for steering said roll; a drive roll in substantial alignment with the steering roll bracketed to the rear end of said tube; means including a prime mover on said platform for driving said drive roll; a ground wheel adjustably supporting the opposite side member of the frame; and means adjacent the platform for adjusting said wheel.

2. In a trench roller as set forth in claim 1, a laterally extending bracket welded to the front end of the tube, and carrying a vertically disposed bearing sleeve; said steering roll having an axle journaled in said sleeve and having a steering arm; and said steering means comprising a steering gear mounted on said tube and operatively connected with said steering arm.

3. In a trench roller as set forth in claim 1, an axle housing welded to said tube and extending above and below the tube and having an axle bearing disposed below the tube; an axle journaled in said bearing and carrying said drive roll; and said driving means including a transmission housing mounted upon the top of the axle housing above the tube and carrying a drive shaft; and intermeshing gears on the drive shaft and hub of the drive roll.

4. In a trench roller as set forth in claim 1, said ground wheel having an axle mounted in a cross-head; and said ground wheel adjusting means comprising a vertically disposed guide mounted on said opposite side member slidably receiving the cross-head; a rotatable screw shaft journaled in said guide and engaging a nut in the cross-head, and a manually operable shaft for rotating said screw shaft.

5. In a trench roller, a frame comprising a relatively long torsion-resisting tube at one side of the frame; a downwardly and laterally extending bracket welded to the front end of the tube and carrying a vertically disposed bearing sleeve; a steering roll having an axle journaled in said sleeve and having a steering arm; and a steering gear mounted on said tube and operatively connected with said steering arm.

6. In a trench roller as set forth in claim 5, said bracket comprising a plate welded to the end of the tube; and a second plate disposed axially of the first plate and in a plane normal thereto, said second plate being welded to the tube, to the first plate, and to the bearing sleeve.

7. In a trench roller, a frame comprising a relatively long torsion-resisting tube at one side of the frame; an axle housing mounted on said tube and extending above and below the tube and having an axle bearing disposed below the tube; an axle journaled in said bearing, a drive roll mounted on said axle; driving means including a transmission housing mounted upon the top of the axle housing above the tube, a drive shaft journaled in said transmission housing; and intermeshing gears on the drive shaft and on the hub of the drive roll.

8. In a trench roller as set forth in claim 7, said axle housing having a substantially semicylindrical recess receiving the side of the tube, said housing being welded to the side of the tube.

ANDREW W. AITKEN.