March 21, 1944. G. W. HUTCHINSON 2,344,701

ROLLER

Filed Feb. 19, 1942

FIG. 1.

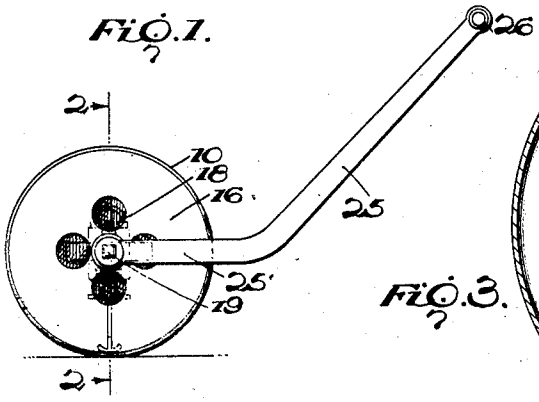


FIG. 3.

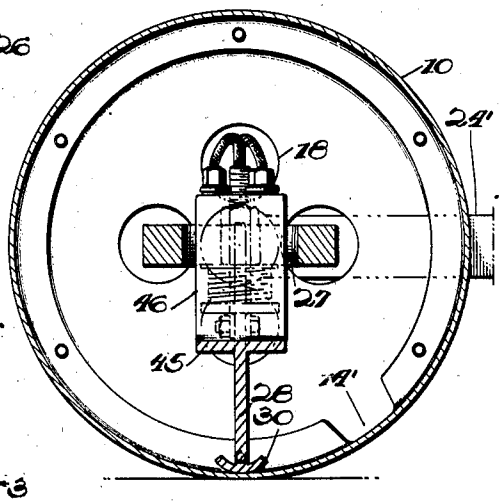


FIG. 2.

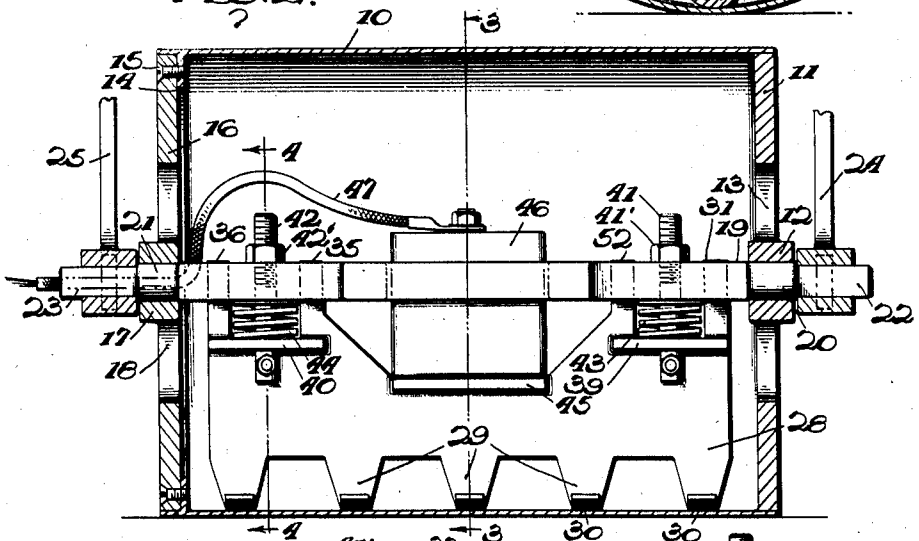


FIG. 5.

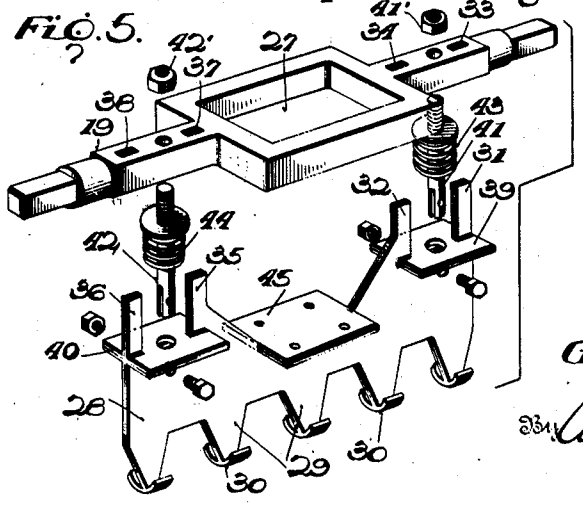
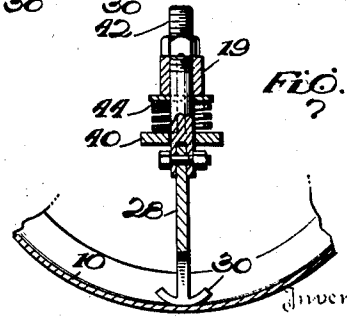


FIG. 4.



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ROLLER

George W. Hutchinson, Raleigh, N. C.

Application February 19, 1942, Serial No. 431,591

5 Claims. (Cl. 94—50)

This invention relates to rollers of the type used in compacting surfacing materials, as in the construction of roads and the like. Ordinarily these rollers rely solely on weight for compacting effect. It is the purpose of the present invention to enhance the effectiveness of such rollers by equipping them with vibratory means in such manner that rapid vibration is imparted to the bottom portions of the rollers. In the accompanying drawing I have shown the invention in practical embodiment by way of example.

In the drawing:

Figure 1 is a side elevation of a roller in accordance with the invention.

Figure 2 is a section substantially on line 2—2 of Figure 1.

Figure 3 is a section substantially on line 3—3 of Figure 2.

Figure 4 is a partial section substantially on line 4—4 of Figure 2, and

Figure 5 is an exploded view in perspective of the axle and vibration transmitting means which appear in assembled relation in the other views.

Referring to the drawing, reference numeral 10 designates a cylindrical metal shell having a circular plate 11 set in one end and secured thereto, for example, by welding. The plate is formed with an axial bearing hub 12 and adjacent the latter is provided with openings as at 13. Adjacent its other end the shell is provided with an inner annular flange 14 against which is secured, as by screws 15 a circular plate 16 like plate 11 and having an axial bearing hub 17 and adjacent openings 18. The openings 13 and 18 are provided for a purpose which will be explained later on. They are spaced inwardly from the shell periphery so that in operating on a soft surface the shell can sink to any likely extent without danger of inflow through the openings.

Reference numeral 19 designates an axle having cylindrical journal portions 20 and 21 in the bearings 12 and 17, the axle being square inwardly of the bearing portions, or otherwise enlarged, so that it is held against axial displacement. Outwardly of the bearing portions the axle has square portions 22 and 23 of reduced section to which are secured operating arms 24 and 25 joined together at their outer ends by a handle bar 26. The arms 24 and 25 are angular and include portions 24' and 25', Figures 1 and 2, which are horizontal when the arms are in normal operating position. The intermediate portion of the axle 19, as here shown, is split or spread to provide a rectangular opening 27, which opening is vertical when axle 19 is in the normal position enforced when the arm portions 24' and 25' are horizontal, and it is this disposition which will be contemplated in the further description of the axle and its associated parts.

Reference numeral 28 designates a rigid plate recessed along its lower edge to provide equally spaced foot portions 29 to which are welded arcuate shoes 30. The plate has at one end parallel upward extensions 31 and 32 freely slidable in vertical openings 33 and 34 in the axle and guided thereby to maintain the plate in radial disposition. Similar extensions 35 and 36 at the other end of the plate are similarly guided in openings 37 and 38. The plate carries horizontal spring seats 39 and 40 at its ends and these plates are perforated to pass the lower bifurcated ends of upwardly threaded rods 41 and 42, the lower ends of the rods straddling the plate below the spring seats and being bolted to the plate as particularly shown in Figure 4. Surrounding rods 41 and 42 are heavy compression springs 43 and 44 whose lower ends bear on seats 39 and 40 and whose upper ends bear against washers, as shown. The threaded upper ends of the rods are passed through vertical bores in axle 19 and have nuts 41' and 42' threaded thereon. By tightening these nuts against the upper face of the axle, plate 28 can be drawn toward the axle against the action of the springs.

The upper edge of plate 28 is centrally recessed and rigidly carries a horizontal platform 45 to which is fixed a vibrator unit 46 whose upper portion is received in opening 27 free of contact with the boundary walls of the latter. As here shown, the vibrator unit is of known electrically operated type and is adapted to generate high frequency vibrations in the vertical direction. Current may be supplied by means of a cable 47 led in through an axial bore at one end of the axle as shown in Figure 2. Any suitable means may be provided for handling the outside portion of the cable so that it will not interfere with free movement of the roller in use and will allow an adequate operating range.

With the parts shown in Figure 5 in assembled relation and the vibrator unit in place and in connection with the cable 47, the nuts 41' and 42' are tightened to draw plate 28 toward the axle so that its total projection from the axis of the latter is less than the inner radius of the shell. Consequently, with the end plate 16 removed from the shell, the axle and associated parts can be inserted axially into the shell to position journal 20 in bearing 12. In order to lessen the necessary compression of springs 43 and 44 in this insert-

ing operation, the flange 14 may be interrupted as at 14', Figure 3, so as to pass the lower extremity of the assembly. Plate 16 is now applied and then the arms 24 and 25 are mounted on the axle ends. The nuts 41' and 42', which are accessible through the openings 13 and 18, are now loosened so that the vibration transmitting member constituted by the plate and shoes is urged against the bottom inner surface of the shell by the springs 43 and 44, as well as by gravity. Of course, the action of the springs can be modified, if desired, by adjusting the nuts. The operator can now manipulate the roller back and forth over the surface to be compacted and, with the vibrator unit in operation, powerful vibrations will be imparted to the bottom of the shell. By maintaining the arm portions as at 25' substantially horizontal, the operator knows that the transmitting member is vertical and that consequently the vibrations will be transmitted to the lowermost portions of the shell where most effective. However, should it be desired to decrease the intensity of the vibrating effect on the material being compacted, as where a softer area of the material is encountered, this can be accomplished merely by swinging the arms in one direction or the other about the shell axis so as the transmitting member is moved from the perpendicular, thus shifting the zone of maximum vibration delivery circumferentially of the shell. In all cases the vibration transmitting member is preferably designed, as shown, to transmit vibrations substantially uniformly throughout the axial dimension of the shell and vibrators of the magnetic or other suitable type, delivering along the radius of the transmitting member, are preferably used.

In the illustrated embodiment a relatively small roller is shown and the axle is split in order to accommodate the vibrator. With a larger shell radius the vibrator could, of course, be entirely below the shell axis so that a straight solid axle could be used. A hand roller is shown merely by way of example and it will be understood that the roller could be a part of a rolling machine or utilized in any other desired manner. While in some cases gravity would suffice to hold the vibration transmitting member in substantially vertical disposition, I preferably provide means, such as shown, whereby the said member can be positively maintained in the vertical. In large machines a plurality of vibrators can, of course, be provided. The shoes 30 might be in the form of rollers. Other variations than those mentioned can be made without departure from the invention as defined in the following claims.

I claim:

1. A roller comprising a cylindrical shell having axial end bearings, a non-rotary axle journaled in said bearings, a member in said shell guided from said axle during travel of the roller with its lower end in contact with the lower inner surface of the shell, spring means interposed between said axle and member and acting to urge the latter against said shell, a threaded portion extending upwardly from said member through an opening in said axle, a nut threaded on said portion whereby said member can be drawn toward said axle against the action of said spring means, and a vibrator unit mounted on said member.

2. A roller comprising a cylindrical shell having axial end bearings, an axle journaled in said bearings and having end portions outwardly of the latter, operating arms fixed to said end portions respectively, said axle having radial openings therein within said shell, a plate having portions guided in said openings, said plate being disposed beneath said axle when said arms are in normal operating position and having a portion contacting the lower inner surface of the shell, spring means interposed between said axle and plate and acting to urge the latter against said shell, a threaded portion on said plate extending through an opening in said axle, a nut threaded on said portion whereby said member can be drawn toward said axle against the action of said spring means, and a vibrator unit mounted on said plate.

3. A vibrating assembly comprising a bar, a plate having portions slidably guided in transverse openings in the bar, spring means interposed between said plate and said bar and urging said plate away from said bar, abutment means on said portions on the opposite side of the bar from said spring means and serving to limit the movement of said plate away from said bar under the action of said spring means, and a vibrator unit carried by said plate.

4. A vibrating assembly comprising a bar, a plate at one side of said bar and having portions guided by the bar whereby movement of the plate in a fixed plane relative to the bar is permitted, spring means urging the plate away from the bar, nuts threaded on said portions and serving to limit the action of said spring means, and a vibrator unit carried by said plate.

5. A roller comprising a cylindrical shell having axial end bearings, an axle journalled in said bearings with its ends projecting outwardly thereof, a member in said shell radially guided by said axle and having a portion in contact with the lower inner surface of said shell, a vibrator unit mounted on said member, and operating arms fixed to said ends respectively and manually swingable to rock the axle end therewith said member whereby the zone of maximum vibration delivery to the shell may be shifted circumferentially of the latter.

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