

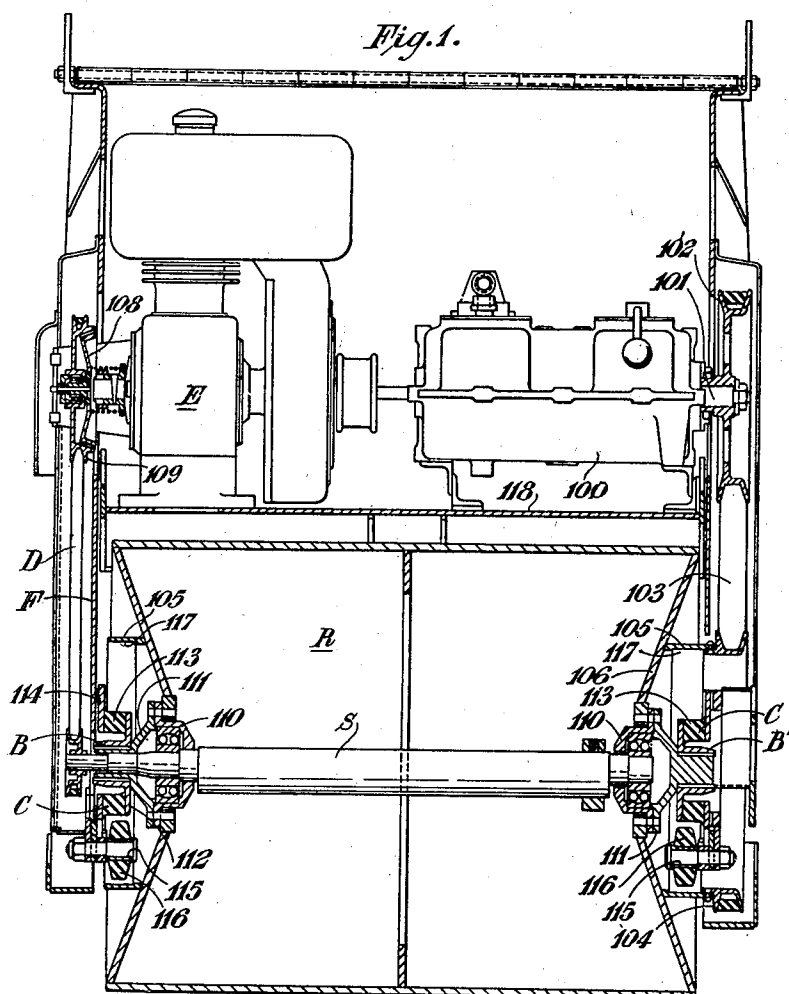
March 9, 1954

N. E. KERRIDGE
VIBRATING ROLLER

2,671,386

Filed June 28, 1950

3 Sheets-Sheet 1



Inventor:
Norman Edward Kerridge;
By his attorneys,
Baldwin, Wright, & Brewster

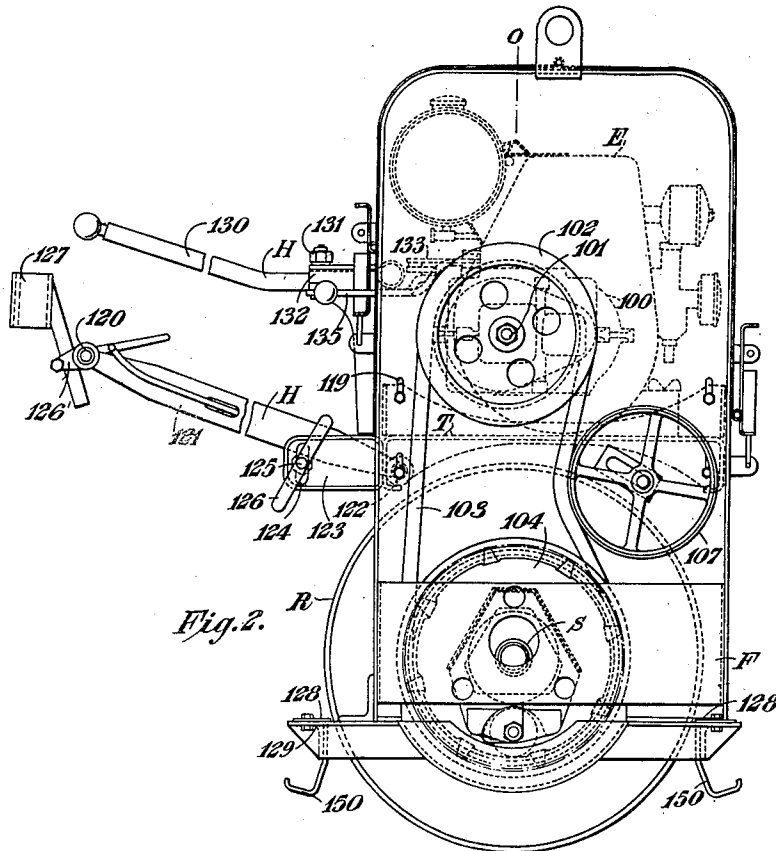
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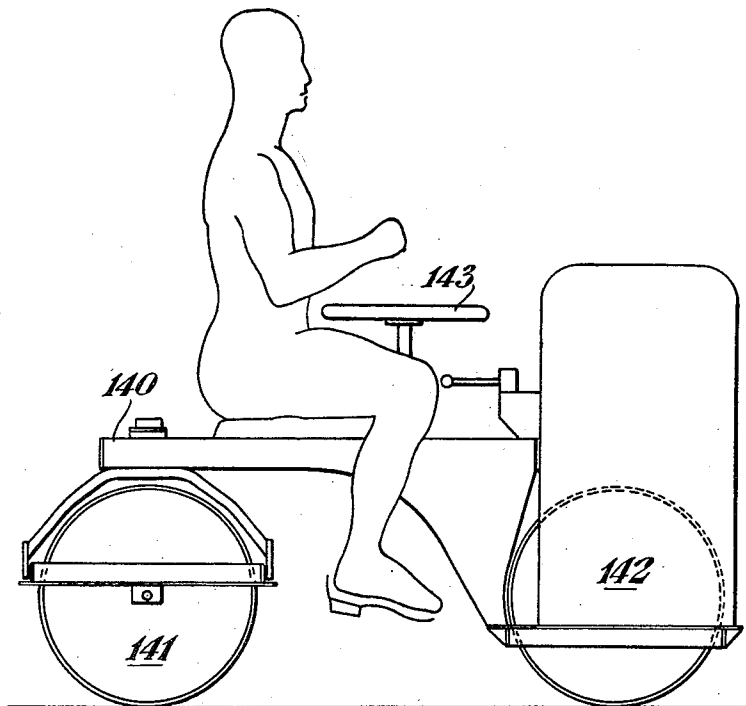


Fig. 3.

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UNITED STATES PATENT OFFICE

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VIBRATING ROLLER

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5 Claims. (Cl. 94—50)

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This invention relates to rollers such as may be utilised for consolidating and/or leveling earth or ballast, such as the subgrade for pavements or roads, for consolidating and/or leveling asphalt paths, or for any apt purpose for which a simple roller, ram or any other means of consolidation and/or leveling would otherwise be used.

The invention is concerned with what is known as a vibrating roller in which there is imparted to the roller high frequency vibrations.

In our prior British Patent No. 588,506 there is described a roller comprising a frame, stub axles supported in the frame from the roller body and a centrally disposed out of balance shaft having an eccentric mass, which shaft is mounted in bearings secured to the roller body and resiliently supported from the frame, so that on rotation of the shaft by an engine carried on the frame, vibrations will be imparted to the roller in its frame.

The object of this invention is to provide an improved design of roller capable of being handled by the operator with the minimum amount of effort.

A further object of the invention is to increase the vibratory action of the roller while reducing the effect of the vibration on the roller frame.

Another object of the invention is to enable both the vibration and tractive effort for moving the roller to be imparted to the vibratory roll itself.

According to the present invention a vibrating roller comprises a roller frame, a roller body having stub axles by means of which axles the roller body is resiliently supported from the roller frame, a centrally disposed out of balance vibratory shaft journaled in the roller body and driving means including an engine in driving connection with the vibratory shaft for causing the same to rotate at speed and coupled to the roller body through an independent drive.

In carrying out the invention, the driving connection between the engine and the roller is preferably by means of a change-speed gear incorporating a reverse drive, hand control clutch mechanism being provided so that the drive from the engine to the vibratory shaft is through the clutch.

According to a further feature of the invention, the resilient block or blocks by means of which the roller body is situated in the roller frame, are so arranged that the rubber or like resilient material is in shear. Snubbing rollers or like members are preferably fitted to the roller

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frame to limit the displacement of the roller body in relation thereto as when subjected to excess traction load.

In order to reduce the effort required by the operator when controlling the roller, an adjustable handle, which may be fitted with a belly-pad, may be provided for moving the centre of gravity of the roller frame to a position either in front or behind the line where the roller makes contact with the ground. Braking of the roller either when travelling or parked may be by means of front and rear sets of ground feet onto which the weight of the roller is lowered.

The invention is illustrated in the accompanying drawings in which Figure 1 is a vertical elevation showing the roller and roller drives in section and Figure 2 a side-on elevation on that side having the tractive drive. Figure 3 is an elevation of a tandem incorporating a vibratory roller in accordance with the invention.

Referring to the drawings there is shown a roller R having an out of balance vibratory shaft S suspended from a roller frame indicated generally at F, the means of suspension including bushes B resiliently connected as at C to the frame F. A prime mover, conveniently an internal combustion engine, indicated generally at E is mounted on a transverse member T of the frame and coupled through a belt drive D to the shaft S. Control of the roller is by handle H on the frame F.

In the machine of this invention the engine E is utilised both to drive the shaft S and the roller R so that the operator under normal working conditions is not called upon to exert a pull or push when using the roller.

For this purpose the engine E is directly coupled to a gear box 100, which preferably as shown is fitted with reverse gear, the output shaft 101 of the gear box having keyed to it a driving pulley 102. Pulley 102 is coupled through a belt drive 103 direct to a rim pulley element 104 riveted or otherwise secured to a flange 105 integral with one of the end discs 106 of the roller R. 107 is a jockey pulley for and adjusting the tension of the belt drive.

The engine E directly drives the out of balance shaft S through the medium of a clutch 108. One of the clutch members 109 has peripheral flanges to form a belt drive to a pulley on the end of the shaft S.

The roller R is mounted to rotate about the out of balance shaft S on bearings in bearing housings 110 as in our prior British Patent No. 588,506, which bearing housings are fitted with

trunnions 111 to revolve in the flexible mounted bushes B, B'.

According to a further feature of the invention, both the bushes B, B' and their counterparts on the roller frame have surfaces, to which the resilient block is attached, arranged in parallel vertical planes. In the embodiment shown these surfaces are provided by flanges 112 on the bushes B, B' and annular discs 114 fast on the machine frame F, between which vertical flanges 112 and discs 114 resilient blocks 113 are attached in shear. By arranging the rubber in shear it reduces the amount of vibration which is transmitted from the roller to the machine frame. Tests have shown that it is possible to insulate at least 97% of the vibration from the frame of the machine.

Inwardly extending stub axles 115 are fixed to the frame F in position beneath the flexible mountings 113 and on these axles are carried rollers 116. These rollers are shod with rubber and function as snubbers co-operating with roller paths, which are conveniently provided by the interior faces 117 of the annular flanges 105 on the roller end discs. When the tractive effort required is high, the pull of the belt 103 will cause the frame to descend relative to the main roller R and the snubbers will prevent this movement from exceeding a predetermined amount. This enables more vibration insulation to be effected by permitting the flexible mountings to be much more flexible.

The engine and gearbox are mounted on a common bedplate 118 which is bolted to the end members of the frame, slotted holes 119 being used to permit raising and lowering the bedplate in order to adjust the centres of the belt drive.

A manual handle 120 and bar 121 has the bar attached to the main frame by means of a swivelling device. This consists of a pivotal anchorage 122 and brackets 123 on the frame having slots 124. Extending through slots 124 is a cross rod 125 which is adjustably fixed by wing nuts 126 so that by altering the position of rod 125, the angular set of the bar 121 and thus the height of the handle 120 can be adjusted to suit the operator. It further enables the operator to relieve the handle from a certain amount of the torque reaction by moving the centre of gravity of the machine forward of the roller centre or behind it, according to whether the machine is travelling forward or backward as will be more fully explained. On the handle 120 is a socket 126', in which is adjustably fixed a belly-pad 127 to relieve the torque reaction from the operator's hands.

When the roller is travelling forward the torque reaction is taken by the operator, through the handle or belly-pad, by his action of preventing this descending, whereas when the roller is travelling in reverse, the torque reaction is taken in the opposite direction, i. e. he will prevent it ascending. The adjustable handle enables the centre of gravity of the roller to be displaced so that with the handle at the same height, the centre of gravity of the machine, indicated at O, which always remains above the roller axle, can be thrown either in a forwards or backwards direction, thus enabling the turning action so produced to resist or partially resist the torque reaction, and therefore relieve the operator from this effort.

130 is a reversing lever, which is pivotally mounted at 131 on a bracket 132 and is connected through lever operated linkage 133 to the

reversing gear (not shown). 135 is a change-speed clutch actuating lever.

Adjustable scrapers consisting of transverse bars 128 are fitted to the lower longitudinals 129 of the frame. In use the bars 128 are set just clear of the roll when it is vibrating so that they clean off material which adheres to the roll without impairing its vibration or transmitting it to the frame of the machine.

The longitudinals 129 of the roller frame are also equipped with parking feet 150 provided either in front or behind the roll or in both places, so that when the operator either raises or lowers the manual handle 120, the weight is transferred substantially onto the feet at either the front or the back, the parking feet functioning thus as travelling or parking brakes.

Referring now to Figure 3, there is shown a tandem roller including a fore and after girder frame 140 supported at the rear by a steering roll 141. At the front end is fitted a vibratory roller unit indicated generally at 142 similar to the construction of Figures 1 and 2. 143 is the steering wheel.

I claim:

1. A vibrating roller having a roller frame, a roller body, bearings on said roller body, a vibratory shaft having an out of balance mass mounted to rotate in said bearings and vibrate said roller body, said roller body having stub axles, bearing elements carried by the roller frame in which said stub axles are journaled, said roller frame and said bearing elements having, respectively, opposed, spaced, vertically extending surfaces, and resilient blocks interconnecting said surfaces, said roller body having an annular surface body at each end thereof, snubbing rollers carried by said roller frame for engagement with said annular surfaces to limit the vertical displacement of the roller body permitted by said resilient blocks, a power mechanism, a driving connection from the power mechanism to the roller body, and a clutch operated driving connection from the power mechanism to the vibratory shaft, whereby said power mechanism may concurrently drive said roller and said vibratory shaft.

2. A vibrating roller having a roller frame, a roller body, bearings on said roller body, a vibratory shaft having an out of balance mass mounted to rotate in said bearings and vibrate said roller body, said roller body having stub axles, bearing elements carried by the roller frame in which said stub axles are journaled, said roller frame and said bearing elements having respectively opposed spaced, vertically extending surfaces, and resilient blocks interconnecting said surfaces, said roller body having an annular surface at each end thereof, snubbing rollers carried by said roller frame for engagement with said annular surfaces to limit the vertical displacement of the roller body permitted by said resilient blocks, a power mechanism, a gear box coupled to the power mechanism, a flexible driving connection respectively from the power mechanism to the roller body and from the power mechanism to the vibratory shaft, whereby the vibrations imparted to the roller body will not be transmitted to the roller frame, said second driving connection being clutch operated, whereby said power mechanism may concurrently drive said roller and said vibratory shaft.

3. A vibrating roller as set forth in claim 2 in which the snubbing rollers are resiliently shod and provide a means of support additional to that

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afforded by the resilient blocks for the roller frame.

4. A vibrating roller having a roller frame, a roller body, bearings on said roller body, a vibratory shaft having an out of balance mass mounted to rotate in said bearings and vibrate said roller body, said roller body having stub axles, bearing elements carried by the roller frame in which said stub axles are journaled, said roller frame and said bearing elements having respectively opposed, spaced, vertically extending surfaces, and resilient blocks interconnecting said surfaces, said roller body having an annular surface on each end thereof, snubbing rollers carried by said roller frame for the engagement with said annular surfaces to limit the vertical displacement of the roller body permitted by said resilient blocks, power mechanism, a flexible driving connection from said power mechanism to the roller body, and a clutch operated flexible driving connection from said power mechanism to the vibratory shaft, whereby said power mechanism may concurrently drive said roller and said vibratory shaft, each of said driving connections consisting of pairs of V-section pulleys coupled to one another by belting, one pulley of each pair being fast respectively with the roller and its vibrating shaft and the other pulleys of each pair being driven from the power mechanism.

5. A vibrating roller comprising a roller frame, a roller body, bearings on said roller body, stub axles on opposite ends of the roller body, means resiliently supporting said stub axles in the frame,

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a vibratory shaft provided with an out of balance mass journaled in said bearings and adapted to vibrate said body, means limiting the displacement of the roller body relative to the frame comprising two laterally spaced rollers mounted on the roller frame, said roller body having annular surfaces for engagement by said rollers, a power unit having a gear box from which a drive is transmitted to the roller body and means including a clutch by which the drive is transmitted from said power unit to the said vibratory shaft whereby said power unit may drive said roller body and said vibratory shaft concurrently or separately.

NORMAN EDWARD KERRIDGE.

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