Sept. 15, 1936. D. B. BAKER ET AL 2,054,532

TRACK ROLLER ASSEMBLY

Filed Aug. 8, 1934 2 Sheets-Sheet 1

Fig. 1

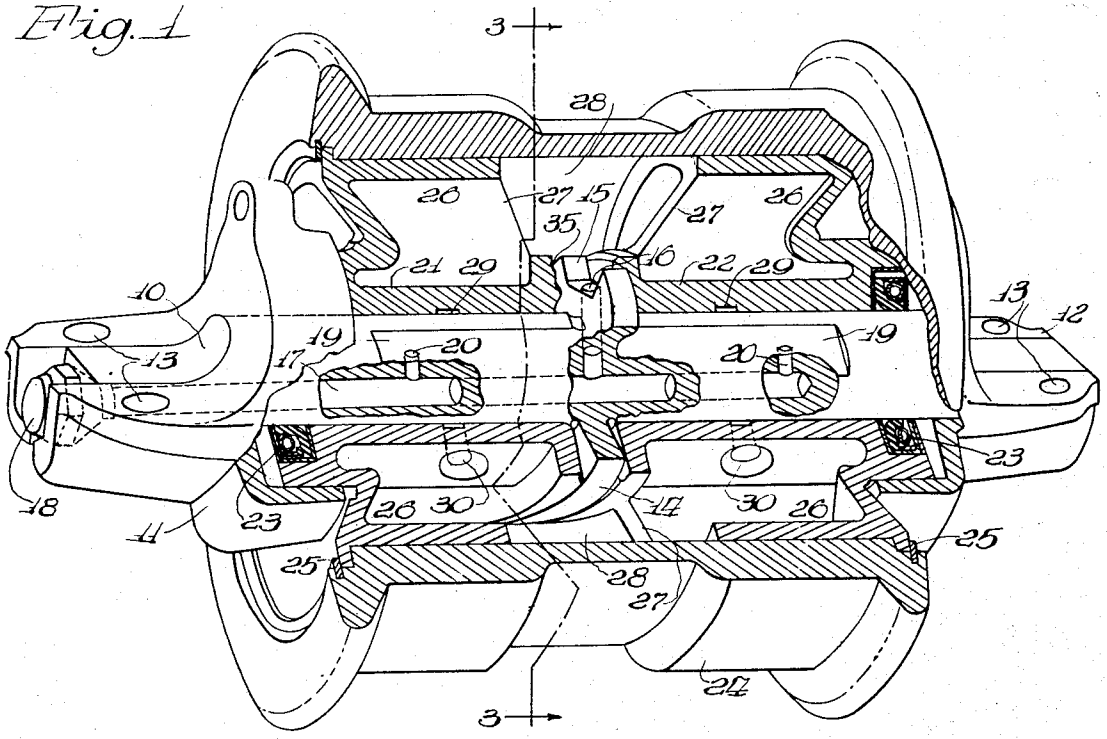

Fig. 2

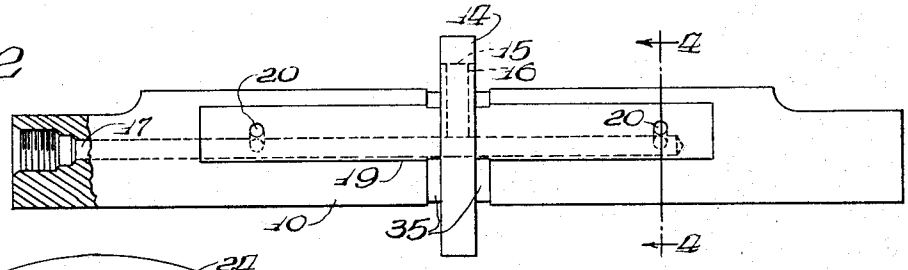

Fig. 3

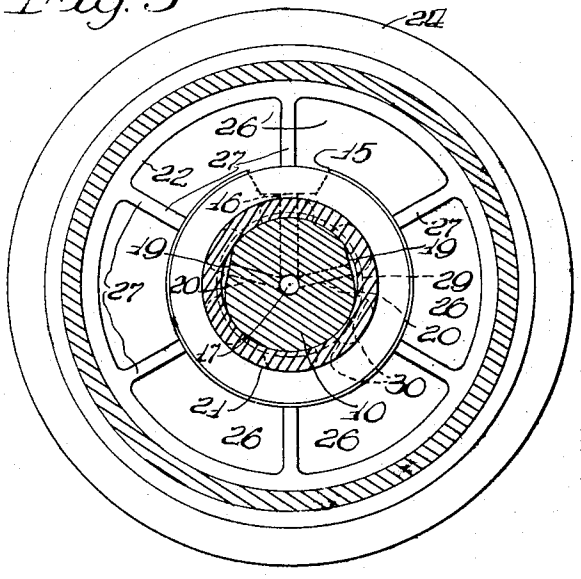

Fig. 4

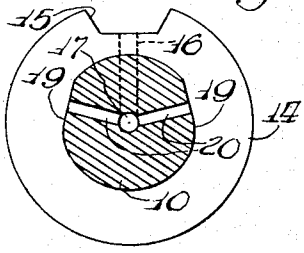

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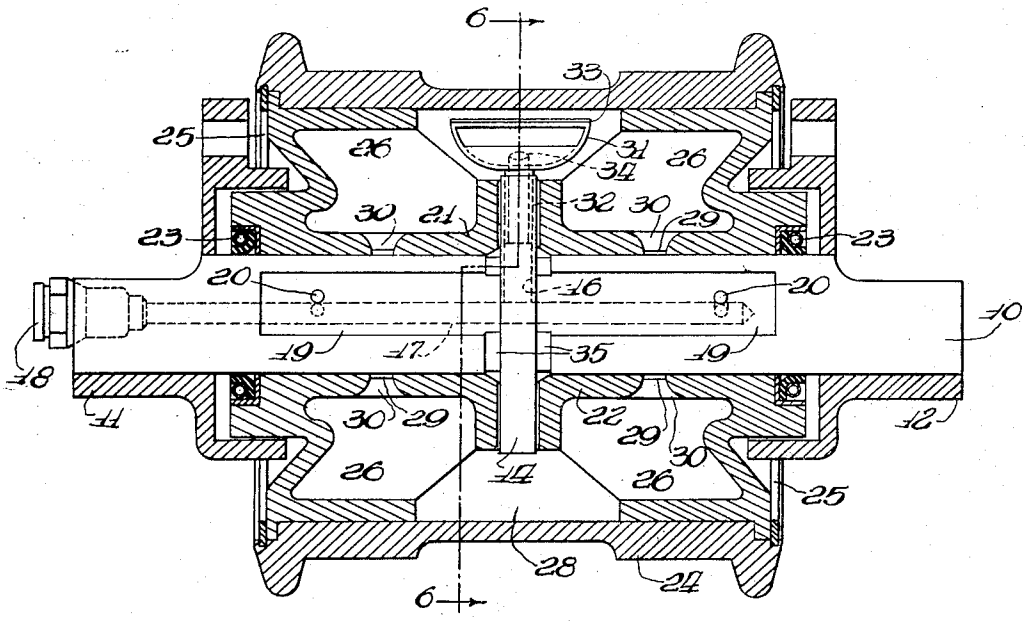
Fig. 5



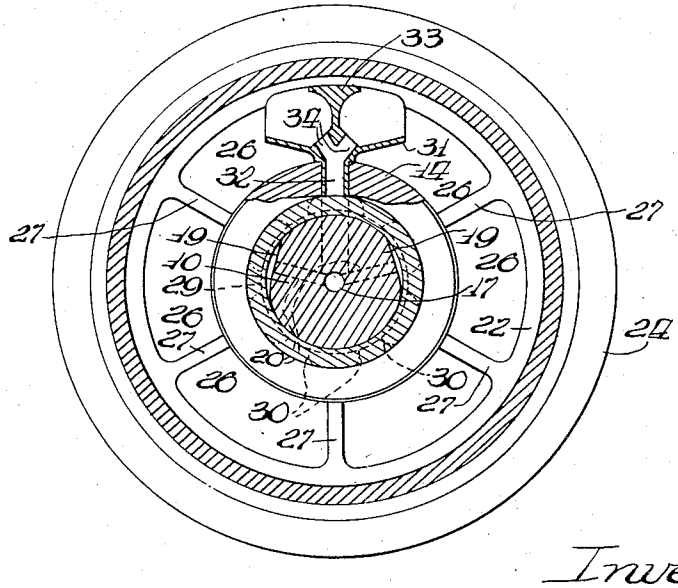


Fig. 6

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TRACK ROLLER ASSEMBLY

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Application August 8, 1934, Serial No. 739,014

6 Claims. (Cl. 308—109)

The invention relates to an improved construction of track rollers and lubrication therefor. Such rollers are employed in track type tractors and, as they are subject to severe load and shock, proper lubrication thereof is important to prevent wear and maintain and prolong their period of usefulness.

The primary object of the invention is to provide an improved track roller construction which lubricates itself in operation by gravity during slow rotation thereof, and which automatically is supplemented by pressure for effective lubrication at high speed rotation of the rollers.

Other objects will be apparent to those skilled in this art as the disclosure is more fully made.

Briefly, these objects may be achieved by the form selected herein for purposes of illustration, in which example a stationary, round shaft is provided, having opposite flat surfaces formed with radial passages for distributing oil from an axial bore in the shaft. Carriers are mounted on the shaft, said carriers carrying the track roller. These carriers thrust against a flange on the stationary shaft between its ends. An oil reservoir is located between the adjacent ends of these carriers, said carriers including baffles providing cavities to pick up the oil from the bottom of the reservoir and elevate it to the top thereof, where it is received by a passage in the thrust flange to distribute it to the axial bore in the stationary shaft. Thus, as the roller and carriers turn on the stationary shaft, the oil is caused to circulate by gravity at slow speed and to be augmented by pressure at high speed, as will subsequently appear.

In the accompanying sheets of drawings:

Figure 1 is a perspective view of the improved roller, with parts broken away to illustrate the interior structure;

Figure 2 is a detail, side elevational view of the stationary track roller shaft;

Figure 3 is a vertical cross-sectional view through the assembly taken along the line 3—3 of Figure 1, looking in the direction of the arrows;

Figure 4 is a vertical cross sectional view through the track roller shaft, taken along the line 4—4 of Figure 2, looking in the direction of the arrows;

Figure 5 is a central longitudinal sectional view through the track roller assembly, showing a modified form of the oil circulating means; and,

Figure 6 is a vertical cross sectional view through this modified form taken along the line 6—6 of Figure 5, looking in the indicated direction.

The improved track roller assembly includes a stationary shaft 10 having its ends carried in an outer bracket 11 and an inner bracket 12, said brackets being provided with holes 13 to receive bolts for securely carrying these brackets and the shaft 10 in the track roller frame, not shown.

As shown best in Figures 2 and 4, the stationary, or non-rotatable shaft 10 is round and formed substantially centrally between its ends with an integral, circular, upset thrust flange 14 notched out in the form of the invention shown in Figure 4, as at 15, to form a groove in said flange 14. A radial passage or bore 16 leads from the groove 15 to an axial bore 17 in the shaft 10, which runs in opposite directions from the flange 14; in fact, in one direction it extends clear through to the end of the shaft 10 to a lubricator fitting 18 shown in Figure 1. At opposite sides, the rounded surface of the shaft is formed to provide upwardly sloped flat surfaces 19, which extend lengthwise of the shaft and oppositely from the flange 14, as shown. Leading to these flat surfaces 19 from the axial bore 17 are radial oil passages 20.

On opposite sides of the flange 14, the shaft 10 rotatably carries an outer track roller carrier 21 and an inner similar carrier 22, said carriers thrusting endwise against the thrust flange 14, and at their outer ends being recessed to receive seals 23 surrounding the shaft 10. Surrounding these carriers and turning therewith on the shaft 10 is the track roller 24 held in place on these carriers by any suitable means, such for example as by the clamp rings 25.

These carriers 21, 22 are hollow and divided into six lubricant holding cavities or spaces 26 by six radial portions or baffles 27. The number of spaces and baffles could, of course, be varied as desired. Further, these carriers at their inner ends adjacent the flange 14 are formed to provide an annular lubricant space 28, or oil reservoir, which communicates with the adjacent ends of the baffle spaces 26. It will be observed that the outer ends of the carriers 21, 22 are closed.

Each carrier 21, 22 has its hub portion substantially centrally between its ends provided adjacent the shaft 10 with an annular oil groove 29, which communicates, as shown in Figure 3, in each carrier with an annular ring of spaced, radial oil holes 30. There are six of such holes for each carrier, one hole 30 communicating with each baffle space 26, as shown.

With the single exception of the groove 15 formed in the top of the flange 14, the description thus far made applies to the modification shown

in Figures 5 and 6, and accordingly the same reference characters given to Figures 1 to 4, inclusive, are also applied to the same parts in Figures 5 and 6. In the modification of Figures 5 and 6, the shaft flange 14 also has the radial bore 16, but, instead of a notch 15 to feed oil thereto, there is provided a cup 31 having a hollow stem 32 fitted into said bore 16 to mount the said cup, as shown. This cup 31 has a partition 33 to provide oppositely facing cup portions to receive oil in the cup, regardless of the direction of rotation of the carrier and roller. Ports 34 in the cup communicate with the bore 16 through the hollow stem 32 in the manner shown. In both forms, oil grooves 35 are formed in the shaft 10 adjacent each side of the flange 14.

In operation, suitable lubricant is forced through the lubrication fitting 18 and into the axial bore 17. The oil emerges from the bore 16, bores 20, grooves 29, and holes 30 into the annular reservoir 28, and fills the same, as well as the connecting spaces or cavities 26 between the baffles 27 in the carriers 21, 22. The hollow track roller assembly is thus loaded with lubricant and is ready for operation, the oil circulating in the manner now to be described.

When the track roller 24, and the carrier 21, 22 with it, turn slowly, the baffles 27 pick up lubricant from the bottom of reservoir 28 and carry it to the top. As each cavity 26 thus reaches the top position, the oil drains by gravity from the holes 30 in the cavities. The oil also passes through the connecting grooves 29 to the flat areas or surfaces 19, which serve to spread the oil laterally along the stationary shaft 10 and the bearing surfaces. Approximately $\frac{1}{32}$ of an inch side clearance is allowed in practice between the carriers 21, 22 and the thrust flange 14. This clearance together with the oil grooves 35 in the shaft 10 insure complete lubrication of the thrust flange and its bearing surfaces.

When the tractor embodying this roller is operating in high speed, the roller 24 and its carriers turn rapidly on the stationary shaft 10 and the lubricant tends to remain by centrifugal force in the outer area of the reservoir 28. In the form of Figures 1 to 4, inclusive, the notch 15 in the flange 14 is in this area. Therefore, this notch traps the oil, and as it crowds thereinto a slight pressure builds up. Thus, the intercepted oil is forced downwardly under pressure through the bore 16 in the flange 14 into the main oil lead 17 and through the holes 20 onto the flat areas 19 of the shaft 10 to be distributed along the shaft's bearing surface. Thus, the notch 15 acts as a pump under the condition just described.

In Figures 5 and 6, the modification of a cup is used in lieu of the notch 15 heretofore described. The cup is open at both ends, in either direction of rotation of the track roller. The cup with its partition 33 is so formed as to cause the oil intercepted thereby at high speed turning of the roller to be crowded, thus building up pressure positively to circulate it through passages 34, 16, 17, and out passage 20 to be spread along the shaft 10 by the flat surfaces 19 in the manner described.

From this it will be seen that thorough lubrication is assured at all speeds of operation.

It is the intention to cover all such changes and modifications of the illustrative examples herein disclosed which do not depart from the scope of the invention as hereinafter claimed.

What is claimed is:

1. A track roller assembly comprising a stationary round shaft having a thrust flange intermediate its ends and flattened oil spreading surfaces at its opposite sides, a carrier on the shaft at each side of said flange, a track roller on the carriers and turnable therewith, said carriers formed with oil receiving cavities, an oil reservoir between the carriers communicating with said cavites, means to pass oil from the cavities to the flattened oil spreading surfaces to be distributed to the bearing and thrust surfaces by gravity when the roller turns slowly, and means in the flange to trap oil from the reservoir and pass it under pressure to the oil spreading surfaces when the roller turns rapidly.

2. A track roller assembly comprising a stationary round shaft having a thrust flange intermediate its ends and flattened oil spreading surfaces at its opposite sides, a carrier on the shaft at each side of said flange, a track roller on the carriers and turnable therewith, said carriers formed with oil receiving cavities, an oil reservoir between the carriers communicating with said cavities, means to pass oil from the cavities to the flattened oil spreading surfaces to be distributed to the bearing and thrust surfaces by gravity when the roller turns slowly, and means on the flange to trap oil from the reservoir and pass it under pressure to the oil spreading surfaces when the roller turns rapidly.

3. A track roller assembly comprising a stationary round shaft having a thrust flange intermediate its ends and flattened oil spreading surfaces at its opposite sides, a carrier on the shaft at each side of said flange, a track roller on the carriers and turnable therewith, said carriers formed with oil receiving cavities, an oil reservoir between the carriers communicating with said cavities, means to pass oil from the cavities to the flattened oil spreading surfaces to be distributed to the bearing and thrust surfaces by gravity when the roller turns slowly, a notch in the top part of the flange to trap oil from the reservoir when the roller turns rapidly, and means comprising passages in the flange and shaft for distributing the oil under pressure from said notch to the oil spreading surfaces.

4. A track roller assembly comprising a stationary round shaft having a thrust flange intermediate its ends and flattened oil spreading surfaces at its opposite sides, a carrier on the shaft at each side of said flange, a track roller on the carriers and turnable therewith, said carriers formed with oil receiving cavities, an oil reservoir between the carriers communicating with said cavities, means to pass oil from the cavities to the flattened oil spreading surfaces to be distributed to the bearing and thrust surfaces by gravity when the roller turns slowly, a cup mounted in the top part of said flange to trap oil from the reservoir when the roller turns rapidly, and means comprising a bore in the flange and passages in the shaft for leading the oil under pressure from said cup to the oil spreading surfaces.

5. A track roller assembly comprising a horizontal shaft fixed against rotation and carrying a stationary thrust flange between its ends, carrier sleeves rotatably mounted on the shaft on opposite sides of the flange, said sleeves at their inner ends thrusting against said flange, a track roller mounted on the carrier sleeves to turn therewith, the carrier sleeves being hollow and formed with spaced substantially radial baffles to form oil containing cavities, said baffles and carrier sleeves being cut away at their inner ends to pro-

vide an annular oil reservoir adjacent and surrounding the thrust flange, means for circulating oil to the bearing surfaces of the shaft from the said cavities at slow speed turning of the carrier sleeves and roller, and means immovably provided on the upper part of the thrust flange within said annular oil reservoir for receiving the oil and pumping it under pressure through passages formed in the flange and shaft to the bearing surfaces of the shaft when the carrier sleeves and roller turn at high speed.

6. A track roller assembly comprising a horizontal shaft fixed against rotation and carrying a stationary thrust flange between its ends, carrier sleeves rotatably mounted on the shaft on oposite sides of the flange, said sleeves at their inner ends thrusting against said flange, a track roller mounted on the carrier sleeves to turn therewith, the carrier sleeves being hollow and formed with spaced substantially radial baffles to form oil containing cavities, said baffles and carrier sleeves being cut away at their inner ends to provide an annular oil reservoir adjacent and surrounding the thrust flange, means for circulating oil to the bearing surfaces of the shaft from the said cavities at slow speed turning of the carrier sleeves and roller, and means immovably provided on the upper part of the thrust flange within said annular oil reservoir for receiving the oil and pumping it under pressure through passages formed in the flange and shaft to the bearing surfaces of the shaft when the carrier sleeves and roller turn at high speed, said immovable means comprising an oil catching scupper cup open in two directions to catch oil either during clockwise or counterclockwise rotation of the carrier sleeves and roller.

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