March 3, 1931. R. G. LE TOURNEAU 1,794,696

SELF ADJUSTING ROLLER

Filed Feb. 21, 1930

Fig. 1

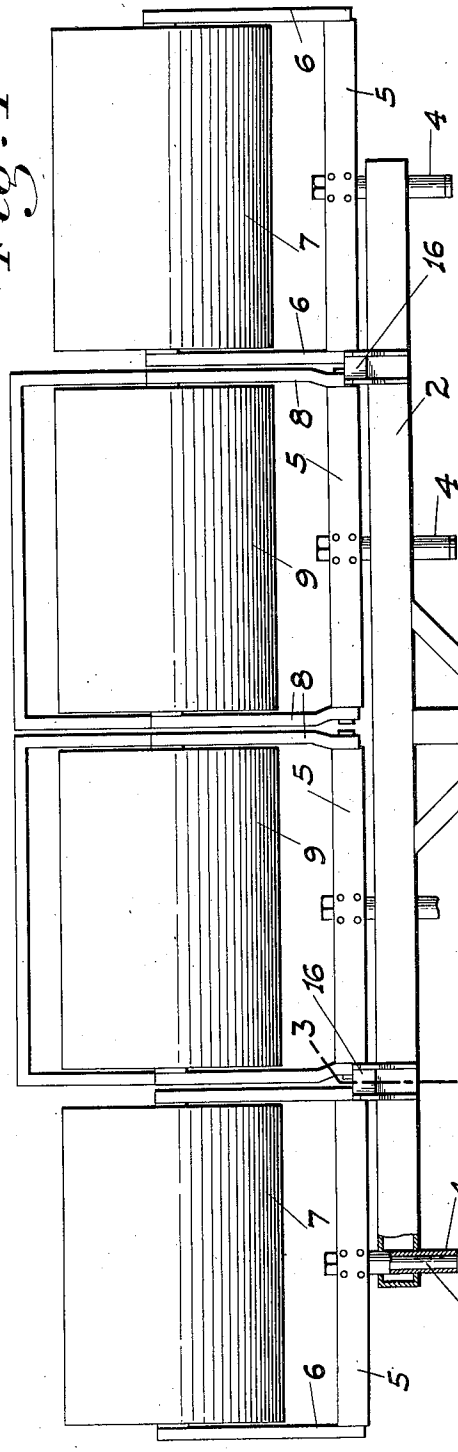


Fig. 3

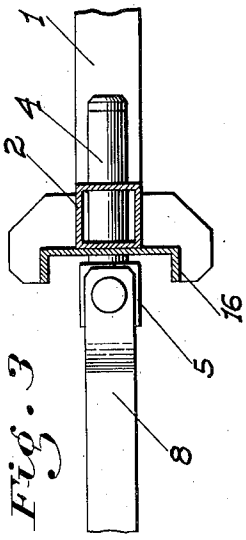


Fig. 4

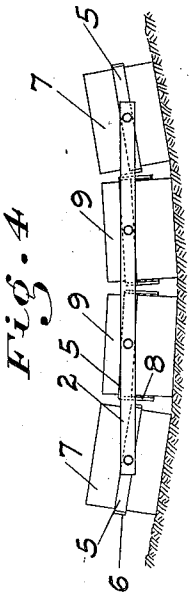
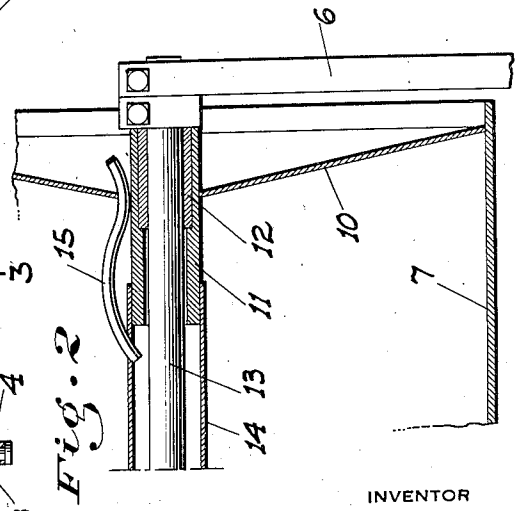


Fig. 2



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UNITED STATES PATENT OFFICE

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SELF-ADJUSTING ROLLER

Application filed February 21, 1930. Serial No. 430,251.

This invention relates to rollers such as are used in rolling ground after grading operations and the like, and particularly to one of that type which is pulled by a tractor rather than by a self-propelled means.

The invention deals with a roller of this character which is of relatively great width so as to enable a considerable area of ground being traversed at one operation. A roller of this width however if made rigid from end to end cannot of course be successfully used on ground having a concave or convex contour in a transverse plane. This is because in the first instance only the outermost portions of the roller would engage the ground and the central portion would hardly contact therewith or if it did it would be to such a slight extent as to provide an inefficient rolling action.

In the second instance just the reverse would be true, or in other words only the central portion of the roller would properly engage the ground and the roller would probably teeter from side to side so that if one end of the roller was engaged with the ground the other would be entirely clear of the same.

The principal object of my invention therefore is to provide a large width roller in which the above mentioned objectionable features have been eliminated by providing a number of alined rollers, mounted together as a unit but in such a manner that the different rollers can automatically adjust themselves to unevenness in the transverse contour of the ground so that all the ground traversed by the structure will be engaged and rolled with equal efficiency.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a top plan view of my improved roller structure.

Fig. 2 is a fragmentary enlarged longitudinal section of a roller.

Fig. 3 is a fragmentary cross section on the line 3—3 of Fig. 1.

Fig. 4 is a front end view of the structure in more or less diagrammatic form showing the same as operating on a ground surface of concave transverse curvature.

Referring now more particularly to the characters of reference on the drawings, the main frame of the structure comprises a tongue 1 adapted to be connected to and supported by the tractor used to haul the roller. At its rear end the tongue is rigidly connected to a cross-beam 2. These members are of hollow built-up construction of rectangular cross section, so as to be very strong and rigid but relatively light. Horizontal spindles 3 are turnably mounted in sleeves 4 which are secured in the beam; said spindles projecting rearwardly from the beam at evenly spaced intervals along the length of the same. At their rear ends these spindles are fixed on separate auxiliary beams 5 centrally between the ends of the same; these beams being parallel to but a short distance behind the beam 2. This mounting allows the auxiliary beams to swing independently in a vertical plane transversely of the movement of the structure, as will be evident.

As shown in the accompanying drawing four such beams are provided. To the ends of the outermost beams arms 6 are rigidly secured and project thence rearwardly to serve as supports for the shafts of the rollers 7 which are mounted between the corresponding pairs of arms. To the ends of the inner pair of beams 5, arms 8 are pivotally connected, which arms project rearwardly and serve as supports for the shafts of other rollers 9, which are the same size as the rollers 7 and are normally in axial alinement therewith. The sets of arms are as close together as possible, so that the rollers may be correspondingly close. This enables the rollers to form a practically continuous rolling structure, but owing to their mounting

as above described the different rollers may follow the contour of the ground in a transverse plane, either when it is concave, as shown in Fig. 4, or when it is convex.

The swinging arms are provided only on the centrally located rollers, since it is only these rollers which need to move up or down relative to the cross beam 2 and their individual supporting beams 5; the level of the said cross beam being always controlled by the positioning of the end rollers to the auxiliary beams 5 to which the corresponding arms 6 are rigidly connected.

The ends of the rollers are clamped by solid disc heads 10 in which inwardly projecting sleeves 11 are fixed at the center. The sleeves carry bushings 12 which turn on the corresponding roller shaft 13; said shaft at its ends being clamped in the adjacent supporting arms. A thin tube or sleeve 14 surrounds the shaft between the ends of the sleeves 11 and is secured to the same, so as to form a lubricant chamber for the shaft. A tube 15 to introduce lubricant into the chamber from the exterior leads from said sleeve 14 to the exterior of one of the discs 10. This prevents the escape of the lubricant and also permits the roller to be filled with water or other ballast when necessary without contacting with the shaft or its bearings.

To limit the swinging movement of the beams 5 I may if desired provide stops 16 mounted on the beam 2 in over and under hanging and spaced relation to the adjacent ends of the adjacent beams 5.

Though I have shown and described a roller constituting a pair or rollers capable of vertical movement in a longitudinal plane, as well as a pair capable of swinging movement only in a vertical transverse plane; it will be evident that a structure using only the latter type of roller may be used, or a greater or lesser number of the relatively flexibly mounted rollers may be employed. In any case the functioning of the structure is the same, namely: to enable all the roller units to contact with the ground with equal effectiveness under all conditions.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. In a roller structure having a plurality of spaced rollers arranged in substantially common axial alinement, and a main frame structure adapted for connection to a draft means and which includes a rigid beam extending transversely of the direction of travel, auxiliary beams, one for each roller, behind said cross-beam, pivotal connections between said auxiliary and cross-beams arranged to permit the former to swing in a vertical plane transversely of the direction of travel, arms rigid with the outermost auxiliary beams and supporting the corresponding rollers, and arms pivoted on the ends of intermediate auxiliary beam and extending rearwardly alongside the corresponding roller to form supports for the same.

2. In a roller structure having a plurality of spaced rollers arranged in substantially common axial alinement, and a main frame structure adapted for connection to a draft means and which includes a rigid beam extending transversely of the direction of travel, auxiliary beams, one for each roller, behind said cross beam, pivotal connections between said auxiliary and cross beams arranged to permit the former to swing in a vertical plane transversely of the direction of travel, means connecting the outermost auxiliary beams and rollers together as a rigid unit, and means connecting the inner beams to the corresponding rollers in a manner to cause them to swing transversely with said arms but enabling said rollers to independently swing in a vertical plane longitudinally of the direction of travel.

In testimony whereof I affix my signature.

ROBERT G. LE TOURNEAU.