Aug. 18, 1953 L. DESSERT ET AL 2,649,292

CENTRIFUGALLY OPERATED REGULATING DEVICE

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Fig.1

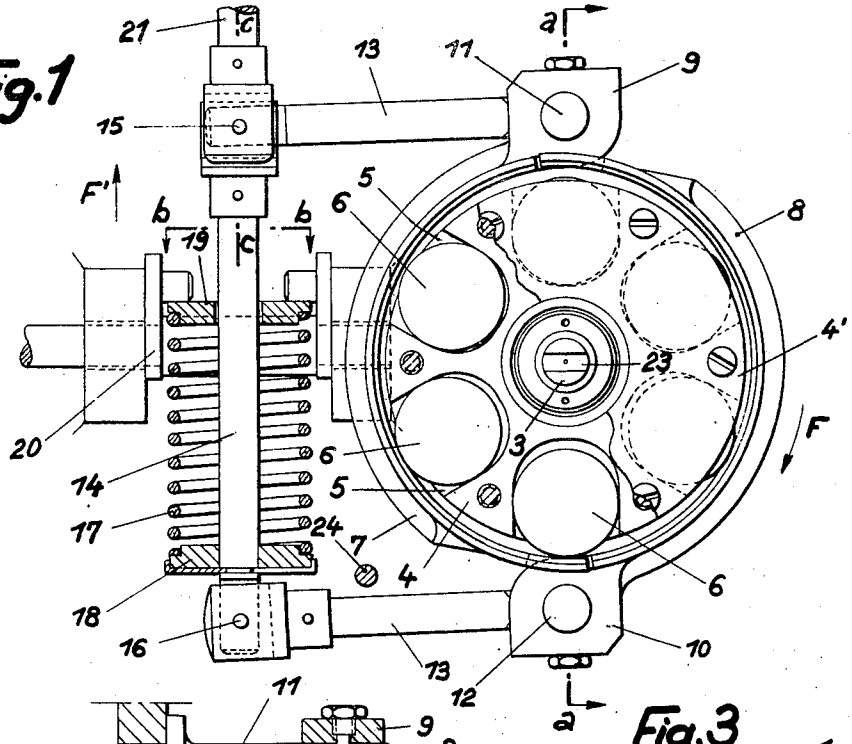
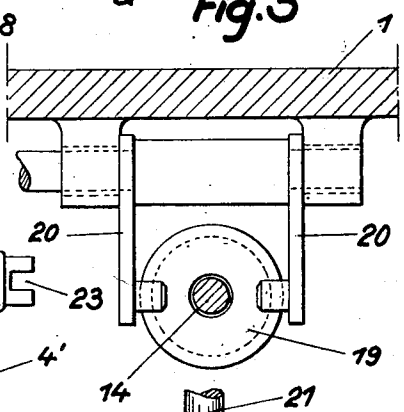


Fig.3



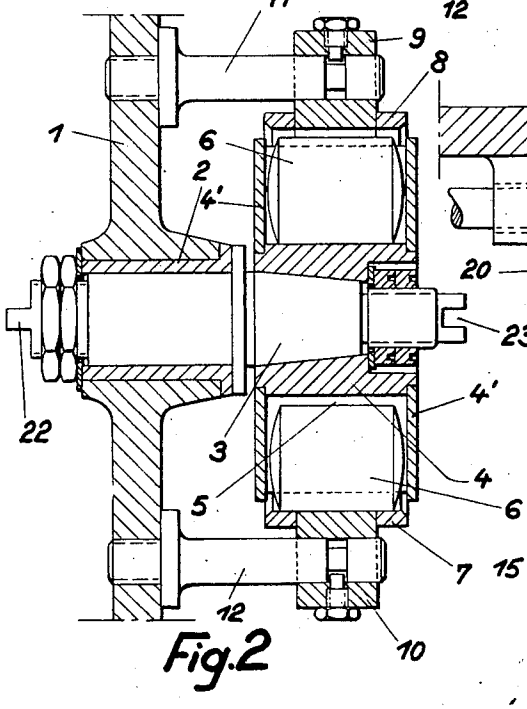


Fig.2

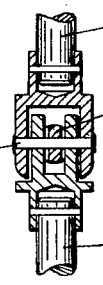


Fig.4

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CENTRIFUGALLY OPERATED REGULATING DEVICE

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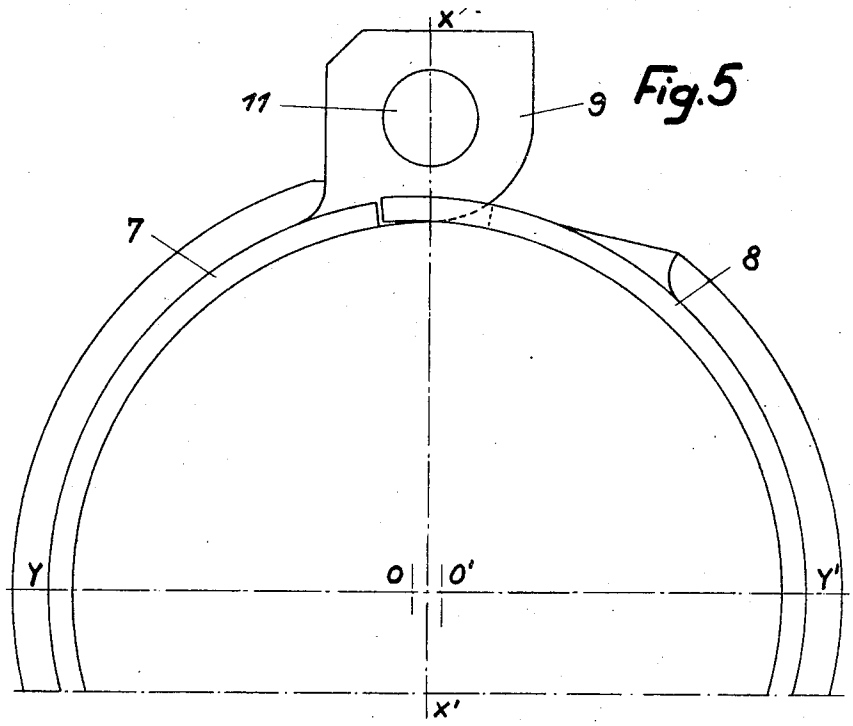


Fig.5

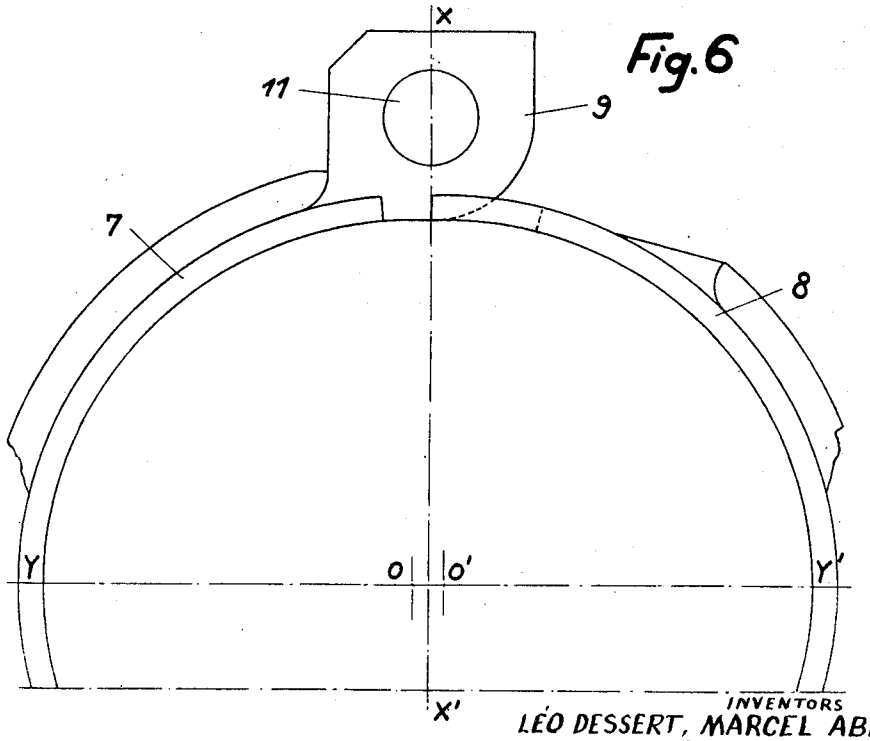


Fig.6

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CENTRIFUGALLY OPERATED REGULATING DEVICE

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4 Claims. (Cl. 264—3)

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The present invention relating to centrifugally operated regulating devices is characterized in that free cylindrical metal masses, arranged within suitable housings provided at the periphery of a rotor keyed to a driving shaft, act by a centrifugal effect within a deformable rolling path creating a displacement thereof which is used for regulating purposes.

According to one embodiment of the invention, said rolling path comprises two half-cylindrical jaws internally hinged opposite to each other on a fixed axis and are capable of being pivoted about their hinges under the force of rollers rolling therein. The swinging movements of said jaws being connected by means of two axes each fixedly connected to its respective jaw, parallel to each other and the ends of which are interconnected by means of a hinged link with the assembly of four hinges forming a parallel motion device. Said link is under the action of a spring, which may be adjustable, or not, and the function of which spring is to determine the beginning of the swinging movement of the jaws or to return them to a rest position when the rotor is not running. A system of rods, pivoted to one of the hinging points of the link, insures the desired control.

Such a regulator is quite compact and with its shaft extending through it from end to end, makes it possible to drive an auxiliary element, such as a tachometer, pump, or the like, from the free end of said shaft. Moreover it can be run fully immersed in an oil bath and all passive resistances due to friction between the elements is quite small. Frictional resistance is limited to the rollers on one side of their housings and are negligible, due to the presence of an oil film at their single contact line and there is, therefore, no wear of the rollers or their housings.

One embodiment of the invention is illustrated in the annexed drawings, in which:

Fig. 1 is a side elevation of the present device.

Fig. 2 is a vertical section taken along line *a*—*a* of Fig. 1.

Fig. 3 is a horizontal section taken along line *b*—*b* of Fig. 1.

Fig. 4 is a partial section taken along line *c*—*c* of Fig. 1.

Figs. 5 and 6 are partial side elevations of the upper half of the jaws forming part of the present device in their rest position and in their maximum position of separation respectively.

Referring now more particularly to the accompanying drawing wherein like and corresponding parts are designated by similar reference characters, the regulator comprises a frame 1 in the bearing 2 of which is rotatably mounted a shaft 3 on which a rotor 4 is keyed. Rotor 4 has formed in its periphery a series of housings 5, within which are arranged rollers 6 of metal, or of a material having a given mass. Housings 5 are closed at their ends by means of flanges 4', held by means of screws on either side of said rotor.

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The rotor is arranged within a rolling path comprising two semi-circular jaws 7 and 8, each having a collar 9 and 10, respectively, at one end thereof. Shafts 11 and 12 are fixedly mounted on and extend diametrically opposite to one another from the face of frame 1 and have collars 9 and 10 respectively, pivotally mounted thereon and keyed thereto against relative longitudinal movement. Each of said collars 9 and 10 has a shaft 13 fixedly mounted thereon and extending therefrom substantially at right angles to said shafts 11 and 12. Shafts 13 are parallel to each other and are directed to the same side of the vertical axis of the device, and their free ends are interconnected by means of a rod 14 pivotally connected by pins 15 and 16 to said shafts 13. Rod 14 is under the action of a compression spring 17 the lower end of which presses on a washer 18 keyed to rod 14, while the upper end of said spring is capped by means of a washer 19 sliding along rod 14 and which washer 19 has the jaws of a forked lever 20 positioned thereon by means of which the pressure of said spring can be adjusted. A rod 21 pivotally mounted on pin 15 transmits to the device to be controlled (not shown) the displacements of the regulator. The ends of shaft 3 are shaped in such a manner that said shaft may be driven from any driving shaft and may itself drive an auxiliary element. For such purpose, the ends of said shaft respectively form a lug 22 and a slot 23. Further an abutment 24 extending from frame 1 limits the opening movement of said jaws.

The device operates as follows:

Shaft 3 is coupled at one end to the driving shaft of the element or machine to be controlled in such a manner that it is rotated in the direction shown by arrow F in Fig. 1. Rotor 4 drives rollers 6 which, under the effect of centrifugal force, move outwardly and rolls within the rolling path comprising jaws 7 and 8 until the resultant of the centrifugal forces developed by rollers 6 exceeds the force of spring 17. At this instant, the jaws open by swinging about

their pivots 11 and 12 moving arms 13 and consequently drive rod 14 and rod 21 in the direction of arrow F', Fig. 1. As soon as the velocity of the rotor decreases, a converse movement occurs. The amplitude of the displacement of arms 13 is limited by abutment 24. In effect, the quadrilateral formed by pivoting points 11, 12, 15 and 16 constitutes a parallel motion device one of the larger sides of which is formed by rod 14.

Figs. 5 and 6 clearly show the relative displacements of said jaws and it is to be noted that at their rest position, said jaws do not form a perfectly cylindrical rolling path; in fact, if the vertical avis XX' and horizontal axis YY' are considered, it may be seen that the respective centers O and O' of jaws 7 and 8 are each located on axis YY' at equal distances on either side of axis XX'. The horizontal diameter of the rolling path is thus shorter than its vertical diameter (Fig. 5).

When jaws 7 and 8 are at their maximum opening (Fig. 6), their respective centers are displaced and moved to O and O' at the same side as their corresponding jaw with reference to axis XX' and are substituted for the previous centers O' and O. When the jaws are half-open, the two centers O and O' are changed and located at the crossing of axes XX' and YY'. The rolling path is then cylindrical. The free ends of said jaws are in the form of forks, the prongs of which are located on either sides of the hinging collars 9 and 10. Thus there is no gap in the rolling path whatever is the position of said jaws.

Of course, the present invention is in no way limited to the embodiment described and shown; thus, the number of the rollers may be any suitable number and the rollers may be coated with rubber or like material for insuring a quite silent operation. The compensating spring may be single or multiple, adjustable or not, or it may even be substituted by a counterweight. The device is capable of considerable modification, but such changes thereto as come within the scope of the appended claims is deemed to be a part of the invention.

Having thus described our invention what we claim is:

1. A centrifugally operated regulating device comprising a driving shaft, a rotor fixedly mounted on said driving shaft, a series of housings provided in the periphery of said rotor, a plurality of rollers each rotatably and slidably mounted in one of said rotor housings, means forming a deformable rolling path for said rollers surrounding the periphery of said rotor, means for retaining said rolling path against rotation with said rollers and said rotor, and regulating means connected to said rolling path for being operated thereby.

2. A centrifugally operated regulating device comprising a driving shaft, a rotor fixedly mounted on said driving shaft, a series of housings provided in the periphery of said rotor, a plurality of rollers each rotatably and slidably mounted in one of said rotor housings, a fixed support, a pair of supporting shafts mounted on said support and extending each on an opposite side of the periphery of said rotor, a pair of semi-circular jaws each pivotally connected to one of said supporting shafts and extending around said rotor periphery in the same direction forming a rolling path for said rollers and regulating means connected to said jaws for being operated thereby.

3. A centrifugally operated regulating device comprising a driving shaft, a rotor fixedly mounted on said driving shaft, a series of housings provided in the periphery of said rotor, a plurality of rollers each rotatably and slidably mounted in one of said rotor housings, a fixed support, a pair of supporting shafts mounted on said support and extending each on an opposite side of the periphery of said rotor, a pair of semi-circular jaws each pivotally connected at one end to one of said supporting shafts and extending around said rotor periphery in the same direction forming a rolling path for said rollers, a pair of operating shafts each extending from one of said jaws, a link pivotally connecting the free ends of said operating shafts, and resilient means tending to restrain said link against the movement of said operating shafts.

4. A centrifugally operated regulating device as claimed in claim 3 wherein said resilient means consist of a coil spring surrounding said link, a base for one end of said spring fixedly connected to said link, a cap for the opposite end of said spring slidably mounted on said link and means bearing on said cap for compressing said spring as desired and retaining said cap against said spring upon compression thereof by said base.

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