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J. ZUBATY

CONNECTION OF FLEXIBLE SHAFT TO SPEEDOMETER

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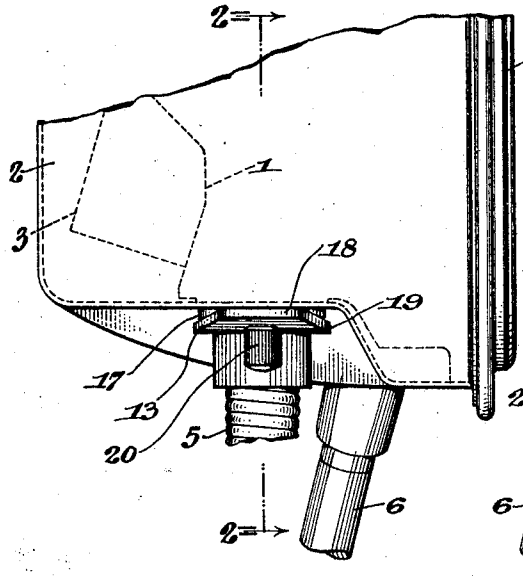


Fig. 1

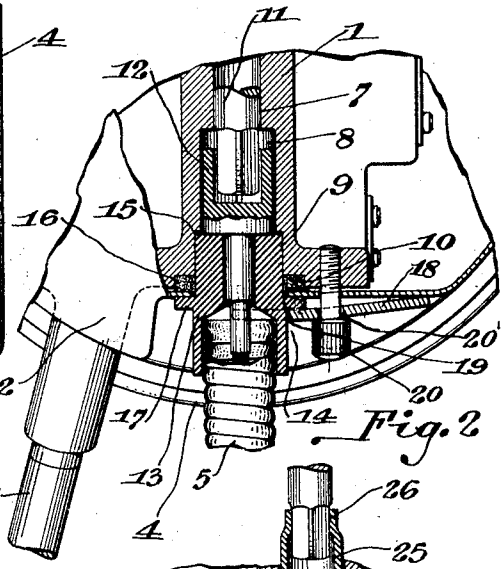


Fig. 2

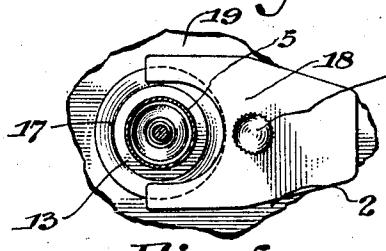


Fig. 5

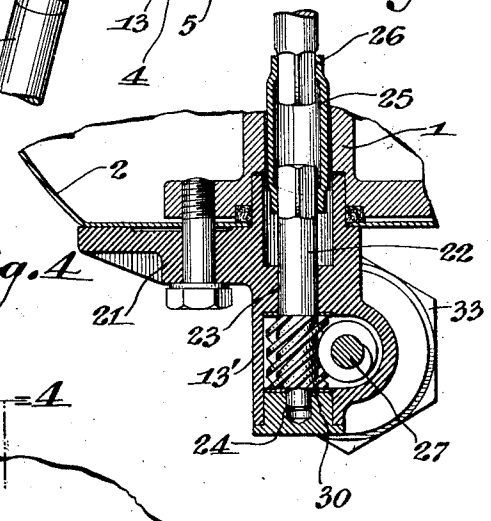


Fig. 4

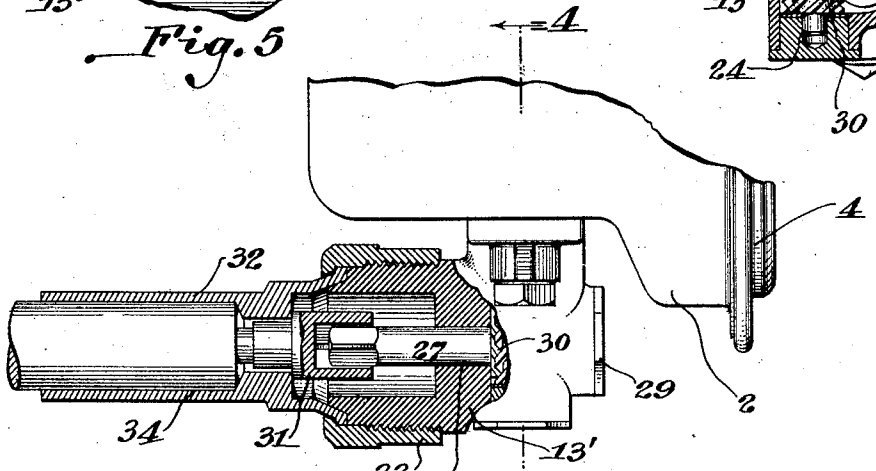


Fig. 3

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CONNECTION OF FLEXIBLE SHAFT TO SPEEDOMETER.

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This invention relates to measuring instruments and is more particularly intended to be applied to speedometers for vehicles.

In a new speedometer with which this invention is intended to be used, a rotor shaft is vertically positioned within a frame of the speedometer, and the invention is primarily concerned with a convenient means for connecting this vertical rotor shaft with the usual flexible drive shaft which extends from the transmission of the car. While designed for this particular use it will be understood that the field of usefulness of the connecting means is not limited to this one application.

An object of the invention is to provide a simple means for connecting a flexible drive shaft to the rotor shaft of a measuring instrument. A further object is to provide a flat surface for conveniently making the connection. As a further object this invention aims to make the connection at a point such that the flexible cable may be curved away from the instrument from a relatively high point, so that it may not be unsightly. Another object consists in providing means for making the attachment in a horizontal plane. A still further object to be attained is to provide a construction to take care of a slight misalignment of shafts.

With these and other objects in view the invention is embodied in structure as shown in the drawing, a description of which follows:

Referring to the drawing:

Figure 1 is a side elevation of the lower part of a speedometer casing showing the flexible drive attachment therefor. Figure 2 is a vertical section on the line 2—2 Figure 1. Figure 3 is an elevation partly in section of a modified form. Figure 4 is a vertical section on the line 4—4 of Figure 3. Figure 5 is a plan view of the fastening means, looking up from the bottom in Figure 1.

Referring by reference characters to the drawing, numeral 1 represents a frame member which is intended to carry the shafts of a speedometer and odometer and their related parts. This frame member is carried within a casing member 2. In Figure 1 there is shown in dotted lines at 3 the lower part of the permanent magnet which is used to influence the action of the indicating element. These parts are not directly concerned with the invention and are therefore not shown. At the front of the casing is shown the bezel 4 beneath which is the glass and dial as usual. Beneath the speedometer is shown the flexible drive shaft casing at 5 and the reset spindle at 6. It may be here remarked that the angle of the reset spindle is such as to remove it from too close proximity to the instrument board and also from the flexible drive shaft. It will be noticed from Figure 2 that the frame member at one portion does not project to the bottom of the cup shaped casing and it is at that portion that the drive shaft is connected. At that portion the casing member is flattened or bent upwardly to a position closely adjacent the lower part of the frame. The advantage of this construction is that the connecting means between the flexible drive shaft casing and the rotor shaft within the frame is hidden and is sufficiently high so that when the flexible casing is curved back it is but little, if at all, visible from the front.

From Figure 2 it will be noticed that the frame member is provided with a vertical passageway, and that this passageway is made with several diameters of increasing dimensions. The upper portion is designated by numeral 7, the second as 8, the third as 9 and the fourth as 10. The upper portion 7 serves as a bearing for the rotor shaft 11. The end of the rotor shaft 11 is non-circular in section and projects into the second opening 8. Freely rotatable in this second opening 8 is the upper end of a driving shaft 12. This driving shaft 12 has a non-circular opening corresponding in size to the end portion of rotor shaft 11. The shaft 12 is reduced in size and rotates freely within a fitting 13. Thus fitting 13 passes through an opening 14 in the casing member and enters the portion 9 of the frame where it ends adjacent a shoulder 15 between the second and third portions of the frame member. Within the part of the frame member of largest diameter 10 is located a felt packing 16. This felt packing fills the opening 10 and projects somewhat beyond its surface. The fitting 13 has a flange 17 which engages the outer wall of the casing member. For securing the parts together there is employed a clamp 18 which has two arms 19 straddling the fitting and engaging the flange. A screw bolt 20 passes through an opening 20′

in the clamp, through the casing member and is threaded into the frame, shown in Figure 2. The parts are of such proportion that when the screw bolt 20 is fastened in position it holds the fitting slightly spaced from the shoulder 15 and the casing is yieldingly held in reference to the frame by means of the packing 16. One advantage of this construction lies in the fact that shocks or jars which may be transmitted to the casing are not directly transmitted to the frame which carries the delicate instruments. Nevertheless the connection is such that the driving and driven members are secured in proper alignment. This construction serves also to render the parts dust proof.

In place of the fastening means 18 and 20 there may be employed by way of substitution fastening means like that shown in Figure 4. Here the fitting 13′ has a lateral projection 21 through which a threaded bolt passes and engages the frame member.

In some installations it is found desirable to employ a fitting to which the drive shaft housing may be connected in horizontal position. For that purpose the fitting is modified so that it shall carry two shafts at an angle to each other. One extending vertically for connection with the rotor shaft and the other extending horizontally for connection with the driving shaft. In Figure 4 the vertical shaft is shown at 22. It has a bearing in the casing 13′ at 23 and another bearing at 24 in a cap portion secured to the bottom of this fitting 13′. The upper end of this shaft is non-circular in section and is to be connected to the non-circular end of the rotor shaft. In view of possible misalignment of these shafts there has been devised a connecting driving member 25. This drive member rotates freely within and out of contact with what I have called the second portion of the frame member. Its upper end and its lower end are both shaped to fit the ends of the two shafts. The bearings 26 at the ends of this connecting member 25 are quite short so that there is a slight rocking motion of each shaft in the bearing 26, thus providing a sort of universal joint. This universal connection takes care of any mis-alignment of the shafts. The horizontal shaft is represented by reference character 27. It has a bearing at 28 in the fitting 13′ and also in the cap 29 secured thereto. Between the vertical and horizontal shafts there is shown a worm gearing connection as at 30. The fitting 13′ is provided with an enlarged opening around the end of the horizontal shaft 28. The end of the shaft 27 has a non-circular end which is received into a correspondingly shaped opening in the end of the driving shaft 31. The driving shaft 31 is carried by a connecting member 32, the outward flared ends of which engage the ends of fitting 13′. Surrounding this flared end is a threaded nut 33 which engages the horizontal portion of the fitting. The driving shaft casing is received into an opening 34 of the connecting member 32, as will be obvious. By this construction I am enabled to do away with the curving flexible casing beneath the speedometer, the jointed shaft arrangement making a very neat assembly and being capable of attachment to the speedometer without removal of any parts.

I claim:

1. An instrument frame, a rotor shaft therein, a casing formed with a recess having a flattened surface above the lower edge of the casing and means for connecting an external driving shaft with the internal rotor shaft at the flat surface.

2. An instrument including a cup shaped casing, a part of the casing wall which is situated at the bottom when the casing is in position for use, formed with a recess and being flattened whereby a flexible shaft may be connected and bent away therefrom without extending appreciably below the bottom of the casing.

3. Means for connecting a drive shaft to a measuring instrument, comprising a frame, a rotor shaft therein, a casing surrounding the frame, a driving shaft for driving the rotor shaft, the driving shaft located within a fitting, means detachably secured to the frame and engaging the fitting for securing the fitting to the frame with the adjacent casing walls therebetween.

4. Means for securing drive shaft to an instrument comprising a fitting through which the drive shaft is passed, a casing surrounding said instrument, a clamp engaging said casing and having a fork for engaging the fitting and means extending through said casing for securing the clamp to the instrument.

5. In an instrument having a frame and an enclosing casing, a fitting having extended therethrough a shaft for driving the instrument, means detachably secured to the frame and engaging the fitting for securing the fitting to the frame, the casing being held between the fitting and the frame.

6. In an instrument having a frame and an enclosing casing, a fitting having extended therethrough a shaft for driving the instrument, the frame and the fitting having cooperative parts, means detachably secured to the frame and engaging the fitting for securing the fitting to the frame with the casing therebetween.

7. In a measuring instrument having a frame and an enclosing casing, a frame having a rotor shaft bearing and a recess coaxial therewith, a fitting having extended therethrough a shaft for driving the rotor shaft and constructed with an extension for

entering the frame recess, means for securing the fitting to the frame with the casing therebetween.

8. In a measuring instrument, a frame having a driven shaft and a shouldered recess in axial alignment therewith, a casing having an opening in alignment with the recess of the frame, a fitting received within the casing opening and the frame recess and engaging the shoulder, packing between the casing and the frame, means fastening the fitting to the frame whereby the frame may be secured to the fitting with the casing therebetween, the packing serving to prevent shocks to the casing being transmitted to the frame, a driving shaft within the fitting, means coupling said shaft with the driven shaft.

9. Means to couple an external driving shaft to a driven shaft within an instrument comprising an inner frame and an outer casing, a fitting passing through the casing opening and secured to the frame, non metallic packing between the frame and the casing, and means to secure the fitting and frame together and also to secure the frame and casing with a yielding engagement.

10. An instrument comprising an external casing and an internal driven shaft carrying frame, a driving shaft carrying fitting positively engaging the frame, clamping means for securing the fitting and frame together and for affording a cushioned engagement between the frame and its casing.

11. In an instrument casing, a frame, a casing therefor, a yielding connection between the frame and casing, a fitting engaging the frame and projecting outside the casing, unitary means for securing the connection between the fitting and frame and the yielding connection between the casing and frame.

In testimony whereof I affix my signature.

JOSEPH ZUBATY.