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Fig. 1.

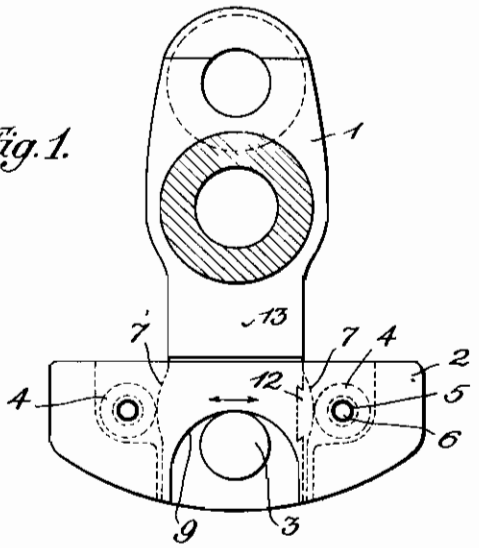
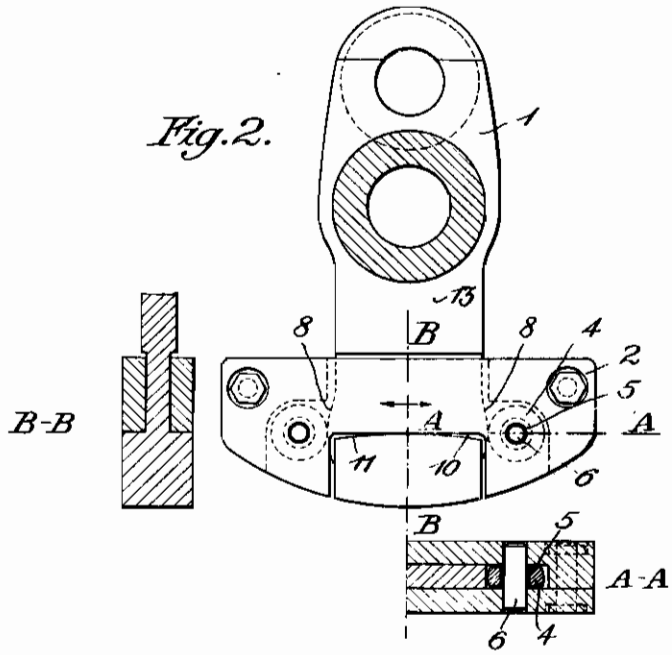


Fig. 2.



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DEVICES FOR SUPPRESSING TORSIONAL OSCILLATIONS

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The present invention relates to devices for suppressing torsional oscillations of crank shafts. In a manner known per se the absorption of the oscillation is effected by resonance pendulums. In connection with constructions known hitherto, this method, however, has the draw-back that its operation is not sufficiently free from sliding friction. Therefore, it is impossible or rather unsufficiently only possible to effectively control torsional oscillations, because the period of oscillation of the pendulum is changed by the sliding friction. The present invention is concerned with the suspension and bedding of the oscillating masses and, due to its construction which perfectly obviates any sliding, results in being free from friction to a large extent, thereby substantially improving the selection.

In the accompanying drawings two constructions according to the invention are shown by way of example.

In these drawings:

Fig. 1 diagrammatically shows an arrangement of the oscillation masses on the web of the crank shaft by means of rolling off according to a cycloide,

Fig. 2 shows an arrangement similar to that illustrated in Fig. 1, but operating by rolling off according to an evolvent.

Fig. 3 is a section on line A—A of Fig. 2, and

Fig. 4 shows a section on line B—B of Fig. 2.

In Fig. 1 the web of the crank shaft is designated 1. Mounted upon an extension 13 of the crank shaft web 1, serving for the suspension of a counterweight, is a bolt 3 of circular cross section extending in parallel to the axis of the crank shaft. On the bolt 3 the oscillating mass 2 is arranged which has a circular recess 9. Instead of mounting one oscillating mass on one web it is also possible to mount several masses on several webs. The circular recess 9 may also be replaced by a plane recess. To prevent a lateral displacement in the direction of the arrow shown in Fig. 1, rollers 4 are journalled, preferably by needles 5, by means of bolts 6 rigidly connected to the oscillating mass 2. In the manner characteristic to the method of absorbing oscillations by resonance, on rotation of the crank shaft pendulum movements of the oscillating mass 2 occur which consist in the mass 2 rolling off upon the bolt 3 along the contact surfaces 3 and 9. During this pendulum movement the centre point of the rollers 4 moves in a curve belonging to the group of cycloid curves. The counter faces 7 upon which the rollers 4 roll off represent equidistances to these cycloids. These surfaces may be integral with the extension 13 or for reasons of manufacture may be inserted as has been indicated at 12 in Fig. 1. From this arrangement it may be gathered that the oscillating mass 2 now is compelled to roll off upon the bolt 3 and that the rollers 4, journalled by means of the needles 5, reduce to a minimum the friction at the lateral contact faces 7. If in some cases the rollers cannot be arranged in the manner explained above, then the roller 4 may be replaced by a curve eventually by a plane also which is inserted or manufactured in the oscillating mass 2.

From Fig. 2 it may be seen that the oscillating mass 2 may be provided with a plane rolling off surface 10 with which it rolls off along the contact face 11 in the form of a part of a circle. The pathways of the centre points of the rollers resulting therefrom are evolvents 8. The equidistances also are in the form of evolvents. To place the oscillating mass 2 upon the web of the crank shaft, the mass 2 may for instance be provided with lateral slots, or the bolt 3 or the member provided with the contact surface 11 respectively may, after placing the mass 2 upon the web of the crank shaft, be inserted from the side of the web of the crank shaft and be fixed in any suitable manner.

There may be formed shoulders on the extension 13 or abutments in order to prevent a movement of the oscillating masses in the direction to the axis, when the engine is running slow on starting or on decreasing its revolution so that the centrifugal forces decrease approximately on 0.

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