

# United States Patent

Peltret

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## [54] GOVERNOR MECHANISMS

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[51] Int. Cl. ....G05d 13/06, G05d 13/14

[58] Field of Search.....73/526, 527, 535, 539, 550

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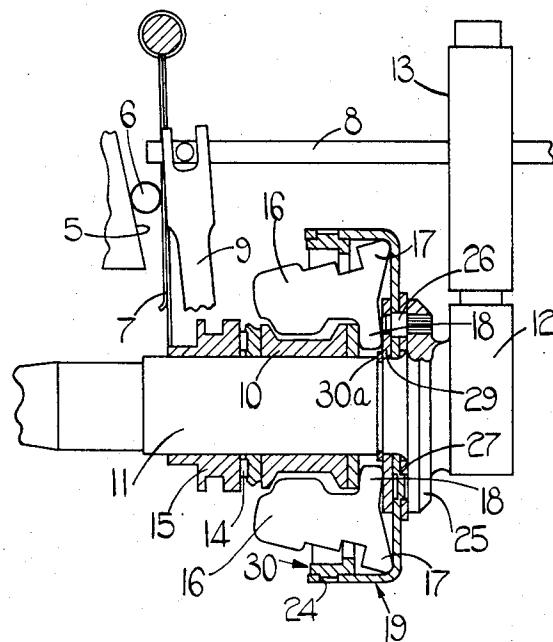
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## [57] ABSTRACT

A governor mechanism including a plurality of weights which are movable under the action of centrifugal force to urge a sleeve in one axial direction, the weights being located within a housing. The housing includes a cup shaped member in which is located an insert. The insert defines surfaces which guide the movement of the weights under the action of centrifugal force.

## 5 Claims, 4 Drawing Figures



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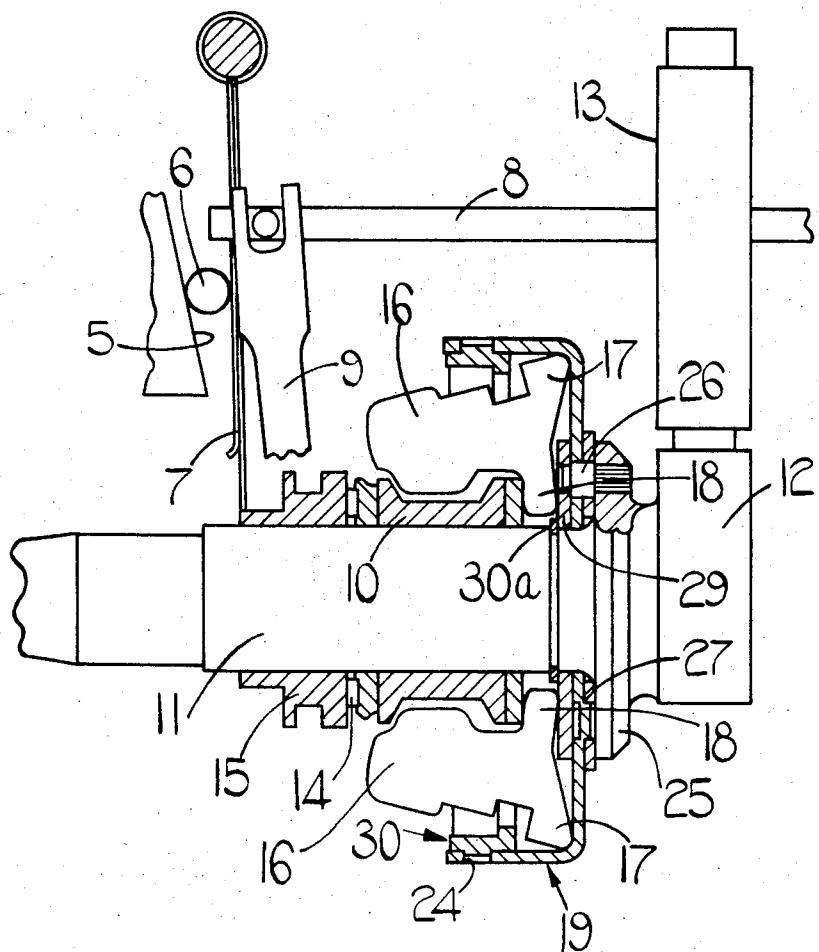


FIG. 1.

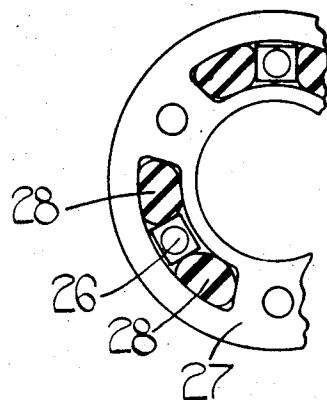


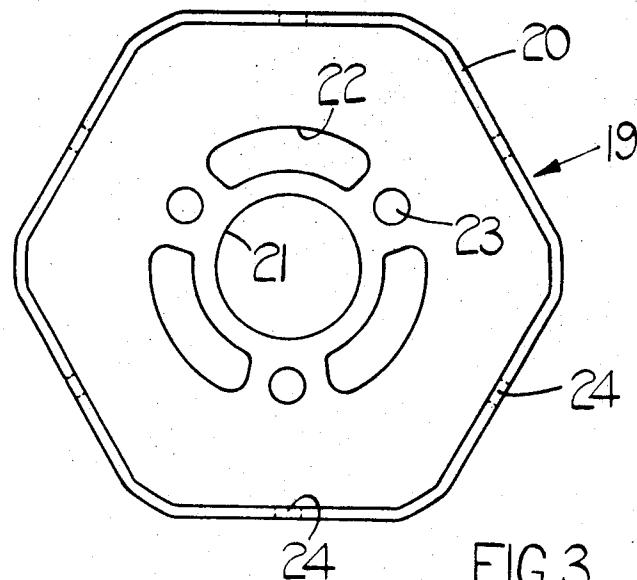
FIG. 2.

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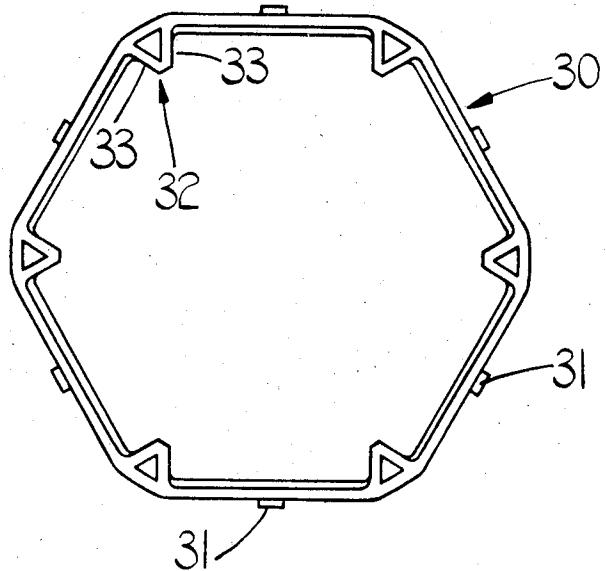
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FIG. 3



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FIG. 4

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## GOVERNOR MECHANISMS

This invention relates to governor mechanism and of the kind including a shaft an axially movable member mounted about the shaft, a cage secured to the shaft, and a plurality of weights which are located and driven by the cage, said weights each having a heel portion defining a pivot surface which bears against a surface defined by the cage and a toe portion which bears against sleeve whereby as the shaft is rotated, centrifugal force acting upon the weights will cause the weights to pivot about said pivot edges to effect axial movement of the sleeve.

In known constructions of this type the cage comprises a sheet metal member which is pressed and drawn to a shape which provides housing portions for the weights respectively, each housing portion defining side surfaces which bear against the side surfaces of the weights. The production of the cage presents considerable problems and the object of the invention is to provide a governor mechanism of the kind specified in a simple and convenient form.

According to the invention in a governor mechanism of the kind specified, the cage comprises a cup shaped member which is provided with an aperture in its base wall through which the shaft extends, and there is secured within the cup shaped member a generally annular insert having a plurality of inwardly extending projections each of which defines a pair of axially extending surfaces on its opposite sides, the adjacent surfaces on adjacent projections being substantially parallel to each other to define surfaces which locate weights disposed intermediate the projections respectively.

One example of a governor mechanism will now be described with reference to the accompanying drawings in which:

FIG. 1 shows the governor mechanism for a fuel injection pump,

FIG. 2 shows an end view of part of the mechanism of FIG. 1,

FIG. 3 shows an end view of part of the mechanism of FIG. 1 to an enlarged scale, and

FIG. 4 is a view similar to FIG. 3 showing another part of the mechanism.

With reference to the drawings the governor mechanism includes a sleeve 10 which is mounted for axial movement upon a shaft 11. The shaft in use, is driven by the engine with which the pump is associated and the shaft is provided with cams 12 for actuating individual injection pumps 13 respectively only one of which is shown. The sleeve 10 through the intermediary of a thrust bearing 14 acts upon a further sleeve 15. The sleeve 15 is provided with a peripheral groove which is engaged by a pair of inwardly directed rollers mounted at one end of a lever 9. The other end of the lever is pivotally connected to a control rod 8 of the injection pump. Moreover, a spring 7 is provided which acts on the sleeve 15, and the force exerted by the spring on the sleeve 15 is determined by the position of a roller 6 disposed intermediate the spring and an inclined ramp 5.

The governor mechanism also includes a plurality of weights 16. The weights are provided with heel portions 17 and toe portions 18. The heel portion 17 of each weight defines a pivot surface which bears against a fixed member (to be described) and the toe portion

of each weight bears against a thrust member associated with the sleeve 10. As the shaft is rotated the weights tend to move outwardly under the action of centrifugal force and tend to pivot about the pivot surfaces thereby imposing an axial force upon the sleeve 10 which tends to move the sleeve axially against the action of the spring 7.

The aforesaid fixed member comprises a cup shaped pressing 19 the wall of the pressing being of generally hexagonal form as FIG. in Figure 3. The base wall of the pressing is provided with a central aperture 21 through which the shaft 11 extends and outwardly spaced from the aperture 21 are three arcuate slots 22. Moreover disposed intermediate the slots 22 are half pressed portions 23 which project on the opposite side of the base wall from the wall 20. Moreover, each wall portion of the wall 20 is provided with an aperture 24.

The pressing 19 is secured to a flange 25 formed on the shaft 11 and the way in which it is secured is such as to provide a resilient connection. The flange 25 is provided with three pins 26 having square head portions which extend through a back plate 27 shown in FIG. 2 into the arcuate slots 22. The half pressed portions 23 on the pressing engage within apertures formed in the back plate and this plate is also provided with arcuate slots. Disposed on opposite sides of the pins 26 are pairs of resilient pads 28 which are located within the cavities defined by the arcuate slots of the pressing and the back plate. Also provided is a retaining plate 29 which engages with the heads of the pins 26 and which retains the pressing in position. The retaining plate 29 is secured in position by means of a circlip 30a. The pads 28 act to cushion the transmission of drive to the pressing 19 from the shaft 11.

Mounted within the pressing 19 is an insert 30 (FIG. 4) and this is complementary in shape to the wall 20 of the pressing. The axial length of the insert is however less than that of the wall of the pressing. The insert is formed as a moulding from synthetic resin material such as nylon and on the outer surfaces of the six side wall portions are provided projections 31 which locate in the apertures 24 of the pressing to retain the insert in position. The inner periphery of the insert is provided with projections 32 these being disposed at the junctions of the side wall portions. Each projection is of hollow triangular form and defines a pair of axially extending side surfaces 33. The adjacent side surfaces 33 of adjacent projections are parallel to each other and define guide surfaces which co-operate with the side surfaces of a weight 16 disposed therebetween. The side surfaces act to guide the movement of the weights as they pivot under the action of centrifugal force. It will be noted that the insert is reinforced by a rib member, furthermore, the periphery of each weight is cut away to allow the weights to move outwardly their maximum extent, and to limit any axial movement of the weights along the shaft due to an acceleration or deceleration force which the mechanism may be subjected to.

The pressing 19 being of a simple shape is easy to produce as also is the insert 30 and the two can be readily assembled together when required.

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

1. A governor mechanism comprising a shaft, an axially movable member mounted about the shaft, a cage secured to the shaft, said cage comprising a cup shaped member the peripheral wall of which is of generally hexagonal form and a base wall through which the shaft extends, a plurality of weights which are located and driven by the cage, said weights each having a heel portion defining a pivot edge which bears against a surface of the cage and a toe portion which bears against said axially movable member whereby as the shaft is rotated, centrifugal force will pivot the weights about said pivot edges to cause axial movement of said member, a generally annular insert of complementary shape to the peripheral wall located within the cup shaped member, inwardly extending projections on said insert, said projections each having axially extending surfaces on their opposite sides, the adjacent surfaces of adjacent projections being substantially parallel and defining locating surfaces for weights disposed between the projections respectively, and outwardly extending projections on the insert which engage within apertures formed in the peripheral wall of the cup shaped member thereby to retain the insert relative to the member.

2. A governor mechanism as claimed in claim 1 including an internal rib extending between said inwardly

extending projections of the insert.

3. A governor mechanism as claimed in claim 2 in which said inwardly extending projections are defined at the corners of the hexagon and are of hollow triangular form.

4. A governor mechanism as claimed in claim 3 including a flange on the shaft, said flange acting to retain the cup shaped member on the shaft.

5. A governor mechanism as claimed in claim 4 including pins on the flange, said pins extending parallel to the axis of the shaft, said pins each having a portion of square section, slots formed in the base wall of the cup shaped member, said portions being accommodated within said slots, the pins being engaged with a retaining plate which is located on the side of the base wall of the cup shaped member remote from the flange, said pins being engaged with said retaining plate, there being a further plate provided intermediate the base wall of the cup shaped member and the flange, said further plate being non-rotatably coupled to the cup shaped member, complementary arcuate slots in said further plate, and resilient pads located on opposite sides of each pin in the cavities defined by the arcuate slots, said pads acting to cushion the transmission of drive to the cup shaped member from the shaft.

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