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## AUTOMOTIVE CENTRIFUGAL CLUTCH

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It is known to design friction clutches in which the pressure between the clutch elements produced by centrifugal weights increases in proportion to the engine speed. With low engine speeds the weights are prevented from swinging outwardly by springs so that the clutch is prevented from being engaged. Only when the rotational speed is increased, the weights are swung outwardly against the resistance of the retractor springs pressing the clutch elements against each other by means of levers or of an additional pressure plate. The engagement of the clutch for this reason needs no pedal and also its disconnection can be effected only by reducing the rotative speed. This is disadvantageous in so far, as the flux of force cannot be interrupted at any desired moment, as it is necessary on a sudden danger or when rapidly changing down from a higher transmission stage to a lower one.

For this reason, centrifugal clutches permitting the disconnection independently of the actual rotative speed by the conventional clutch pedal have been developed.

One of these known centrifugal clutches shows e. g. a pressure plate held in disconnected position by springs retracting it to the cover plate of the clutch housing. Levers are pivotally mounted on the cover plate, one arm of which is attacked by the centrifugal weights and the other by the thrust bearing. At a predetermined rotative speed the pressure plate is pressed via a cam and short guided bolts contrary to the action of its springs against the clutch discs which are pressed against the housing.

With this centrifugal type clutch the coupling pressure produced by the centrifugal weights is increasing with an augmenting engine speed, so that the disengagement with high rotative speeds requires much force and fatigues the driver.

It has been proposed therefore to arrange the centrifugal weights at the circumference of the clutch housing and to provide them internally with helical springs the free ends of which are acting through rocking levers on the pressure plate. When the clutch is engaged the weights bear against the rims of the housing so that only the spring pressure is acting on the pressure plate but not the centrifugal weights. For disengaging a clutch of this type with the centrifugal weights engaged it will be only necessary to overcome the spring pressure, the centrifugal weights themselves do not change their positions.

Clutches of the type described above take much room, of which especially in the case of automo-

tive vehicles cannot be disposed, so that they could not brought into use.

According to the present invention an essential simplification is obtained and little room is taken up with such a type of clutch by providing that the centrifugal weights interiorly equipped with springs, are pivotally mounted on the cover plate of the clutch housing and acting through openings in the cover plate on the pressure plate, the swinging movement of the centrifugal weights being limited by bent up rim of the opening in the cover plate. The pressure plate is in this case provided with recesses for the reception of the bolt heads.

The new centrifugal force device can be easily fitted also in a conventional frictional clutch equipped with the usual disengaging gear.

One form of embodiment of the invention is the accompanying drawing, in which

Fig. 1 is a section through the new centrifugal clutch in engaged position;

Fig. 2 shows the position of the centrifugal weights at low speeds, the clutch being disconnected.

The engine crankshaft 1 is rigidly connected to the clutch housing 2 forming the flywheel in which as in the usual manner the clutch disc 3 with the facing material 4 and the pressure plate 5 are fitted. The clutch disc 3 with its hub 6 is mounted for longitudinal movement but connected for rotation on the splines 7 of the shaft 8. The clutch housing 2 is closed by the cover plate 9, on which the supports 10 carrying the clutch levers 11 are mounted, which with one arm 12 attack the connection links 13, whereas their other arms 14 are bearing against the thrust bearing 15. The centrifugal weights 17, in which the pressure bolts 19 under the influence of the springs 18 are slidably fitted, are pivotally attached to the lugs 16 of the cover plate 9, said bolts being provided at one end with a stop ring 20 and at the other with a mushroom type head 21 reaching through openings in the cover plate and bearing in corresponding recesses 22 against the pressure plate 5. The swinging movement of the centrifugal weights 17 is limited by abutments 23 on the cover plate 9. Small springs 24 are withdrawing the centrifugal weights at low rotative speeds until they are contacting against the lip 25 on the cover plate 9.

The mode of operation of the new centrifugal clutch is as follows:

If a predetermined engine speed is obtained, the centrifugal weights 17 are swinging out-

wardly, contrary to the action of the springs 24, compressing the spring 18 and pressing the bolts 19 with their mushroom type heads 21 against the pressure plate 6 which is bearing via the clutch disc 3 against the housing 2, so that the clutch is engaged. As in case of a further increase in the speed of rotation the centrifugal weights 17 bear against the stops 23, there is no further increase in the coupling pressure. The

disconnection of the clutch can be effected at any rotative speed by depressing the clutch pedal, thus moving the thrust bearing 15 to the left which causes the clutch lever to retract the pressure plate 6 from the clutch disc 3 contrary to the action of the springs 18 in the interior of the centrifugal weights 17.

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