

ALIEN PROPERTY CUSTODIAN

ELECTRO-MAGNETIC CLUTCHES

Albert Maier and Fritz Gutmann, Friedrichshafen, Bodensee, Germany; vested in the Alien Property Custodian

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Our invention relates to electromagnetic clutches and has special reference to the discs used therein.

Such discs have to be very thin so that a plurality of them may be used in one clutch of the electromagnetic type. Some of these discs are in driving connection with an interior part and some with an exterior part. The clutching effect is obtained by pressing the discs together. For this purpose there is an exciting electric coil on one side of the succession of discs and an armature disc or plate at the other side thereof. It has become usual to provide apertures in such discs in the zone opposite to the stimulating electric coil.

Such discs when in use are subject to great heat development from the inner parts of the clutch, the outer parts suffering not so much therefrom. Consequently, there are forces tending to expand the inner portions to a higher degree than the outer portions. This results in the discs becoming sinuous or dished, as the inner portions cannot yield, and causes a greater distance between the individual discs in the axial direction which again results in a greater force being necessary to cause engagement of the clutch. When becoming cool again the inner portions shrinking tend to force the outer portions to a reduction in diameter which again causes the discs, in this case especially the outer portions, to become sinuous or otherwise misshaped, so that the discs will still be in frictional touch even after the clutch having been released.

Our invention avoids all these drawbacks by providing slits in the discs, such slits extending from the inner portion to the middle portion and also from the outer portion to the middle portion. Preferably, with the discs being in driving connection with an exterior part the slits in the inner portion should meet with the apertures afore-mentioned, whereas with the discs being in driving connection with an interior part the slits in the outer portion should meet with these apertures. In this manner the discs will be subdivided by substantially radially extending slits into a number of individual sector-like or segment-like portions which may expand at ease because of heat being created in the clutch on its operation, without warping or becoming sinuous.

Having given a general description of our invention we now want to point it out more in detail having reference to the drawings which represent several examples embodying our invention.

Fig. 1 is a side view, partly in section on an electromagnetic clutch.

Fig. 2 is a vertical section taken on line II—II of Fig. 1.

Figs. 3 and 4 are plan views on outer and inner guided discs, respectively.

Figs. 5 and 6 are like views but showing differently drawn slits in the discs.

Shaft 1 is surrounded by a bush 2 on which pinion 3 is loosely journaled. Magnet body 4 is keyed to said pinion 3. Enclosed therein is the exciting coil 5 and on its circumference sliding ring 6 is seated in the isolating mass 7. There is a connecting wire 8 from said coil 5 to said sliding ring 6.

Opposite to coil 5 the clutch discs 10, 14 are situated. They are extremely thin and a number of them (10) by means of teeth 11 are in driving connection with outer claws 12 belonging to the magnet body 4 and another number (14) are in driving connection with shaft 1 by means of projecting teeth 15 and grooves 16 or the like. These different clutch discs are arranged in alternating sequence, as usual. There is an armature disc 17 situated at the left hand end of the sequence of discs 10, 14; this armature disc is in driving connection with shaft 1.

All of the discs are axially displaceable. They have apertures 18 in the ring zone opposite to coil 5 leaving intermediate connecting studs 19. With the discs (10) which are in outer driving connection, as represented in Fig. 3, there are slits 20 extending from the outer circumference to said studs 19 and other slits 21 extending from the inner edge to the apertures 18. In contradistinction thereto the discs (14) being in inner driving connection (Fig. 4) have slits 25 extending from the inner toothed edge towards said studs 19 and other slits 24 extending from the outer circumference to the apertures 18. Slits 24 may extend even further, for example to limiting circle 40 shown in dashed lines in Fig. 4, and slits 25 may end also at this circle 40.

But, as represented in Figs. 5 and 6, both, the outer slits 26 and the inner slits 25 may extend even beyond such limiting circles and they may have at their ends circular enlargements 30 and 35, respectively.

The sector- or segment-like subdivision of the discs is more clearly demonstrated in Figs. 3 and 4 in which the wing-shaped plane portions are marked in dotted lines.

We do not want to be limited to the details described or shown in the drawings, as many variations may occur to those skilled in the art without deviating from the scope of our invention.

ALBERT MAIER,
FRITZ GUTMANN.