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H. D. BRAILSFORD

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ADJUSTABLE TIMING CAM

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Fig. 1.

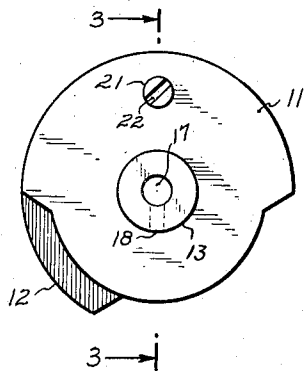


Fig. 2.

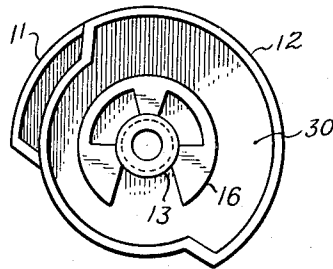


Fig. 4.

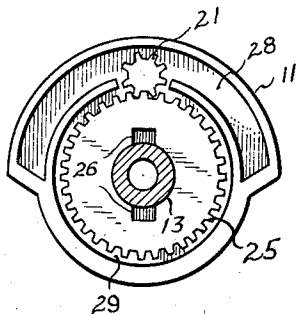


Fig. 5.

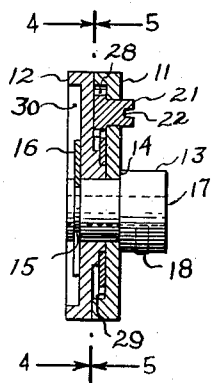
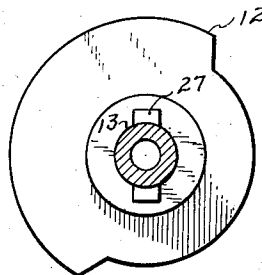


Fig. 3.

INVENTOR.  
HARRISON D. BRAILSFORD  
BY *Varby & Darby*  
ATTORNEYS

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## ADJUSTABLE TIMING CAM

Harrison D. Brallsford, Rye, N. Y.

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1 Claim. (Cl. 74—568)

This invention relates to cams and their structure and particularly to an adjustable timing cam.

Cams for use as adjustable timing cams for delicate devices such as for instance microswitches and the like, have in the past comprised a cam shaped disc lacking in any adjustment or a pair of cam shaped discs coaxially mounted and adjustable by rotation of one with respect to the other by hand. This latter type, though adjustable, has not been found to be satisfactory in view of the difficulty of adjusting small discs in this way with the accuracy sometimes required.

Accordingly it is an object of this invention to provide an adjustable timing cam having provision for accurate adjustment though the structure may be small and delicate for operation with for instance devices such as the aforementioned microswitch. Other objects will be apparent after a study of the following description, claim and the drawing in which—

Figure 1 is a view of one side of the adjustable timing cam constructed in accordance with the teachings of this invention.

Figure 2 is a view of the opposite side of the cam.

Figure 3 is a cross-section view through 3—3 of Figure 1.

Figure 4 is a view of the inside of one cam disc of the pair comprising the structure, and

Figure 5 is a view of the inside of the other of the pair of discs.

With reference to the drawings the adjustable timing cam structure in accordance with this invention comprises a pair of cam shaped discs 11 and 12. The particular cam shape of these discs will of course depend upon the intended use in accordance with well known cam practice. The discs 11 and 12 are coaxially mounted on a common shaft 13.

One end of the shaft 13 has a shoulder 14 abutting against the outer side of the disc 11 so as to hold the disc in position at this end of the shaft. The other end of the shaft 13 has an annular groove 15 positioned adjacent the outer side of the other disc 12. A U shaped spring retaining clip 16 is fitted resiliently into and about this groove 15 so as to retain the second disc 12 in position whereby the whole cam comprising the two discs 11 and 12 is held firmly in position on shaft 13.

At least one of the discs such as the disc 12 is free to rotate on and about the shaft. The shaft 13 has a longitudinal opening 17 for mounting on the drive shaft of any mechanism (such as timing mechanism) on which the cam is to be used and is held in place by any suitable means such as for instance a small set screw 18.

Rotatable settings or adjustments of the discs with respect to each other, so as to vary the overall cam shape, are made by means of a pair of gear members mounted preferably intermediate or between the two discs 11 and 12. The first such gear 21 is the smaller of the two and is formed as part of, or is mounted on, one end of a short shaft-like structure extending through and mounted in the side of the disc 11 near the outer edge thereof.

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The other end of this shaft portion of this gear member 21, which extends outside of the outer surface of the disc 11, has a slot diametrically thereof suitable for the use with a small screwdriver whereby the gear may be rotated by any desired amount by a screwdriver adjustment from the outside and thus accessible side of the cam. The gear teeth adjacent the inner side of the disc 11 thus are positioned intermediate the two discs 11 and 12 as shown.

The second and larger gear member 25 is flat and disc-like, having gear teeth complementary to and engaging those of the first gear 21. The second gear 25 is mounted on shaft 13 coaxially with and between the two cam discs 11 and 12. The second gear 25 is preferably considerably larger than that of the first gear 21 so as to provide a gear reduction ratio thus making possible greater accuracy of positioning or adjustment through the rotation, by a screwdriver, of the first gear 21. It may now be seen that the position of smaller gear 21 is determined by the larger gear 25.

The larger gear 25 has a pair of rectangular cutaway portions extending radially from the center for a short distance. The inner surface of the second disc 12 has a pair of projections 27 extending slightly from the surface thereof in a position and of a size complementary to that of the cutaway portions on the gear 25. In this way the gear 25 is positioned flat against the inner surface of the cam disc 12 with the projections 27 from the disc extending through the open portions 26 of the gear thus retaining the gear in position and preventing relative rotation between the gear 25 and the disc 12.

The larger gear 25 is free to rotate about the shaft 13 with respect to the first cam disc 11. Rotation of the smaller gear 21 which is fixed in the first disc 11, causes the larger gear 25 to rotate, and through the locking means of the projections 27 in the inner surface of the second disc 12 this rotation is imparted to the latter disc whereby the second disc 12 rotates with respect to the first disc 11. The frictional pressure of the retaining clip 16 is sufficient to hold the discs in their relative positions so as to maintain the overall cam shape after the setting has been made. The clip on the other hand does permit the rotatable movement of the second cam disc 12 on the shaft 13 and with respect to the first disc 11.

Since the two gear members 21 and 25 are positioned preferably between the cam discs 11 and 12, at least one of the discs 11 should have recesses in the inside surface thereof to accommodate the two gears. Such recesses are illustrated at 28 and 29 in Figures 3 and 4 of the drawings. Similarly one (the outer) surface of the other disc 12 may be recessed so as to accommodate the retaining clip 16 and such recess is illustrated at 30 in Figures 2 and 3 of the drawings.

With the structure illustrated and described accurate adjustments of the small timing cam are possible after the cam has been mounted on its associated timing mechanism. A simple turn of the smaller gear 21 by means of a screwdriver fixes minutely and accurately, the relative rotational position of the second disc 12 with respect to the first disc 11. Adjustments of the cam shape are thus made possible with far greater accuracy and ease than those of small cam structures heretofore known.

While preferred embodiments of the invention have been illustrated and described the scope thereof is defined by the following claim.

What is claimed is:

An adjustable timing cam comprising a pair of disk cams in relatively rotatable juxtaposition on a common axial shaft, the first said cam being a driving cam securely mounted on said shaft to rotate therewith and having

a recess in the side surface; driven disk means within said recess and rotatable about said axial shaft and rotatable with respect to said driving cam, the second said cam being a driven cam rotatably mounted on and with respect to said axial shaft and having means engaging said driven disk means thereby to rotate therewith, an adjustably rotatable driving pinion mounted within a recess in the said surface of said driving cam and positioned to engage the circumferential edge of said driven disk, whereby adjustment of said rotatable driving pinion in said driving cam causes rotation of said driven cam with respect thereto.

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