Page dimensions: 595.0x842.0

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EUROPEAN PATENT SPECIFICATION

Date of publication of patent specification: 17.11.88
Application number: 85107264.5
Date of filing: 12.06.85

Priority: 12.06.84 IT 2225184 u
Date of publication of application: 08.01.86 Bulletin 86/02
Publication of the grant of the patent: 17.11.88 Bulletin 88/46

Designated Contracting States:
AT BE CH DE FR GB LI NL SE

References cited:
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Description

The present invention relates to a locking device for control cams of a sewing machine and to a sewing machine having such a locking device.

It is known that in modern sewing machines selection of the sewing stitch is made by selecting an appropriate cam profile which regulates the operation cycle of the operative parts of the machine and in particular the operation cycle of the needles which perform the sewing.

These cam profiles are provided on a single one-piece support which is sensed by a sensor connected to a selector.

It is also known that, given the high number of types of sewing machine stitches which can be performed with a modern sewing machine, it is equipped with a certain number of cam assemblies and supports of the aforesaid type so that their prompt and easy replacement becomes necessary.

A locking device for control cams of a sewing machine is known from US-A-3 026 831. The device is used to impart an oscillatory movement to a lever in order to produce a zig-zag sewing pattern. The device includes a plurality of cams formed on the outer surface of a substantially cylindrical support. A locking part is provided with a coupling flange which is arranged to be introduced in operative position into an internal cavity of the support. The locking part is driven by a drive mechanism of the sewing machine, the angular position of the locking part and hence the cylindrical part being fixed. The locking part has an internal bore designed to receive an end of a centering shaft around which the locking part is rotatable. The cam support, however, is not located directly on the shaft and is supported solely by the locking part. The coupling element therefore not only determines the angular position of the support with respect to the locking part, it also determines the degree of coaxiality of the support with respect to the shaft. A fixing means, namely a leaf spring is provided to resiliently and releasably hold the cam support against the coupling flange. This leaf spring is secured to the locking part by means of a stud. Due to the cantilever arrangement of the cam support with respect to the rotation shaft and due to the use of a resilient fixing method of the cam support to the locking part, there is a limit to the force which can be transmitted from the cam to the cam follower alternatively, it is not possible to provide a cam support with several rows of cams to provide a large number of sewing machine stitch types. Further, it is not possible to realize a fixed angular position of the cam support with respect to the locking device.

An object of the present invention is to provide an effective device for replacement, locking in position and unlocking of the cam support with respect to the rotation shaft of same.

Said object is achieved with a locking device for sewing machine control cams of the type including a plurality of cams formed on the outer surface of a substantially cylindrical support comprising a locking part provided with a coupling element and arranged to be introduced in operative position into an internal cavity of said cam support, said locking part being mounted for rotation on a base connected to a drive mechanism of the sewing machine, the angular position of the locking part and hence the cam support being adjustable with respect to a base of a sleeve, said cam support having an axial sleeve coaxial therewith born for rotation by an end of a centering shaft around which said locking part is rotatable, and locking means designed to engage said coupling elements of said locking part in a releasable manner.

The invention will now be described in relation to the embodiments illustrated in the annexed drawings, wherein:

Fig. 1 is a perspective schematic view of a sewing machine incorporating the device according to the invention;

Fig. 2 is a partial cross section of the sewing machine of Fig. 1 with the device of the invention in unlocked position;

Fig. 3 is a view similar to that in Fig. 2, although limited to the device, shown closed;

Fig. 4 is an exploded view of the device of the invention;

Fig. 5 is a cross section along line V—V of Fig. 4; and

Figs. 6 and 7 are plan views of the device shown in Fig. 4 seen in the direction of arrows A and B respectively.

With reference to the drawings, number 50 indicates a sewing machine shown with a top cover 51 in which (Fig. 2) is hinged a door 52 which allows access to the device according to the invention indicated as a whole and generally with number 53.

With reference to the drawings, number 10 indicates a cylindrical tubular support on whose external surface are formed cam profiles 11 designed to be explored by a sensor 54 which in turn controls in a known manner the parts which perform the sewing operations.

The sensor 54 is shiftable in a known manner on command from one profile to the other of the cam 11 by means of a selecting lever 55 and a known mechanism indicated wholly by reference number 56.

To the internal cylindrical surface 12 of the support 10 is fixed by a small fixing block 13 a central sleeve 14 which is coaxial with the axis of the support 10 and pierced axially as indicated by reference number 15.

On the top end of the sleeve 14 are formed two side pins 16 aligned on a diameter of the circular section of the sleeve.

Inside the support 10 between its cylindrical internal surface 17 and the external surface of the sleeve 14 is insertable an anchoring element 18 forming two locking protrusions 19 having the purpose described below and equipped with a
base 20 having a central hole 21 designed to arrange itself coaxially with the hole 15 in the sleeve 14 against which said base rests.

The fixing block 13 also has two through steps 22 with a rectangular cross section and two regulating and adjusting slots 26 at 90 degrees.

To couple the element 18 to the support and centering shaft or pin 23 whose purpose is to support in a central position the cam support 10 during its rotation, the base 20 is fixed to the top circular base 57 of a sleeve 58 which is mounted in a turning manner on the shaft 23 and bears a pinion gear 59 meshed with a worm 60 to operate the pinion gear and hence to rotate the anchor element 18 and with it the support 10 bearing the cam profiles 11.

The base 20 is secured to the base 57 of the sleeve 58 by means of the screws 61. To regulate and hence time the position of the support 18 and hence of the support 10 of the cam profiles 11 the screws 61 pass into openings 62 formed by the base 20, the openings 62 having an extended ring so that the angular position of the anchoring element 18 and hence of the support 10 with respect to the sleeve 58 can be adjusted finely.

The cam support 10 is mounted and locked as needed on the anchoring element 18.

To achieve this, on the pins 16 protruding from the sleeve 14 is mounted in a rotating manner a substantially U-shaped handle 27 the inside of which has blind holes 28 for mounting on the pins 16 while the arms of the U have on the outside semi-circular locking elements 29 which upon pivoting of the handle 27 around the pins 16 engage with the locking protrusions 19 of the locking part 18 which is assembled integrally in a turning manner with the shaft 23.

As a result the cam support 10 can be rapidly mounted and removed with respect to the shaft 23 and hence made to be rotated by the latter.

Function of the device according to the invention is consequently very clear.

In the beginning there is the shaft 23 which bears the locking part 18 fitted to it in the aforesaid manner.

The cam support 10 is fitted on the locking part 18 in such a manner that the central shaft 23 enters the axial hole 15 of the sleeve 14, bringing the locking protrusions 19 into a position suitable for engagement by the corresponding locking elements 29 of the handle 27.

Pivoting of the handle 27 in either direction toward the position shown in Fig. 3 causes locking of the support 10 to the locking element 18 while pivoting in the reverse direction to the intermediate position shown in Fig. 2 is sufficient to release it.

Claims

1. Locking device (53) for sewing machine control cams of the type including a plurality of cams (11) formed on the outer surface of a substantially cylindrical support (10) comprising a locking part (18) provided with a coupling element (19) and arranged to be introduced in operative position into an internal cavity of said cam support (10), said locking part (18) being mounted for rotation on a base (20) connected to a drive mechanism (57, 58, 61) of the sewing machine, the angular position of the locking part (18) and hence the cam support (10) being adjustable with respect to a base (57) of a sleeve (58), said cam support (10) having an axial sleeve (14) coaxial therewith for rotation by an end of a centering shaft (23) around which said locking part (18) is rotatable, and locking means (27, 29) designed to engage said coupling elements (19) of said locking part (18) in a releasable manner.

2. Device according to claim 1 characterized in that said locking means consists of a U-shaped handle (27) whose side arms are pivoted on two aligned pins (16) protruding from said sleeve (14), and having locking elements (29) which upon pivoting of said handle (27) engage said coupling elements (19) of said locking part (18).

3. Device according to claim 2 characterized in that said locking elements consist of at least one semi-circular recess (29) turning together with said handle (27) and coaxial with said aligned pins (16) which protrude from said sleeve (14).

4. A sewing machine characterized by a locking device (53) according to any one of claims 1 to 3.

Patentansprüche

1. Verriegelungsvorrichtung (53) für Nähmaschinensteuerungsnocken mit eine Vielzahl von Nocken (11), die an der äußersten Oberfläche eines im wesentlichen zylindrischen Trägers (10) gebildet, enthaltend: ein Verriegelungsteil (18), das mit einem Kupplungselement (19) versehen und derart ausgebildet ist, daß es in betriebsfähigem Position in einen internen Hohlraum des Nockenträgers (10) eingeführt wird, wobei das Verriegelungsteil (18) zum Drehen auf einer mit einem Antriebsmechanismus (57, 58, 61) der Nähmaschine verbundenen Grundplatte (20) angeordnet ist, die Winkelausstellung des Verriegelungssteils (18) und dadurch des Nockenträgers (10) in bezug auf eine Grundplatte (57) einer Buchse (58) einstellbar ist, und der Nockenträger (10) eine axiale zu diesem konzentrische Buchse (14) aufweist, die zum Drehen durch ein Ende einer zentrierenden Achse (23) getragen ist, um welche das Verriegelungsteil (18) drehbar ist, und Verriegelungsmittel (27, 29), die derart ausgebildet sind, daß sie in die Kupplungselemente (19) des Verriegelungssteils (18) losbar eingreifen.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Verriegelungsmittel aus einem U-förmigen Griff (27) bestehen, dessen Seitenarme auf zwei ausgerichteten, aus der Buchse (14) herausragenden Stiften (18) drehbar sind, und Verriegelungselemente (29) aufweisen, die beim Drehen des Griffs (27) in Eingriff mit den Kupplungselementen (19) des Verriegelungssteils (18) kommen.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Verriegelungselemente
aus wenigstens einer halbkreisförmigen Ausnehmung (29) bestehen, die sich gemeinsam mit dem Griff (27) dreht und koaxial zu den aus der Buchse (14) herausragenden Stiften (16) ist.

4. Nähmaschine, gekennzeichnet durch eine Verriegelungsvorrichtung (53) nach einem der Ansprüche 1 bis 3.

Revisions

1. Dispositif de blocage (53) pour cames de commande de machine à coudre, du type comportant plusieurs cames (11) formées sur la surface externe d’un support (10) sensiblement cylindrique, comprenant une pièce de blocage (18) pourvue d’un élément d’accouplement (19) et formé pour être introduite en position de travail dans une cavité interne du porte-cames (10), la pièce de blocage (18) étant montée rotative sur une embase (20) reliée à un mécanisme d’entraînement (57, 58, 61) de la machine à coudre, la position angulaire de la pièce de blocage (18), donc aussi du porte-cames (10), étant réglable par rapport à une joute (57) d’une douille (58), le porte-cames (10) contenant un manchon axial (14) qui est coaxial au porte-cames (10) et est conçu pour être entraîné en rotation par l’extrémité d’un axe de centrage (23), autour duquel la pièce de blocage (18) est rotative, ainsi qu’un moyen de blocage (27, 29) conçu pour être relié de façon amovible, par emboîtement, avec l’élément ou les éléments d’accouplement (19) de la pièce de blocage (18).

2. Dispositif selon la revendication 1, caractérisé en ce que le moyen de blocage est constitué par une manette (27) de forme en U, dont les branches latérales sont articulées sur deux ergots (16) alignés et qui font saillie du manchon (14), le moyen de blocage possédant des éléments de blocage (29) qui, lors du pivotement du la manette (27) établissent une liaison par emboîtement avec les éléments d’accouplement (19) de la pièce de blocage (18).

3. Dispositif selon la revendication 2, caractérisé en ce que les éléments de blocage comprennent au moins une encoche semi-circulaire (29) qui tourne conjointement avec la manette (27) et est coaxiale aux ergots (16) alignés faisant saillie du manchon (14).

4. Machine à coudre, caractérisée en ce qu’elle comprend un dispositif de blocage (53) selon l’une quelconque des revendications 1 à 3.