Feb. 9, 1960 R. E. JOHNSON 2,924,120

CAM-DISK SUPPORT DEVICE FOR SEWING MACHINES

Filed Jan. 24, 1957

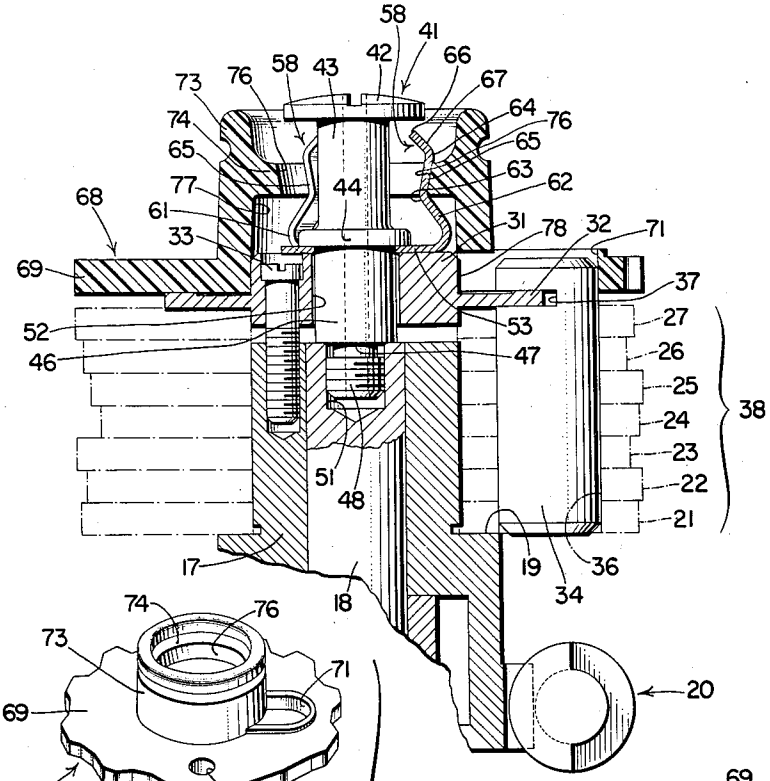


Fig. 1

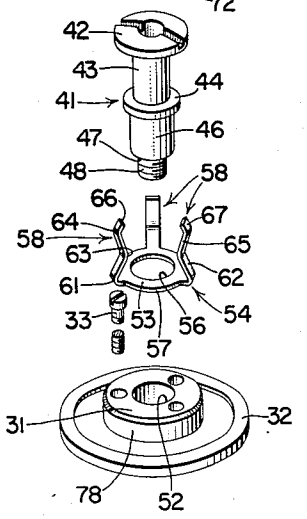


Fig. 3

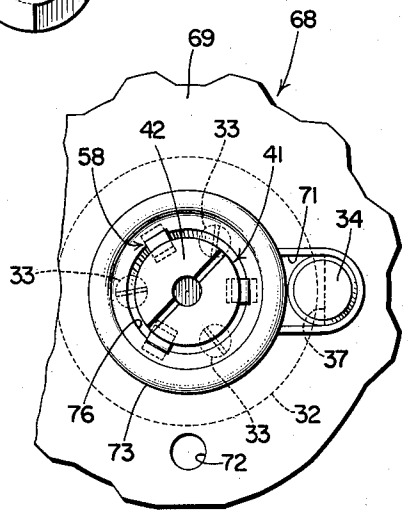


Fig. 2

WITNESS

William Martin

INVENTOR.

Ralph E. Johnson

BY

Marshall J. Breen

ATTORNEY

United States Patent Office 2,924,120 Patented Feb. 9, 1960

2,924,120

CAM-DISK SUPPORT DEVICE FOR SEWING MACHINES

Ralph E. Johnson, Mountainside, N.J., assignor to The Singer Manufacturing Company, Elizabeth, N.J., a corporation of New Jersey

Application January 24, 1957, Serial No. 636,023

9 Claims. (Cl. 74—568)

This invention relates to ornamental stitch sewing machines of the type adapted to use pattern cams to produce a large number of ornamental designs without the necessity of making any changes in the construction of the machine, and more particularly relates to a pattern cam support device adapted to be used with such a machine.

U.S. patent application Serial No. 471,766, filed November 27, 1954, now Patent No. 2,862,468, of which the present application is a continuation-in-part, among other items, shows a group of stacked cam-disks the top one of which is designated as "Special." This "Special" cam-disk is intended to be removed and replaced by any one of several other "Special" cam-disks that are designed to operate with the ornamental stitch sewing machine fully disclosed in Patent No. 2,862,468.

The principal object of the present invention is to provide an improved cam-disk mounting means by the use of which any one of several "Special" cam-disks can easily be mounted on or removed from functional operation with an ornamental stitch sewing machine.

Another object of the present invention is to provide an improved cam-disk mounting means.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations, and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings:

Fig. 1 is an enlarged vertical sectional view taken through a plurality of stacked cam-disks carried on the upper end of a cam-disk support sleeve, and on which has been mounted the cam-disk support of the present invention,

Fig. 2 is a top plan view of the same, and Fig. 3 is an exploded view, in perspective, of certain elements shown in Figs. 1 and 2.

Referring more specifically to the drawings, the invention is disclosed as comprising a cam-disk support means having a sleeve 17 rotatably mounted on a stationary cylindrical stud 18. Preferably the sleeve 17 will be rotated by means of a worm and worm gear drive 20. The sleeve 17 has a shoulder 19 and thereby carries a stack of seven centrally apertured cam-disks 21, 22, 23, 24, 25, 26 and 27. The cam-disks 21 to 27, inclusive, are clamped to the shouldered sleeve 17 by a capping plate 31, which has a flange 32, the plate 31 being held to the sleeve 17 by three screws 33 which pass through holes in the plate and are threaded into the upper end of the sleeve 17. The seven cam-disks 21 to 27, inclusive, are held in rotating synchronism by means of a pin 34 which passes through holes 36 formed in each of the cam-disks. Endwise movement of the pin 34 is prevented by a slot 37 formed in the pin 34 and which is entered by the flange 32. The sleeve 17,

the cam-disks 21 to 27, inclusive, the pin 34, the plate 31 and the screws 33 form a unit 38 which, if it were not for a post screw 41 presently to be described, could be lifted as an assembly from the stud 18.

The screw 41 has an enlarged screw driver receiving head 42, a reduced stem 43, a circular flange 44, a staff or shank 46, a shoulder 47, and a small sized threaded end 48. The threaded end 48 is screwed into a threaded hole 51, coaxially formed in the stud 18, and the shoulder 47 abuts against the upper end of the stud 18, thereby maintaining a predetermined clearance between the upper end of the stud 18 and the lower face of the flange 44. The staff 46 loosely passes through a clearance hole 52 centrally formed in the plate 31 and a washer-like base 53 of a cam-disk support spring 54. The length of the staff 46, the thickness of the cam-disks 21 to 27, inclusive, and the size and position of the plate 31 are such that the flange 44 does not clamp the base 53 against the top of the plate 31, there being sufficient clearance provided between the bottom of the flange 44 and the top of the plate 31 to permit the plate 31 to rotate freely with respect to the stationary stud 18 and the stationary screw 41 carried thereby.

The cam-disk support spring 54, in addition to having the base 53, which has a central hole 56 and an outer edge 57, has three equally spaced upstanding resilient prongs 58, 58, and 58. Each of the three prongs 58 of the spring 54 is substantially S-shaped and each prong has a curved lower end 61 which is secured to the outer edge 57 of the base 53. Above the end 61 the prongs 58 are convergent, as at 62, the convergent portions extending to bends 63. From the bends 63 to bends 64 the prongs 58 are divergent as at 65, and from the bends 64 to the free ends 66 the prongs 58 are again convergent, as at 67. Reference to Fig. 1 shows that the ends 66 of the prongs 58 are all hidden beneath the enlarged head 42 of the screw 41.

The cam-disk support spring 54 supports an eighth cam-disk 68. Cam disk 68 is "Special" in that it is intended to be removed and replaced by any one of several other "Special" cam-disks (not shown) and because of this it will be understood that the "Special" cam-disks are designed to be easily and quickly clipped to or removed from the cam-disk support spring 54.

Each "Special" cam-disk 68 comprises an edge-cam flange 69 having an elongated hole 71 and a small circular hole 72. The hole 71 corresponds to the holes 36 formed in the cam-disks 21 to 27, inclusive, and thus hole 71 receives the upper end of the pin 34, thereby synchronizing the cam-disk 68 with the cam-disks 21 to 27, inclusive. The hole 72 is for lubricating purposes and needs no further consideration here. An upstanding collar 73, which is integrally formed on the flange 69, provides a handle by which an operator can pick up the cam-disk 68. The collar 73 has an internal inturned ring 74, and the inner circular face or surface of the ring 74 is upwardly divergent, as at 76. Reference to the upper right-hand portion of Fig. 1 shows that the divergent face 76 is engaged by the divergent portions 65 of the prongs 58. The central cavity 77 of the cam-disk 68 fits over the external surface 78 of the raised portion of the plate 31, thereby registering the cam-disk 68 with respect to the plate 31, the sleeve 17, and the stud 18. The cam-disk 68 is identical with all other "Special" cam-disks (not shown) except that the peripheral edge of all of the flanges 69 are different, thereby causing the sewing machine with which the cam-disks 68 are used to produce various ornamental stitch patterns depending on which "Special" cam-disk is used.

If it is assumed that the cam-disk 68 has been removed, then it or another "Special" cam-disk 68 can be installed as follows: The operator grasps the outer surface of the

collar 73 and places the central cavity 77 over the head 42 of the screw 41 until the head 42 passes through the hole which is bounded by the surface 76. Actually the enlarged head 42 guides the spring prongs 58 through the opening bounded by the surface 76, thereby preventing the ring 74 from engaging the ends 66. In other words, the free ends 66 of the prongs 58 are protected by the enlarged head 42. The internal ring 74 first engages the convergent portions 67 of the three prongs 58 and downward pressure on the cam-disk 68 bends the prongs 58 inwardly until the ring 74 passes over the bends 64 to such an extent as to seat the divergent surface 76 on the divergent portions 65 of the three prongs 58. The shape of the portions 65 of the spring 54 assures that the base of the cam-disk 68 will be properly seated on the plate 31. A cam-disk 68 may be removed from contact with the spring 54 by pulling on the handle collar 73. Pulling on the cam-disk 68 causes the ring 74 to act on the divergent portions 65 of the prongs 58 to bend the three prongs 58 inwardly thereby releasing the cam disk 68.

Having thus set forth the nature of the invention, what I claim herein is:

1. A cam-disk arrangement for an ornamental stitch sewing machine comprising, a stationary stud; a shouldered sleeve rotatably mounted on said stud; a worm and worm gear for rotating said sleeve; a plurality of stacked cam-disks carried by said sleeve; a centrally apertured capping plate positioned on top of the uppermost cam-disk; screws holding said capping plate to said sleeve and thereby holding said cam-disks on said sleeve; a synchronizing pin connecting said cam-disks, said pin having a slot which is entered by a portion of said capping plate; and a shouldered screw freely passing through the central aperture in said capping plate and being threaded into the upper end of said stationary stud.

2. A cam-disk arrangement for an ornamental stitch sewing machine comprising, a plurality of rotary cam-disks, means for semipermanently stacking said cam-disks as a unit on said sewing machine, means for semipermanently synchronizing the rotation of said cam-disks, an additional special cam-disk, means for removably mounting said special cam-disk, and means for synchronizing the rotation of said special cam-disk with the rotation of said semipermanently stacked cam-disks.

3. A cam-disk arrangement for an ornamental stitch sewing machine comprising, a plurality of rotary cam-disks, a rotatably mounted sleeve for semipermanently mounting said cam-disks in a stack on said sewing machine, a pin engaging each of said cam-disks and thereby semipermanently synchronizing the rotation thereof, an additional special cam-disks, a spring means for removably mounting said special cam-disk, and means for removably connecting said special cam-disk to said pin and thereby synchronizing the rotation of said additional cam-disk with the rotation of said stacked cam-disks.

4. In an ornamental stitch sewing machine; a shouldered sleeve; a plurality of stacked cam-disks carried by said sleeve; a centrally apertured capping plate positioned on top of the uppermost cam-disk; means holding said capping plate to said sleeve and thereby securing said cam-disks to said sleeve; a synchronizing pin connecting said cam-disks; and a special cam-disk resting on said capping plate, said special cam-disk also engaging said pin and thereby synchronizing said special cam-disk with said plurality of cam-disks.

5. In an ornamental stitch sewing machine; a stationary stud; a shouldered sleeve rotatably mounted on said stud; a plurality of stacked cam-disks carried by said sleeve; a centrally apertured capping plate positioned on top of the uppermost cam-disk; screws holding said capping plate to said sleeve and thereby holding said cam-disks on said sleeve; a synchronizing pin connecting said cam-disks, said pin having a slot entered by a portion of said capping plate; a post screw freely passing through the central aperture in said capping plate and being threaded into the upper end of said stationary stud; and a special cam-disk resting on said capping plate, said special cam-disk having a flange engaging said pin, and thereby synchronizing said special cam-disk with said plurality of cam-disks.

6. In an ornamental stitch sewing machine; a stationary stud; a shouldered sleeve rotatably mounted on said stud; a plurality of stacked cam-disks carried by said sleeve; a centrally apertured capping plate positioned on top of the uppermost cam-disk, screws holding said capping plate to said sleeve and thereby holding said cam-disks on said sleeve; a synchronizing pin connecting said cam-disks, said pin having a slot entered by a portion of said capping plate; a post screw freely passing through the central aperture in said capping plate and being threaded into the upper end of said stationary stud, said post screw being provided with a circular flange and an enlarged head; a cam-disk support spring, said spring having an apertured washer-like base through which passes said post screw, and a plurality of resilient prongs of which the fixed ends are secured to the outer edge of said base, each of said prongs having a divergent portion, and a free end, the free end of said prongs being located beneath the head of said post screw; and a special cam-disk adapted to be held by said support spring, said special cam-disk having a flange engaging said pin, said special cam-disk also having an inturned ring provided with a divergent face, said face being adapted to engage the divergent portion of the prongs of said spring.

7. A cam-disk support device for use with an ornamental stitch sewing machine, said device comprising a spring having an aperturned base, a post screw having an enlarged head and a shank the latter passing through said apertured base, a plurality of resilient prongs formed as part of said spring and having fixed ends secured to said base, the free ends of said prongs being located beneath the enlarged head of said screw.

8. A cam-disk support device for an ornamental stitch sewing machine, said device comprising a post screw having an enlarged head; a cam-disk support spring; a base; a plurality of resilient prongs of which the fixed ends are secured to said base, each of said prongs having a divergent portion adapted to be engaged by a cam-disk, and a free end, the free end of said prongs being located beneath the head of said post screw.

9. A cam-disk support device for an ornamental stitch sewing machine, said device comprising a post screw having a circular flange and an enlarged screw-driver-receiving head; a cam-disk support spring, said spring having an apertured washer-like base through which passes said post screw, and a plurality of resilient prongs of which the fixed ends are secured to the outer edge of said base, each of said prongs having a convergent portion, a divergent portion, a second convergent portion, and a free end, the free end of said prongs being located beneath the head of said post screw.

References Cited in the file of this patent

UNITED STATES PATENTS

2,667,084	MacNamara	Jan. 26, 1954
2,672,764	Bedford	Mar. 23, 1954

FOREIGN PATENTS

317,079	Switzerland	Dec. 29, 1956