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SHUTTLE MECHANISMS FOR SEWING MACHINES

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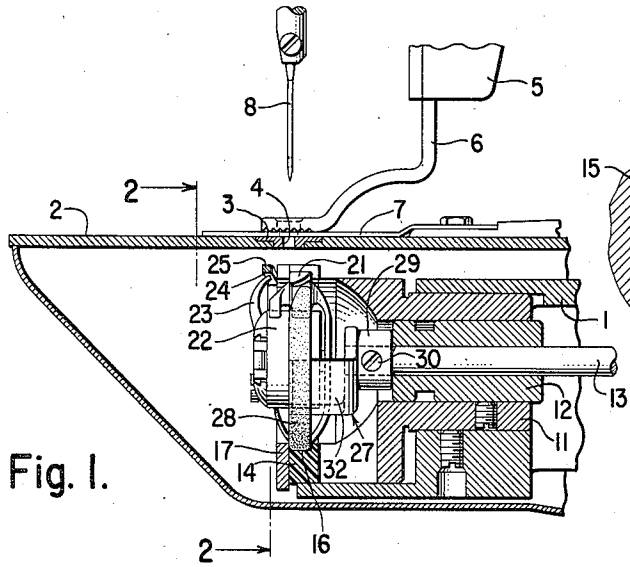


Fig. 1.

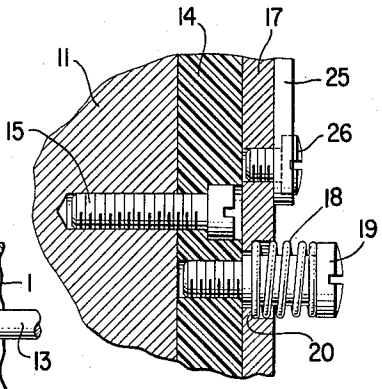


Fig. 5.

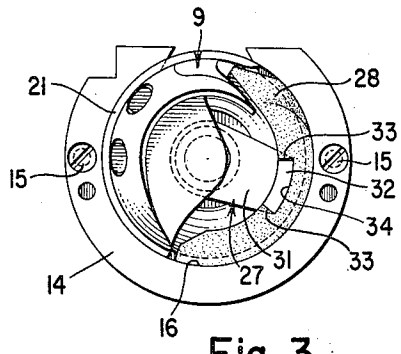


Fig. 3.

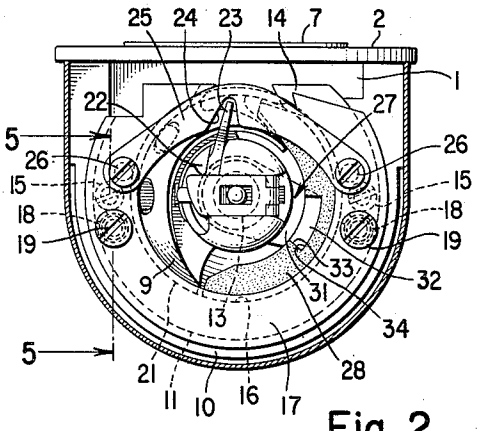


Fig. 2.

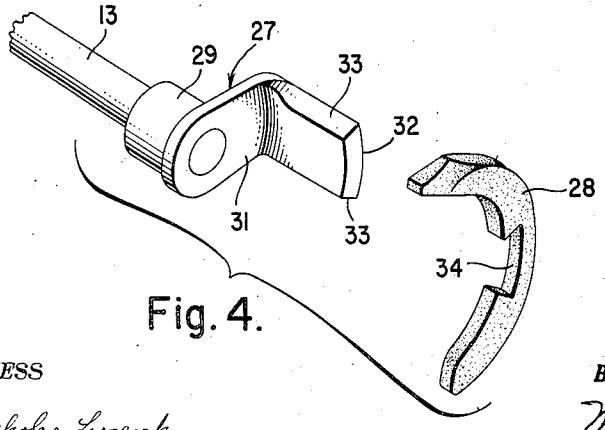


Fig. 4.

WITNESS

Nicholas Leszczak

INVENTOR.
Michael F. Ivanko

BY
Marshall J. Breen
ATTORNEY

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SHUTTLE MECHANISMS FOR SEWING MACHINES

Michael Francis Ivanko, Stratford, Conn., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

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8 Claims. (Cl. 112—232)

The present invention relates to sewing machines and has for a primary object to provide a new and improved shuttle mechanism therefor. More specifically, it is an object of this invention to provide an improved sewing machine shuttle driver that is smoother and quieter in operation than prior devices, is inexpensive and efficient, and is adapted to be readily removed and replaced.

Having in mind the above and other objects that will be evident from an understanding of this disclosure, the invention comprises the devices, combinations and arrangements of parts as illustrated in the presently preferred embodiment of the invention which is hereinafter set forth in such detail as to enable those skilled in the art readily to understand the function, operation, construction and advantages of it when read in conjunction with the accompanying drawings in which:

Fig. 1 is a fragmentary longitudinal vertical section view through the free end of the bed of a sewing machine embodying the present invention.

Fig. 2 is a fragmentary transverse vertical section view taken substantially on the line 2—2 of Fig. 1 and illustrating only the bed mechanism.

Fig. 3 is a front elevation of the shuttle mechanism per se illustrated in Fig. 1, the retaining gib for the shuttle being removed.

Fig. 4 is an exploded perspective view of the two portions of the shuttle driver illustrated in Fig. 1.

Fig. 5 is a detail section view taken substantially on the line 5—5 of Fig. 2.

Sewing machines of the oscillating-shuttle type are old and well known and, accordingly, this disclosure will include only that portion of the sewing machine believed necessary to convey a full understanding of the present invention.

With reference to the drawings, the sewing machine in which the present invention has been incorporated includes a cylinder type bed 1 having a work-supporting surface 2 provided with a throat-plate 3 having a needle aperture 4 therein. The work is moved relative to the point of stitch formation by a clamp-feed mechanism including a conventional work-clamp 5 having a clamping foot 6 and a work-supporting plate 7. The stitching mechanism of the machine comprises a needle 8 that is adapted to be reciprocated in any conventional manner and to cooperate in the formation of stitches with a loop-taker 9 mounted in the bed 1.

Mounted in a depending boss 10 of the bed 1 is a shuttle support 11 that in turn has mounted therein a bushing 12 in which is journaled for oscillation the shuttle-shaft 13. Preferably, the shuttle-support 11 includes a replaceable bearing member 14 secured to the end thereof by screws 15, the member 14 having formed therein in the usual manner the bottom wall and inner side wall of an open-sided internal circular raceway 16 that is adapted to receive the loop-taker 9. For purposes of lubrication and to provide an inexpensive but satisfactory bearing, the member 14 is designed to be made of "Textolite" or other suitable plastic material. The outer wall of the raceway

is formed by the usual shuttle-retaining gib 17 which is resiliently held against the member 14 by a pair of identical springs 18 each of which encircles the smooth surfaced end portion of a screw 19 threaded into the bearing member 14. Each spring 18 is compressed between the head of the screw 19 and a shoulder 20 formed by counterboring the aperture in the gib 17 through which the screw 19 passes.

The loop-taker 9, which is a conventional oscillating shuttle, is provided with a bearing rib 21 that is adapted to be journaled in the raceway 16. A stationary bobbin-case 22 is received within the shuttle 9 and to hold the same against oscillation with the shuttle there is provided an arm 23 that is received within a notch 24 formed in the rotation restraining member 25 that is secured to the gib 17 by screws 26.

The shuttle driver comprises a shuttle-driving crank element 27 fixed to the end of the shaft 13 and a head or shuttle-engaging portion 28. The crank element 27 includes a hub 29 secured to the shaft 13 as by a screw 30, a lateral crank arm 31 extending radially of the hub and a driving finger 32 carried at the end of the arm 31 and arranged parallel to the shaft 13. The finger 32 is curved transversely about the axis of the shaft 13 and the side edges 33 thereof are formed radially of the axis of the shaft 13, whereby they diverge away from said axis. The head 28 of the shuttle driver, as seen in the drawings, is made to conform or in other words is complemental to the raceway 16 and is provided with a notch 34 that is formed the same in configuration as the cross-section of the finger 32 and is dimensioned snugly to receive the same. The ends of the head 28 are formed to abut against the heel and the throat of the shuttle 9, and thereby, upon oscillation of the shaft 13, the motion will be transmitted through the crank 27 and the head 28 to the shuttle 9, whereby it will be oscillated in the usual manner.

One of the improvements embodied in the present invention is the formation of the head of the shuttle driver to the curvature of the raceway. Thus, the head of the shuttle driver rides in the shuttle raceway and is thereby supported about its periphery which reduces the strain incident to high speed operation when the inertia forces tend to straighten out the head. In other words, the flexing of the head of the shuttle driver during operation has been substantially eliminated, which flexing would become quite serious when the driver head is formed from a plastic material such as nylon which is used in the preferred embodiment of the invention. The other advantages derived by the present invention is the elimination of metal-to-metal contact between the head of the shuttle-driver and the shuttle, and the ease with which the head of the shuttle driver can be readily removed or repaired.

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

1. Shuttle mechanism for a sewing machine comprising a shuttle support having a circular raceway, an oscillating shuttle having a bearing rib complemental to said raceway and journaled for oscillation in said raceway, means for imparting oscillation to said shuttle comprising a shuttle driver including a head having an outer surface which at a point upon each side of the center of oscillation thereof is complemental to said raceway and journaled in said raceway for oscillation, said shuttle driver being adapted to contact said shuttle upon opposite sides of the center of oscillation thereof whereby upon oscillation of said shuttle driver oscillation will be imparted to the shuttle, and means for oscillating said shuttle driver.

2. A shuttle mechanism in accordance with claim 1

in which the head of said shuttle driver is of a plastic material.

3. A shuttle mechanism in accordance with claim 1 in which the head of said shuttle driver is of nylon.

4. Shuttle mechanism for a sewing machine comprising a shuttle support, an open-sided raceway formed in said support and a removable gib secured to said shuttle support and closing the open side of said raceway, an oscillating shuttle having a bearing rib complemental to said raceway and journaled for oscillation in said raceway, means for imparting oscillation to said shuttle comprising a shuttle driver having an actuating element and a head, said head being adapted to contact said shuttle at points upon opposite sides of the center of oscillation thereof whereby upon oscillation of said shuttle driver oscillation will be imparted to the shuttle, said actuating element being journaled for oscillation about an axis aligned with the center of oscillation of said shuttle and having a radially extending crank arm, the free end of said crank arm being keyed to said head for imparting oscillation to said head upon oscillation of said actuating element and for axial displacement of said head relative to said crank arm whereby when said gib is removed said head may be readily removed and replaced.

5. A shuttle mechanism in accordance with claim 4 in which the head of said shuttle driver is of a plastic material.

6. A shuttle mechanism in accordance with claim 4 in which the head of said shuttle driver is of nylon.

7. Shuttle mechanism for a sewing machine comprising a shuttle support, an open-sided raceway formed in said support and a removable gib secured to said shuttle support and closing the open side of said raceway, an oscillating shuttle having a bearing rib complemental to said raceway and journaled for oscillation in said raceway, means for imparting oscillation to said shuttle comprising a shuttle driver having an actuating element and a head, said head having an outer surface with the major portion thereof complemental to said raceway and journaled in said raceway and said head being formed to contact said shuttle at points upon opposite sides of the center of oscillation thereof whereby upon oscillation of said shuttle driver oscillation will be imparted to said shuttle, said actuating element being journaled for oscillation about an axis aligned with the center of oscillation of said shuttle and having a radially extending crank arm, the free end of said crank arm being keyed to said head for imparting oscillation to said head upon oscillation of said actuating element and for axial displacement of said head relative to said crank arm whereby when said gib is removed said head may be readily removed and replaced.

8. Shuttle mechanism in accordance with claim 7 in which the head of said shuttle driver is of nylon.

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