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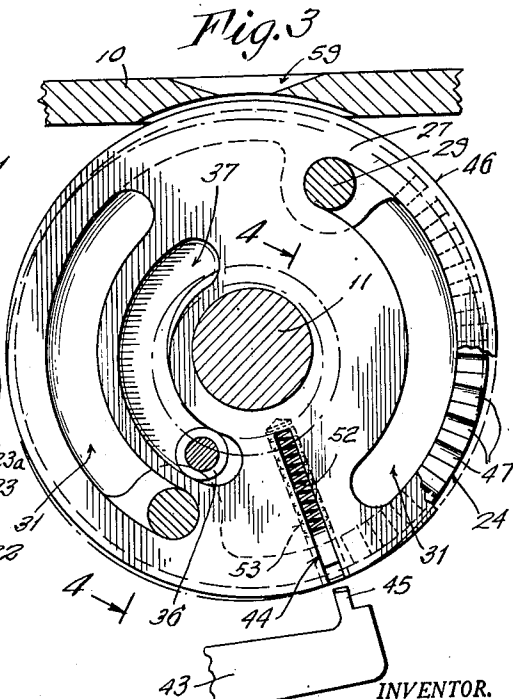
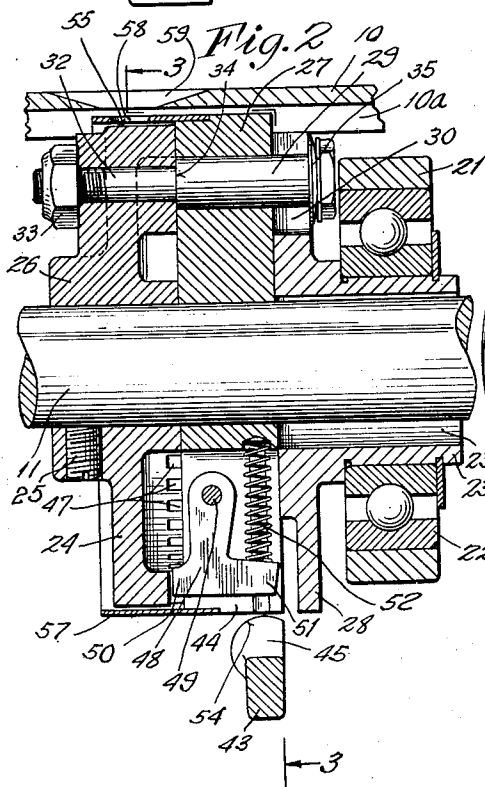
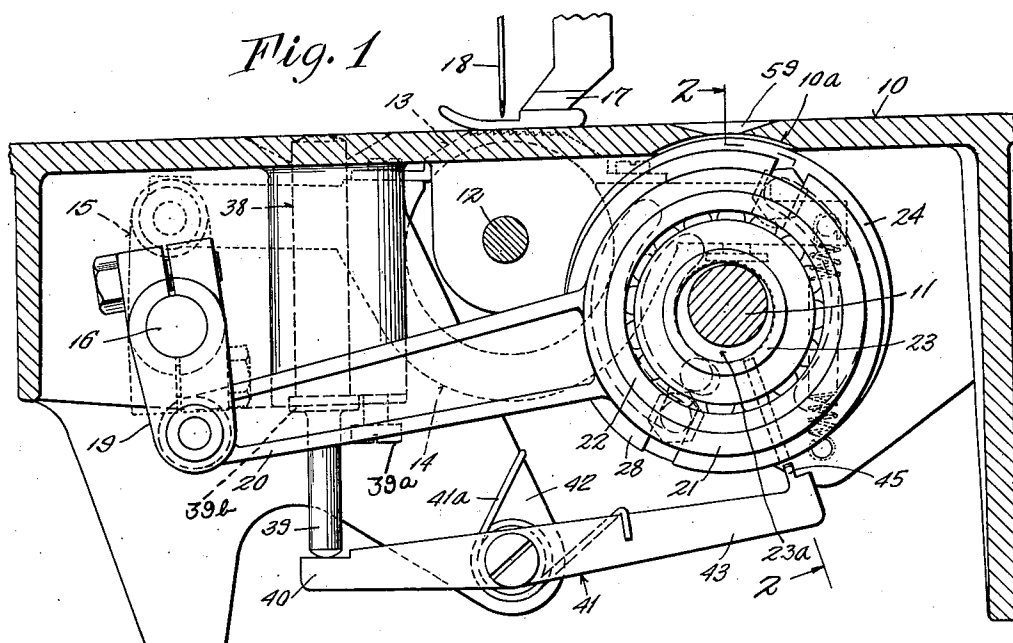
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STITCH-ADJUSTING MECHANISM FOR SEWING MACHINES

Filed Oct. 17, 1946

2 Sheets-Sheet 1



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Fig. 5

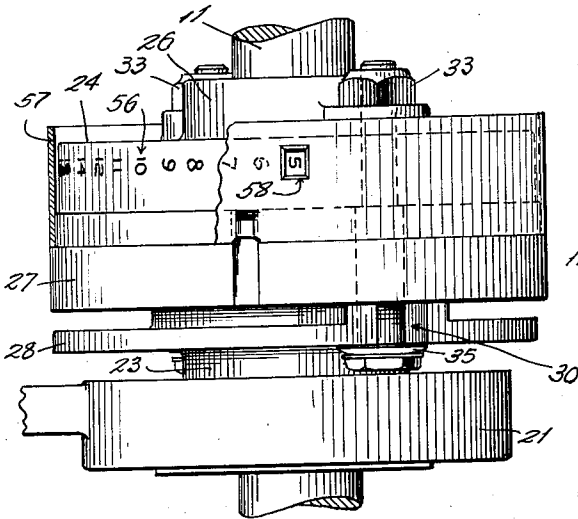


Fig. 4

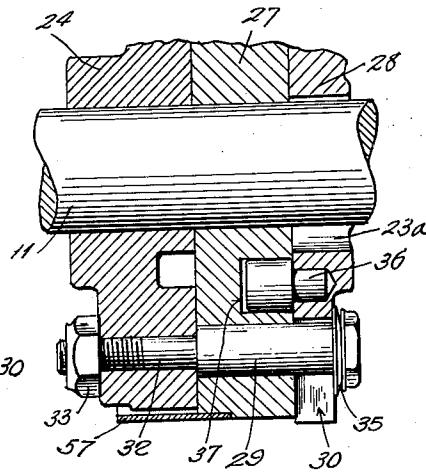
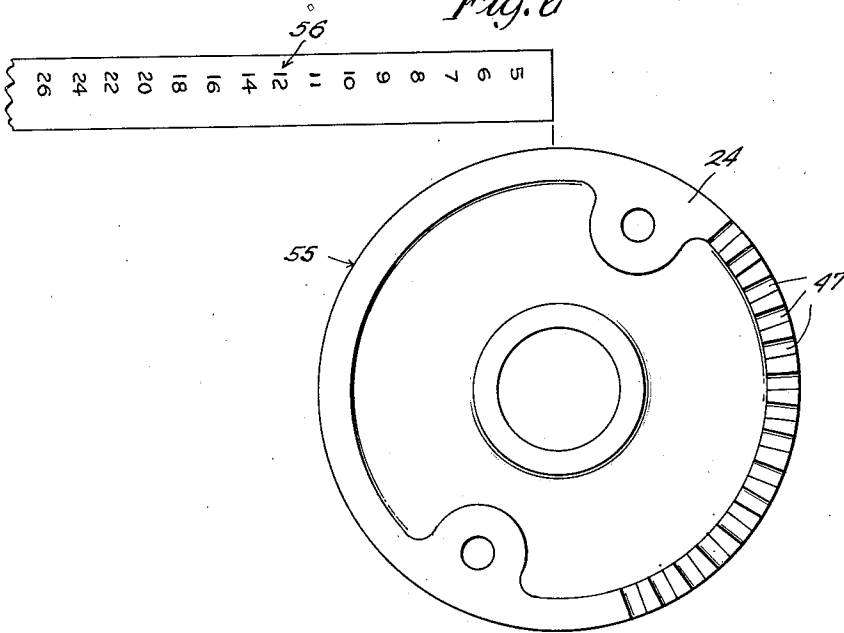


Fig. 6



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STITCH-ADJUSTING MECHANISM FOR
SEWING MACHINES

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This invention relates to sewing machines, and more particularly to stitch-adjusting mechanisms of sewing machines.

An object of the invention is to provide in a sewing machine an improved stitch-adjusting mechanism which is convenient and quick in operation and which provides an indication of its setting at a location substantially directly in front of the operator, where the indication may be quickly and easily viewed.

Another object of the invention is to provide a stitch-adjusting mechanism as above which is of simple construction with relatively few parts, and which is inexpensive to manufacture.

A further object of the invention is to provide a mechanism as above which is accurate and reliable in its operation, and is sturdy so that a long, attention-free life is obtained.

A still further object of the invention is to provide a stitch-adjusting mechanism of the above type which is compact and small in size.

Yet another object of the invention is to provide, in a stitch-adjusting mechanism of a sewing machine, an improved high-speed actuating eccentric which is readily adjustable and which may be positively locked in any adjusted position.

In accomplishing these objects the invention provides a novel organization associated with the main shaft of a horizontal-bed type sewing machine, the said organization being located directly under the bed, and being connected with the feed dogs of the machine by short, direct linkages. A manually operable member is provided, extending through the machine bed so as to be accessible at the top thereof in front of the machine operator, the said member being connected to the eccentric mechanism for the purpose of enabling convenient adjustment of the latter to be had.

At the point where the eccentric mechanism extends adjacent the underside of the bed, the latter is provided with a window, and the mechanism provided with indicia which enable an operator to quickly and conveniently determine with accuracy the setting of the adjusting mechanism. Both the manually operable member and the window in the bed are substantially directly ahead of the operator, within easy reach so that adjustment of the stitch may be done quickly and without inconvenience.

By virtue of the mechanism being located closely adjacent the feed dogs of the machine, the linkage by which the dogs are actuated from the eccentric is short and direct, and the various parts of the eccentric-adjusting mechanism be-

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ing few and simple in number, the overall cost is relatively small.

The eccentric is provided with a simple, positive-locking clutch organization which includes a latch released by operation of the manually operable member of the device, the latch and clutch organization being so arranged that a positive locking is had in any adjusted position, and so that the effect of centrifugal force upon the latch when the eccentric is rotated at high speeds is such as to maintain the positive locking.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is a vertical transverse section through the bed of a sewing machine made in accordance with the invention, the improved stitch-adjusting mechanism being shown in elevation.

Fig. 2 is a fragmentary section taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary section taken on the line 4—4 of Fig. 3.

Fig. 5 is a fragmentary plan view of the stitch-adjusting mechanism, and

Fig. 6 is an elevational view of the stitch indicator wheel of the adjusting mechanism, including a planar development of a portion of the wheel surface to show the indications thereon.

The sewing machine and improved stitch-adjusting mechanism shown in Fig. 1 comprises a table or bed 10 having a main shaft 11 and a looper shaft 12, and having feed dogs 13 carried by a feed bar 14 which latter is actuated from a lever 15 carried by a feed-bar actuating shaft 16. Above the bed 10 is the usual presser foot 17 and needle 18, mounted and operated in the well-known manner.

The feed-bar actuating shaft 16 is operated by a lever 19 driven from an eccentric arm 20, and the said arm has a follower 21 encompassing an antifriction bearing 22 carried on an eccentric 23 mounted on the main shaft 11. The eccentric 23 has a bore 23a substantially larger than the diameter of the shaft 11, so that the amount of eccentricity of the eccentric may be varied within limits without interference from the shaft. It is understood that rotation of the main shaft 11 causes the eccentric 23 to reciprocate the arm 20 and lever 19, and in turn impart a reciprocatory movement to the feed dogs 13.

According to this invention an improved and novel mechanism is provided, and is located under the bed 10 for regulating or adjusting the

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number of stitches per inch of work, as controlled by the travel of the feed dogs 13 in their reciprocatory movement. This improved means is so organized and located that an operator of the sewing machine can quickly and conveniently adjust the stitching to conform to any of a large number of standard values, which are found useful in the various kinds of sewing operations. These values are graded in single and double steps, between a large stitch of 5 per inch and a small stitch of 26 per inch. Single steps or graduations are provided for the larger stitches, ranging from 5 per inch to 12 per inch, and double steps provided for the smaller stitches between 12 per inch and 26 per inch, and a convenient visual indication is provided to enable the machine operator to quickly and accurately choose the desired stitch. Positive means are provided which lock the adjusting mechanism and preclude its shifting out of any setting and causing an alteration in the stitch which has been selected.

Accordingly, referring to Fig. 2, there is provided on the main shaft 11 a novel assembly which is cooperable with the eccentric 23 to alter the setting of the latter with respect to the said shaft. This assembly includes a stitch indicator wheel 24 which is fixed to the shaft 11 near the eccentric 23 by a set screw 25, the said screw passing through a hub 26 of the wheel. Between the indicator wheel and eccentric a circular cam plate 27 is provided, rotatable on the shaft 11, and the machine bed 10 is cut away at its underside, as shown at 10a, to provide clearance for the indicator wheel and cam plate. The eccentric 23 has a circular flange 28 which is tied to both the cam plate 27 and indicator wheel 24 by shouldered studs 29 which pass through slots 30 in the flange, and through arcuate apertures 31 in the cam plate. The tie studs 29 have reduced portions 32 which extend through the indicator wheel 24 and are threaded to carry nuts 33, the latter securing the studs firmly to the wheel by drawing the wheel up against shoulders 34 on the studs. Referring to Figs. 1 and 3, there are two studs 29, these being located diametrically opposite each other, and the same is true of the slots 30 and arcuate apertures 31. Under the heads of the studs 29 resilient washers 35 are provided, engaging the outer face of the flange 28 and providing a yieldable frictional connection between the latter and the studs.

According to this organization the cam plate 27 can be rotated on the main shaft 11 with respect to the indicator wheel 24 and eccentric 23 between limits as determined by the center angles of the arcuate openings 31 in the said plate. However, the eccentric is held against rotation relative to the indicator wheel 24 due to engagement of the studs 29 with the walls of the slots 30 in the flange of the eccentric. At this point it should be noted that the slots 30 are elongated to allow sufficient space below and above studs 29, as shown in Figs. 1 and 2, to allow movement for eccentric 23 as the same is shifted within limits relative to the indicator 24 along a diametric line passing through studs 29. This shifting changes the amount of eccentricity of the eccentric, and when the latter is so shifted it thus varies the stroke or travel of the feed dogs 13 of the machine.

In the adjusting mechanism as provided by this invention the shifting of the eccentric 23 along its diametric path is quickly and conveniently effected through turning the main shaft

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of the machine, as by turning the machine hand-wheel, while holding stationary or locking the cam plate 27, and simultaneously a visual indication is had of the coarseness or fineness of the stitch resulting from the shifting. In accomplishing this, the eccentric 23 is provided with an adjusting drive pin 36 which is rigidly secured to it and which extends into a cam groove 37, Figs. 3 and 4, in one face of the cam plate 27.

As shown in Fig. 3, the cam groove 37 has a center of curvature which is non-coincident with the axis of the main shaft 11 of the machine. As a result, if the eccentric 23 is caused to turn while the cam plate 27 is held stationary, the eccentric will be shifted along its diametric path of travel by the pin 36, varying the amount of eccentricity throughout a wide range.

In accordance with the present invention, novel and improved manually operable locking means are provided which serve to lock together the indicator wheel 24 and cam plate 27, and to release the latter from the wheel and simultaneously lock it against turning when it is desired to change or adjust the stitches of the machine through turning of the shaft 11, the said means being automatically returnable to a normal position upon removal of the manual operating force.

Referring to Fig. 1, this means comprises a conveniently located manually depressible plunger 38 which is mounted in the bed 10 to be vertically movable therein, the top end of the plunger being normally substantially flush with the top of the bed. The lower end 39 of the plunger engages one end 40 of a lever 41 which latter is pivotally mounted on a depending bracket 42 of the machine bed, the other end 43 of the lever extending below and adjacent the cam plate 27. The lever 41 is biased clockwise by a spring 41a which thus normally holds the plunger 38 in the raised position shown.

For the purpose of locking the cam plate 27 against turning, referring to Figs. 2 and 3, a deep radially extending cut 44 is made in the plate, the end of the cut being adapted to receive a lug 45 on the lever end 43 when the said end is raised as a result of the manually operable plunger 38 being depressed. Inasmuch as the pivot of the lever 41 is anchored to the bed 10, the act of depressing the plunger 38 and causing the lug 45 to enter the cut 44 will securely lock the cam plate 27 against any movement. If the cut 44 should not be aligned with the lug 45 when the plunger 38 is depressed, the latter will not move downward to the full extent of its travel, and the lug will engage the circular periphery 46 of the cam plate. However, if the shaft 11 of the machine is turned during this circumstance, the corresponding rotation of the cam plate will bring the cut 44 in registration with the lug 45, whereupon the latter will enter the cut so as to lock the plate.

The locking of the cam plate 27 to the indicator wheel 24 during the normal sewing operations of the machine is effected by the provision of a plurality of notches 47 in the inner face of the wheel adjacent the periphery thereof, and by a latch 48 mounted in the cut 44 and pivoting about a pin 49. The latch 48 has a lateral extension 50 adapted to be received in any of the notches 47, and has a second lateral extension 51 which is engageable by the lug 45 of the lever 41. A latch-operating compression spring 52 is carried in grooves 53 in the walls of the cut 44 for engagement with the extension 51 of the latch 48, so as to normally cause the extension 50 of

the latter to occupy one of the slots 47. When the latch 48 is in this position as shown in Fig. 2, the cam plate 47 is securely locked to the indicator wheel 24. When, however, the manually operable plunger 38 is depressed and the lug 45 of the lever 41 enters the cut 44, the said lug will engage the extension 51 of the latch and turn the latter counterclockwise, compressing the spring 52 and removing the latch extension 50 from the slot which it occupied. To facilitate the actuation of the latch 48 by the lug 45 the latter is provided with a curved edge 54 as shown in Fig. 2. It will thus be seen that the act of depressing the plunger 38 while at the same time turning the hand wheel of the machine to rotate the main shaft 11 will first cause registration of the cut 44 of the cam plate with the lug 45, and upon the lug entering the said cut, will operate the latch 48 so as to release the indicator wheel 24 from the cam plate. Further movement of the machine hand wheel and main shaft 11, either backwards or forwards, will cause relative movement between the cam plate 27 on the one hand and the indicator wheel 24 and eccentric 23 on the other hand. This relative movement will alter the eccentricity of the eccentric and therefore change the extent of travel of the feed dogs 13 so as to vary the stitching of the machine.

In order to provide a convenient visual indication as to the setting of the eccentric 23, and therefore as to the number of stitches per inch for which the machine is set, the indicator wheel 24 is provided on its periphery 55 with a plurality of numbers 56, Fig. 6, each number representing stitches per inch which the machine will sew. Cooperable with the marked periphery of the indicator wheel 24 is a cylindrical band 57 which is press-fitted on the periphery of the cam plate 27 so as to encompass the wheel periphery 55, the said band having a single square aperture or window 58. This single window will be adjacent only the stitch number for which the eccentric is set, regardless of the rotative position of the band, as the rest of the band will cover the other stitch numbers on the wheel 55. The bed 10 of the machine is also provided with a sight opening 59, Figs. 1, 2 and 3, adjacent the top of the band 57. The window 58 is so located with respect to the cut 44 of the cam plate 27 that when the cam plate is locked by the lug 45 occupying the said cut, the window 58 is directly below the sight opening 59 in the bed, enabling an operator to view, from above the bed, the stitch number for which the eccentric is set.

It will be seen that, by this organization, at the time that the indicator wheel 24 is released from the cam plate 27 as a consequence of depressing the plunger 38 while simultaneously turning the main shaft of the machine to enable the lug 45 to enter the cut 44, the window 58 of the cam plate will be automatically positioned below the sight opening 59 in the bed. Upon the main shaft 11 being then rotated either forwards or backwards, the various indicia 56 on the periphery 55 of the indicator wheel will become consecutively visible through the window and sight opening, and will indicate the stitches per inch for which the eccentric 23 is set. When the desired stitch number has been brought into view in the window 58 and centralized therein, it is only necessary to release the plunger 38 whereupon the latter will be returned to its normal position by the spring 41a, causing the lug 45 to be disengaged from the cut 44. The latch 48 will

then be returned to its normal locking position shown in Fig. 2, by the spring 52, the latch pushing or driving the extension 50 into one of the notches 47, whereby the indicator wheel 24 will be securely locked in its newly adjusted position with respect to the cam plate 27. This of course locks the eccentric 23 in its newly adjusted position so that the machine will sew the desired stitches.

It will be noted that rapid turning of the main shaft 11 will, by the action of centrifugal force on the latch 48, serve to aid the spring 52 in maintaining the latch in locked position. There is thus prevented any likelihood of the stitch-adjusting mechanism shifting from any setting in which it is placed.

When the machine is once set to the proper stitch adjustment, to prevent any additional adjustment by an unauthorized person, the plunger 39 can be locked with a locking screw 39a as shown in Fig. 1. This screw can be turned up to seat against a flange 39b of the plunger 39 so that the latter cannot be depressed to make a stitch adjustment. This screw can also be used as a stop, to limit downward movement of plunger when so desired.

By virtue of the plunger 38 and window 59 being located closely adjacent the feed dogs 13, presser foot 17 and needle 18 which are directly in front of the operator, the operation of the stitch-adjusting mechanism is extremely convenient and may be done very quickly, thereby eliminating loss of time. The window 59 is in direct view of the operator without bending the head or averting the eyes.

It will be seen that relatively few and simple parts are utilized in the improved adjusting mechanism, thereby reducing the cost of manufacture of the same. The parts are sturdy in construction and the operation of the entire device is reliable and extremely accurate. The compactness and small size of the mechanism enables it to be readily located on the main shaft of the machine directly below the bed 10, thereby simplifying the matter of providing a conveniently located indicator and short, direct linkages to the feed dogs.

It will be understood that the stitch setting of the machine can be noted at any time desired by merely turning the handwheel to bring the window 58 into alignment with the sight opening 59 of the machine bed.

Variations and modifications may be made within the scope of this invention and portions of the improvement may be used without others.

I claim:

1. In a sewing machine, a rotary shaft; a feed-advance eccentric on the shaft; and means for adjusting the amount of eccentricity of the eccentric, including a pair of relatively movable members on the shaft, one member having indicia thereon and the other member having a portion overlying the said indicia, the said portion having a window through which the indicia may be viewed.

2. In a sewing machine, a rotary shaft; a feed-advance eccentric on the shaft; and means for adjusting the amount of eccentricity of the eccentric, including a member rigid on the shaft and having indicia thereon, and including a member rotatable on the shaft, having a portion overlying the said indicia, the said portion having a window through which the indicia may be viewed.

3. In a sewing machine, a rotary shaft; a feed-

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advance eccentric on the shaft, having a slotted flange; a drive member on the shaft, having studs extending through the slots in the flange of the eccentric to drive the latter and to enable the eccentric to be shifted so as to alter the amount of its eccentricity, the said drive member having indicia; an eccentric-adjusting member on the shaft, interposed between the drive member and eccentric and having clearance slots through which the drive studs extend, the said adjusting member having a cam groove and the eccentric having a projection cooperable with the walls of the groove so that the adjusting member shifts the eccentric upon the latter turning relative to the adjusting member; and a drum carried by the adjusting member and surrounding the indicia of the drive member, the said drum having a window for viewing the indicia selectively.

4. In a sewing machine, a bed; a rotary shaft located below the bed; a feed-advance eccentric on the shaft, having a slotted flange; a drive member on the shaft, having studs extending through the slots in the flange of the eccentric to drive the latter and to enable the eccentric to be shifted so as to alter the amount of its eccentricity, the said drive member having indicia; an eccentric-adjusting member on the shaft, interposed between the drive member and eccentric and having clearance slots through which the drive studs extend, the said adjusting member having a cam groove and the eccentric having a projection cooperable with the walls of the groove so that the adjusting member shifts the eccentric upon the latter turning relative to the adjusting member; and a drum carried by the adjusting member and extending adjacent the underside of the bed and surrounding the indicia of the drive member, the said drum having a window and the bed having a cooperable window for viewing the said indicia selectively.

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5. In a sewing machine, a bed; a rotary shaft located below the bed; a feed-advance eccentric on the shaft, having a slotted flange; a drive member on the shaft, having studs extending through the slots in the flange of the eccentric to drive the latter and to enable the eccentric to be shifted so as to alter the amount of its eccentricity, and the said drive member having indicia; an eccentric-adjusting member on the shaft, interposed between the drive member and eccentric and having clearance slots through which the drive studs extend, the said adjusting member having a cam groove and the eccentric having a projection cooperable with the walls of the groove so that the adjusting member shifts the eccentric upon the latter turning relative to the adjusting member; means including a member manually operable from the top of the bed for locking the adjusting member to the bed in a predetermined position; and a drum carried by the adjusting member and extending adjacent the underside of the bed and surrounding the indicia of the drive member, the said drum having a window and the bed having a cooperable window for viewing the said indicia selectively.

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