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SEWING MACHINE DRIVES

Filed July 16, 1953 2 Sheets-Sheet 1

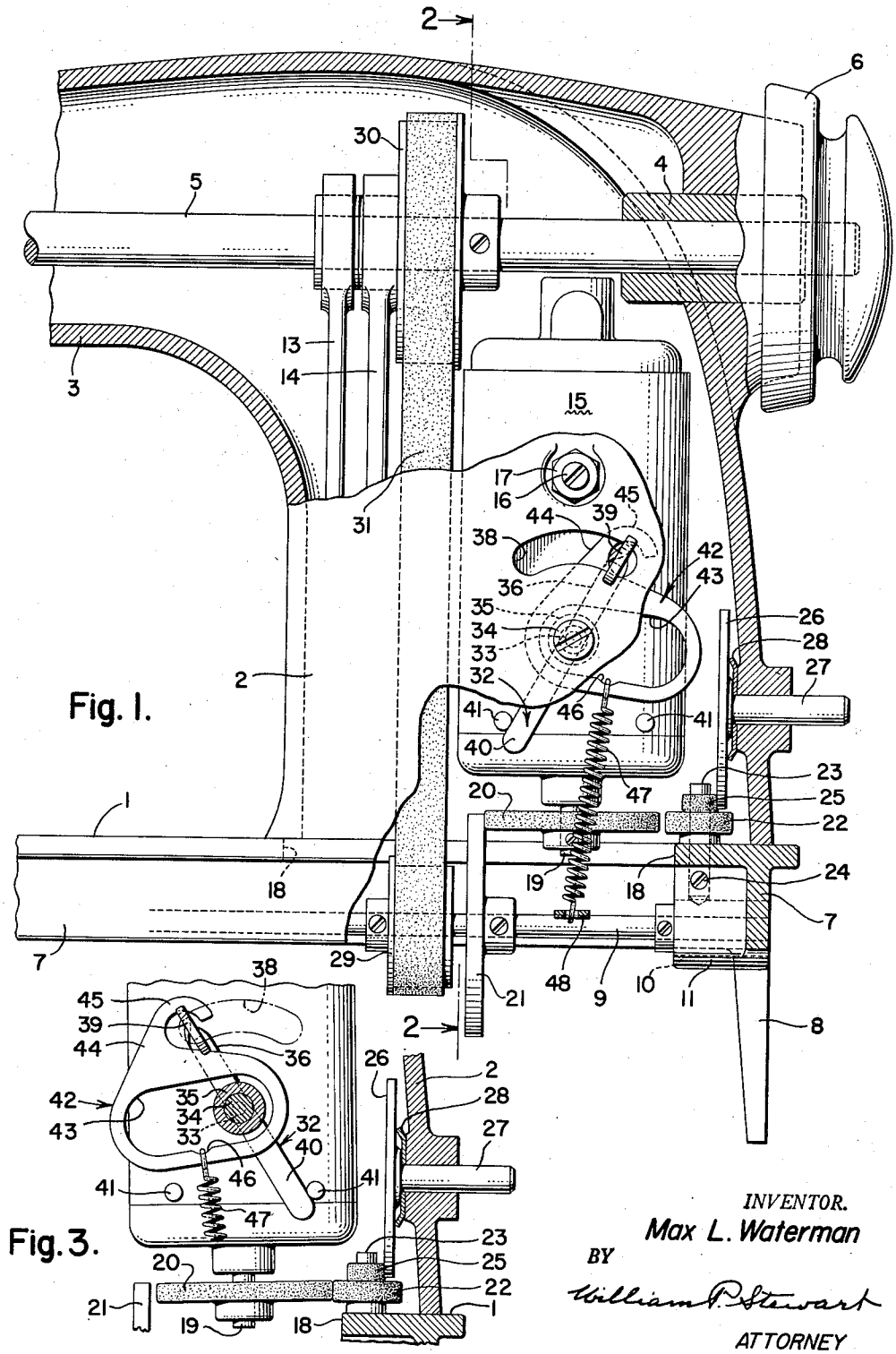



Fig. 1.

Fig. 3.

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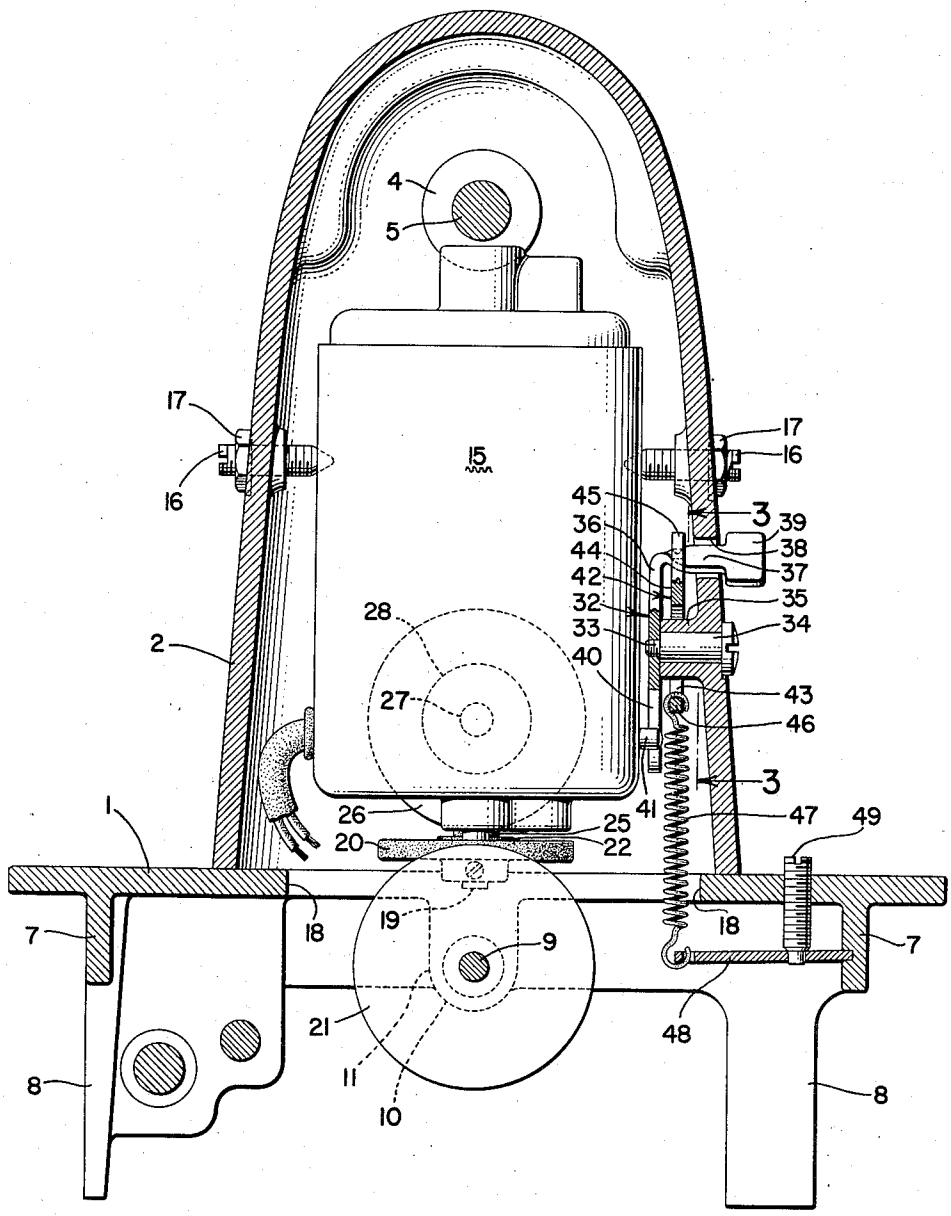



Fig. 2.

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# SEWING MACHINE DRIVES

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4 Claims. (Cl. 112—218)

The present invention relates to sewing machines and has for a primary object to provide an improved drive means therefor.

More specifically, it is an object of the present invention to provide a sewing machine having a drive motor enclosed within the frame, together with a new and improved means for connecting and for maintaining the same in driving relationship with the various operating mechanisms of the machine.

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 front elevation view, partly in section, of a sewing machine which embodies the invention, with the motor arranged to drive the sewing machine.

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

Fig. 3 is a detail section view taken substantially on the line 3—3 of Fig. 2 with the motor arranged to drive the bobbin-winder.

The present invention is illustrated as embodied in a sewing machine having a bed-plate 1 on which is mounted the hollow standard 2 of an overhanging bracket-arm 3, a portion of which is illustrated in Fig. 1. Journaled longitudinally of the bracket-arm 3 in suitable bearings such as shown at 4 is the usual arm-shaft 5 that carries a combined balance and hand-wheel 6. The bed 1 includes integral depending flanges or walls 7 and is supported by the usual legs, as 8. A hook-shaft 9 is journaled longitudinally of and disposed below the bed 1 and parallel to the arm-shaft 5. At the illustrated end of the machine, the shaft 9 is supported by a conventional bearing 10 fixed in a lug 11 depending from the bed 1.

It will be understood that, although not illustrated, the arm-shaft 5 is intended to drive in any well known manner, the sewing machine mechanism carried by the bracket-arm 3, such as the needle-bar and the take-up. In addition, the feeding mechanism is designed to be actuated by the arm-shaft 5, as by pitmans 13 and 14 which embrace eccentrics on the same in the usual manner. The loop-taker of the illustrated machine (also not shown) is intended to be of the rotary hook type although it is obviously not limited thereto.

Mounted with its axis vertical within the standard 2 is an electric motor 15 for selectively driving the machine or the bobbin-winder. The motor 15 is pivotally carried on a horizontal axis by conical bearing pivot-studs 16 threaded through suitable bosses formed in the front and rear walls of the standard 2 and cooperating with appropriate bearing recesses formed in the casing of the motor. The pivot-studs 16 are held in set position by lock-nuts 17. Directly below the standard 2 and within the area defined thereby, the bed 1 is provided with a suitable aperture 18 which provides adequate clearance for the various connections between the mechanisms carried by the bed 1 and those carried by the bracket-arm 3, such as the pitmans 13 and 14 and the elements hereinafter referred to. In addition, the aperture 18 is made adequate to permit insertion or removal of the motor 15 therethrough.



The motor 15 is provided with a depending drive-shaft 19 which carries a drive-element preferably in the form of a friction wheel 20 that is adapted to selectively engage a first friction disk 21 secured to the hook-shaft 9 or a second friction disk 22 that is journaled on a vertical stud 23 fitted in a bore through a suitable boss, the bed 1 and into the lug 11. The stud 23 is locked in position by a set screw 24. The friction disk 22 includes a reduced portion 25 which is in contact with a friction disk 26 secured to a bobbin-winding shaft 27 that is journaled on a horizontal axis in a suitable boss provided in the standard 2. Contact between the reduced portion of disk 22 and the friction disk 26 is resiliently maintained by a spring washer 28. The hook-shaft 9 is provided with a pulley 29 which is connected to a pulley 30 on the arm-shaft 5 by a belt 31 and thus the shaft 9 is adapted to drive the shaft 5 and the mechanisms associated therewith in the ratio of 2 to 1. From the above, it will be seen that the motor 15 is adapted to drive the sewing machine when the friction wheel 20 is in contact with the disk 21, and to drive the bobbin-winding shaft 27 when the wheel 20 is in contact with the disk 22. In the usual manner, the drive ratio between the motor 15 and the hook-shaft 9 is substantially one-to-one or, as illustrated, will effect a slight speed reduction, while the drive ratio between the motor 15 and the bobbin-winding shaft 27 will effect a substantial speed multiplication.

Means is provided for tilting the motor 15 about the axis defined by the pivot-studs 16 and thus for selectively bringing the friction-wheel 20 into driving relation with either the disk 21 or the disk 22, which means includes a lever 32 screwed intermediate its ends onto the reduced and threaded end portion 33 of a pivot-screw 34 extending loosely through the front wall of the standard 2 and through a boss 35 integral therewith. The upper end of the lever 32 comprises an arm 36 including an angular end 37 bent to lie in a plane that is perpendicular to and includes the longitudinal center line of the main portion of the lever, which end 37 extends through an arcuate slot 38 in the front wall of the standard 2 and terminates in an enlarged finger-piece 39. The other or lower end of the lever 32 comprises an arm 40 that is adapted to contact selectively one of a pair of abutments, which are illustrated as studs or pins 41 secured to the motor casing, and thus to pivot the same. The pins 41 are so positioned relative to the angular path of travel of the arm 40 that they will be contacted only near the end of the swing or only after a predetermined lost motion and will be moved only for the distance between the point of contact and the stop position of the lever 32 as determined by engagement of the friction-wheel 20 with the respective one of the disks 21 and 22, which engagement will be near the respective end of the slot 38.

For biasing the lever and thus the motor into the desired position there is provided a plate 42 having an elongated aperture or slot 43 designed to accommodate the boss 35, and an arm 44 with a hooked end 45 that operatively engages the angular end 37 of the lever arm 36. A depression 46 is formed centrally of the slot 43 and is adapted to receive one end of a coiled tension spring 47, the opposite end of which is secured to the

free end of a cantilevered leaf spring 48 carried by the depending wall 7 of the bed 1. The spring tension can be adjusted by means of a screw 49 threaded through the bed 1 of the machine and engaging the spring 48 intermediate its secured end and its free end. The plate 42 constitutes a connecting element between the tension spring 47 and the arm 36 of the lever 32, the slot 43 being formed therein to provide clearance for the boss 35 in either position of adjustment of the lever. These elements thus comprise an over-center means which will resiliently bias the lever 32 and thus the motor 15 and the friction-wheel 20 in the desired direction.

It will be seen that when the lever 32 is swung to the position as illustrated in Fig. 1, i. e., in which the friction wheel 20 is in contact with the disk 21, the spring 47 will tend to cause the plate 42 to assume the illustrated position with the hooked end 45 thereof urging the lever 32 toward its stop position. When the lever 32 is swung in the opposite direction, to the position illustrated in Fig. 3, i. e., in which the friction wheel 20 is in contact with the disk 22, the plate 42 will be shifted relative to the boss 35 and thus assume the illustrated position in which the hooked end 45 thereof will urge the lever 32 towards its new stop position. In order to obtain resiliently biased contact between the friction wheel 20 and the selected friction disks 21 and 22, the slot 38 is preferably made longer than required so that the lever 32 will not contact the end of the slot when it is urged to rotation under the action of the spring 47 and thus the stop position will be determined by the contact between the friction wheel 20 and one of the disks 21 and 22.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of my invention which is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

Having thus described my invention, what I claim herein is:

1. In a sewing machine having a frame, a machine-actuating shaft and a bobbin-winding shaft journaled in said frame and having driven-elements secured thereto, a drive-motor pivotally mounted within said frame and having a drive-shaft with a drive-element secured thereto, said drive-element being arranged to be operatively connected selectively to one of said driven-elements upon pivotal movement of said motor, a lever pivotally mounted on said frame and operatively connected to said motor for pivoting the drive-element carried thereby into engagement with a selected one of said driven-elements upon pivotal movement of said lever, and a tension spring connected to said frame at one end and operatively connected to said lever at the other end, the line of action of said spring being to one side of a line through the point of connection of said spring to the frame and said pivot-axis when the lever is shifted to bring the drive-element into engagement with one of said driven-elements, and in the opposite side of said line when the lever is shifted to bring the drive-element into engagement with the other of said driven-elements.



2. A sewing machine in accordance with claim 1 in which the operative connection between said lever and said motor comprises a lost-motion connection.

3. Means for shifting a pivoted sewing machine motor between a plurality of drive positions in which said motor is operatively connected to drive different mechanisms, said means comprising a lever mounted on a pivot-axis substantially parallel to the pivotal axis of said motor, spaced abutments on said motor within the angular path of motion of said lever, and an over-center tension means comprising a plate having an elongated slot therein which receives the pivot-axis of said lever for shifting movements relative thereto, said plate being pivotally connected to said lever at a point spaced from said pivot-axis, and a tension member operatively connected to said plate and thereby to said lever to bias the same about said pivot-axis and together with said plate having a line of action shiftable to opposite sides of said pivot-axis.

4. In a sewing machine having a frame and a drive-motor pivotally mounted within said frame, and a drive-element carried thereby, driven elements journaled in said frame, said drive-element being arranged to be operatively connected selectively to one of said driven-elements upon pivotal movement of said motor between drive-positions defined thereby, means for shifting said motor between said drive positions and for resiliently maintaining the same in the desired position, said means comprising a lever pivotally mounted on said frame on a pivot-axis substantially parallel to the pivotal axis of said motor, spaced abutments on said motor within the angular path of motion of said lever, a plate having an elongated slot therein which receives the pivot-axis of said lever for shifting movement relative thereto, said plate being pivotally connected to said lever at a point spaced from said pivot-axis, and a tension member connected at one end to said frame and operatively connected at the other end to said plate and thereby to said lever to bias the same about said pivot-axis and together with said plate having a line of action shiftable to opposite sides of said pivot-axis of said lever.


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