

[54] CONVERTIBLE SEWING MACHINE BEDS

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[56] References Cited

UNITED STATES PATENTS

3,344,762 10/1967 Szostak et al. 112/260

FOREIGN PATENTS OR APPLICATIONS

657,270 2/1938 Germany 112/260

960,244 3/1957 Germany 112/258

175,135 6/1953 Austria 112/260

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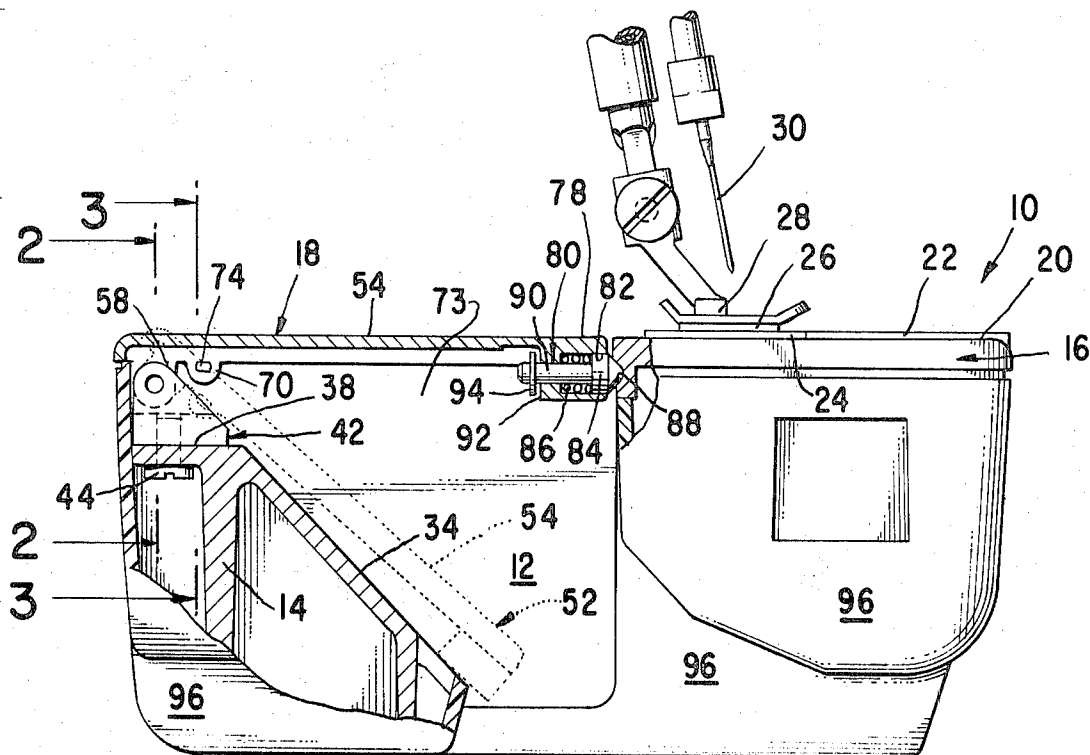
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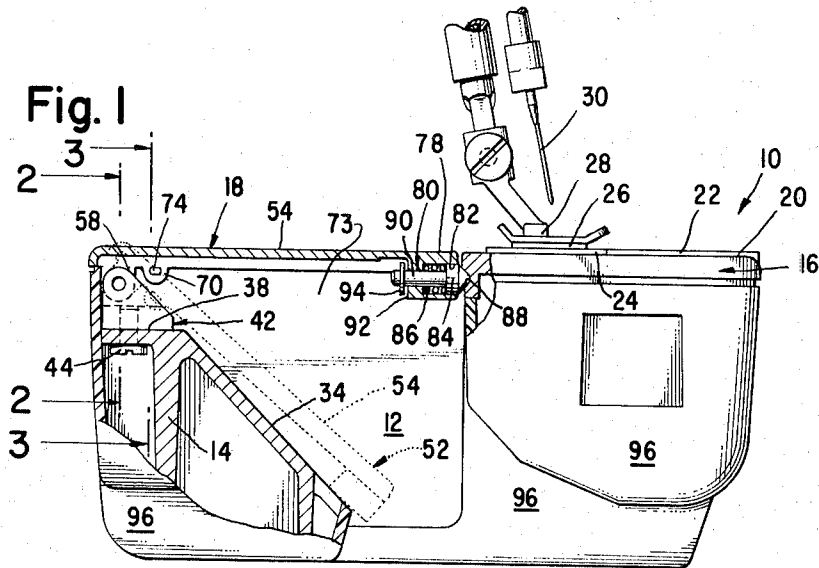
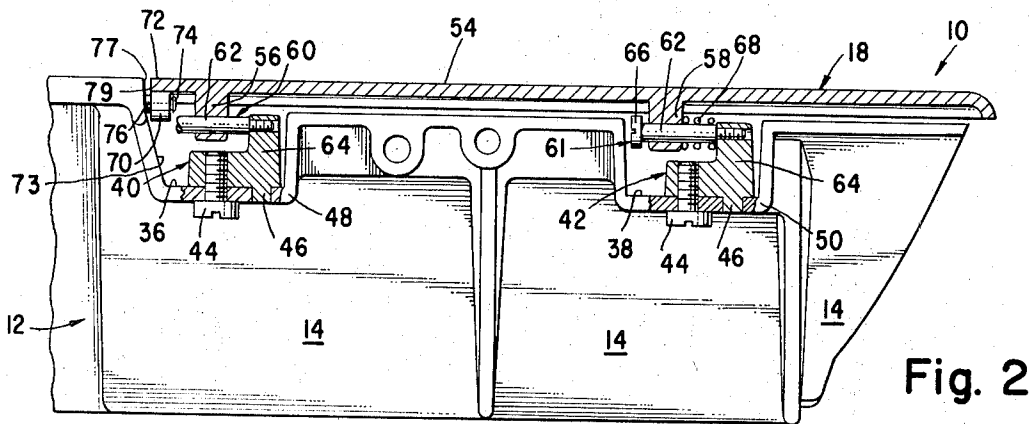
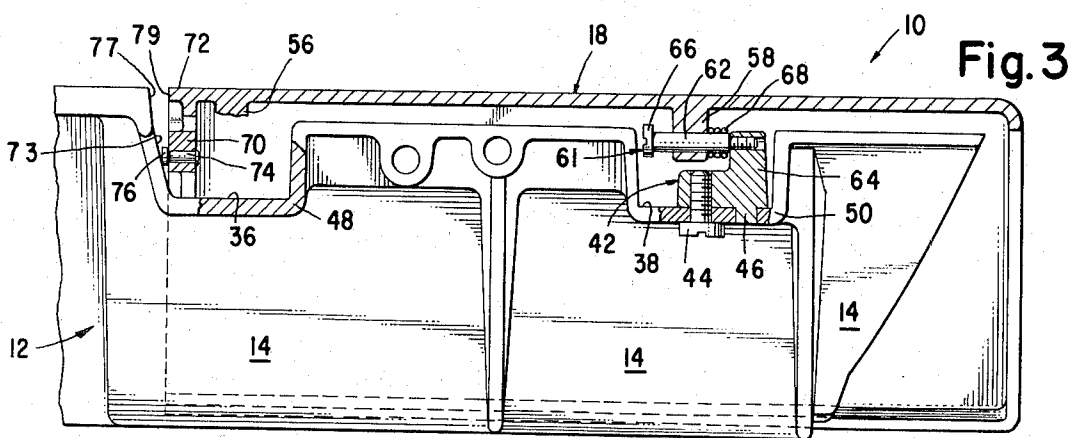
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ABSTRACT

A convertible sewing machine bed which includes a base having a longitudinally extending arm and a spring biased support member that is movable in one direction with respect to the arm and simultaneously shiftable in another direction with respect to the arm. The shifting movement, which prevents the support member from interfering with or damaging the finish of other parts of the sewing machine bed, is effected by spring influenced interengagement between a cam member on the support member and a cam surface on the sewing machine base as the support member is moved toward and away from the longitudinally extending arm.

10 Claims, 3 Drawing Figures





CONVERTIBLE SEWING MACHINE BEDS

BACKGROUND OF THE INVENTION

This invention relates to work supporting beds for sewing machines, and more particularly, to a dual purpose convertible bed structure that can be arranged to accommodate sewing material of flat sheet-like shape or sewing material generally tubular in shape.

One known sewing machine adaptable to sew on sheet-like as well as tubular shaped material, has a detachable bed portion and a fixed bed portion. When the detachable bed portion is removed from the machine, tubular shaped sewing material can be supported around the fixed bed portion for rotation thereon while sewing. When flat sheet-like material is being sewn, the detachable bed portion remains fixed to the machine to help support the material as it is moved laterally back or forth with respect to the sewing needle. Removing and reaffixing the detachable bed portion to the machine, is, among other things, a bothersome inconvenience, especially when frequent conversions are being made between flat and tubular sewing materials.

Another known sewing machine having provision for accommodating flat or tubular shaped material, is shown in U.S. Pat. No. 3,344,762. The structures disclosed therein include a movable plate mounted to the machine bed for movement from a material supporting position to a nonsupportive position. Minimal clearances are desired between the bed and plate in the material supporting position, to prevent entrapment of the material, needle, pins and other sewing accessories in the clearance space. It is also desirable that the plate not interfere with or rub against other parts of the bed when the plate is moved from its supporting position to its nonsupportive position. Unless such interference is prevented the support plate and surface finish of the sewing machine bed will become scratched, scored, chipped or otherwise blemished thereby rendering the sewing machine defective. To avoid these problems it is usually necessary to require close manufacturing tolerances on the plate, the bed and the means for joining the plate to the bed, resulting in high tooling and manufacturing expenses.

It is thus desirable to provide a convertible sewing machine bed having a material support member that does not interfere with the bed, is simple to operate and does not require expensive tooling or close tolerances.

Among the several objects of the present invention may be noted the provision of a novel convertible work supporting bed for a sewing machine; a novel convertible work supporting bed having a spring biased support member that simultaneously moves in two directions on the bed; a novel convertible work supporting bed having a cam associated with a movable support member on the bed for preventing interference between the support member and bed while the support member moves with respect to the bed. Other objects and features will be in part apparent and in part pointed out hereinafter.

SUMMARY OF THE INVENTION

The present invention relates to a novel dual purpose convertible work supporting bed for a sewing machine. The sewing machine, in the preferred embodiment, includes a bed assembly having a fixed elongated arm extending longitudinally from the base of the machine

and a spring-biased support member that is movable toward and away from the elongated arm. The support member has an end portion that is arranged to longitudinally shift in a direction parallel to the arm as the support member moves away from the arm. A cam member is provided at the end portion of the support member for engagement with a cam surface formed on the base of the machine, said engagement establishing a clearance space between the end portion and the base during movement of the support member. Biasing springs on the bed assembly normally urge the end portion of the support member to shift in an opposite longitudinal direction as the support member is moved toward and away from the fixed arm.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is an end view, partly shown in section, of the convertible sewing machine bed of the present invention;

FIG. 2 is a side view thereof, partly shown in section, taken substantially along line 2—2 of FIG. 1 and showing the support member in the position illustrated in solid lines in FIG. 1; and

FIG. 3 is a side view similar to FIG. 2 partly shown in section taken substantially along line 3—3 of FIG. 1 and showing the support member in the position illustrated in dotted lines in FIG. 1.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawing.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the drawing for a detailed description of the present invention, a convertible sewing machine bed assembly is generally indicated by reference number 10. The bed assembly 10 comprises a base 12 having a stand portion 14 which, for stabilization purposes, can be conventionally secured to a support cabinet or other similar structure (not shown). The bed assembly 10 further comprises an elongated arm 16 freely extending from base 12 in spaced relationship from stand portion 14. A support member 18 bridges the space between the stand portion 14 and the elongated arm 16 as shown in solid lines in FIG. 1.

The elongated arm 16 has a primary work supporting surface 20 accommodating a slide cover 22, and a throat plate 24 through which a feed dog 26 projects. Any conventional presser device 28 and needle assembly 30 may be supported over the primary work supporting surface 20.

The stand portion 14 has an inclined surface 34 formed thereon and further includes spaced recesses 36 and 38 which accommodate identical pivot support pieces 40 and 42. Each pivot support piece 40, 42 is anchored in the corresponding recesses 36, 38 by fasteners 44, 44. The pivot support pieces 40, 42 further include projections 46, 46 engaging complementary shaped openings in respective flanges 48 and 50 of the recesses 36, 38.

The support member 18 has a secondary work supporting surface 54, and a pair of spaced depending pivot bosses 56 and 58. A pair of identical screws 60, 61 have elongated shoulder portions 62, 62 that extend

through the bosses 56, 58 to permit sliding movement of the support member 18 on the shoulder portions 62, 62. Each of the screws 60, 61 is threaded at one end into a leg 64 of one of the support pieces 40 and 42 and has a slotted head 66 at an opposite end thereof. A biasing spring 68 provided on the shoulder 62 of the screw 61 has one end bearing against the boss 58 and the opposite end bearing against the leg 64. Another biasing spring (not shown) identical to the spring 68 can be similarly disposed on the shoulder 62 of the screw 60.

A boss 70 depends from an inner end portion 72 of the support member 18 adjacent an inner wall portion 73 of the base 12. The boss 70 is provided with a spacer plug 74 having a cam head 76. The plug 74, which is made of any suitable material such as plastic or nylon, is retained in the boss 70 in any suitable known manner such that the cam head 76 is projected toward the inner wall portion 73 beyond the confines of the end portion 72. If desired an upper portion 77 of the inner wall 73 and an inner edge 79 of the support member 18 can be machined painted or otherwise finished. However the machining or finishing tolerances for these surfaces need not be close, since the amount of clearance therebetween is determined by the size of the cam head 76. Cam head 76, by maintaining a clearance between the inner edge 79 and the upper portion 77 of the inner wall 73, prevents the support member 18 from scratching, chipping or otherwise damaging the finish of the upper portion 79 as well as other surface portions of the inner wall 73.

The support member 18 further includes a side portion 78, as shown in FIG. 1, having a detent member 80 depending therefrom and slidably mounted in a socket 82. The detent member 80 has a head portion 84 biased outwardly of the socket 82 by a spring 86. The head portion 84 is engageable with a detent depression 88 formed in the arm 16. The detent member 80 also has a stem portion 90 extending through a rear wall 92 of the socket 82 and a retaining ring 94 on the stem portion 90 beyond rear wall 92. An outer casing 96 may be detachably secured to base 12 or integrally formed therewith.

In using the convertible sewing machine, the bed assembly 10 will support flat sewing material (not shown) for lateral feeding with respect to needle assembly 30 when the support member 18 is located in a first limit position as shown in solid lines in FIG. 1 wherein the secondary work supporting surface 54 forms a continuation of the primary work supporting surface 20 on the arm 16 and the detent member 80 is releasably engaged in the depression 88. With the support member 18 in the first limit position, clearance between the inward end 72 of the support member 18 and the inner wall 73 of the base 12 is determined by the amount that the cam head 76 projects from cam mounting boss 70. The spring 68 constantly urges the inward end 72 of the support member 18 to shift toward the inner wall 73 until the cam head 76 contacts the wall 73. Although variations in clearance between the inner wall 73 and the support member 18 are not usually needed, lesser or greater amounts of the first limit position clearance between the support member 18 and the inner wall 73 are obtainable by merely providing the spacer plugs 74 with cam head portions 76 of varying size and/or shape.

The arm 16 will support tubular shaped sewing material for rotation thereon with respect to the needle as-

sembly 30 when the support member 18 is pivoted to a second limit position, shown dotted in FIG. 1, wherein the support member 18 rests on the inclined surface 34 of the stand portion 14. The arm 16 thus freely extends from the base 12. Movement of the support member 18 from the first limit position to the second limit position requires light finger pressure on the secondary work supporting surface 54 to disengage the detent member 80 from the depression 88 and permit clockwise pivoting of the support member 18, about the shoulders 62, 62 of the screws 60 and 61.

Since the cam head 76 engages the inner wall 73 of the base 12 during pivotal movement of the support member 18 from the first limit position to the second limit position the wall 73 functions as a cam surface. As the inner wall 73 is inclined to the right with reference to FIGS. 2 and 3 the support member 18 shifts longitudinally to the right on the shoulders 62, 62 while the cam head 76 engages the inner wall 73 during movement of the support member 18 from the first limit position to the second limit position. The longitudinal shift of the support member 18 from one limit position to another can be noted by comparing the distances between the upper wall portion 77 of the inner wall 73 and the inner edge 79 of the support member 18 in FIGS. 2 and 3, which are drawn to the same scale.

The biasing spring 68 is compressed as the support member 18 undergoes a longitudinal shift in pivoting from the first limit position to the second limit position. The biasing force of the spring 68 causes the support member 18 to longitudinally shift in a reverse direction on the fastener shoulders 62, 62 when the support member 18 is pivoted from the second limit position to the first limit position. The shifting movement of the support member 18 corresponds to the shape of the inner wall 73.

It will be apparent to those skilled in the art that the bed assembly 10 can be combined with sewing machines used in industry as well as those used in the home.

Some advantages of the novel sewing machine bed assembly evident from the foregoing description include a convertible bed wherein a cam on a support member is engageable with a cam surface on the base for simultaneously shifting a spring biased support member in one direction while the support member pivots in another direction. The shifting of the support member 18 as disclosed solves the problem of scratches and chips on the bed assembly 10 as the support member is moved toward and away from the elongated arm 16. The biasing of support member 18 by spring 68 eliminates the need for requiring close machine tolerances on the support member 18 and the inner wall 73 to maintain desired therebetween.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results obtained.

As various changes can be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense.

Having thus set forth the nature of the invention, what is claimed therein is:

1. In combination with a sewing machine having a base with a work supporting bed including an elongated

longitudinal arm having a primary work supporting surface for disposition of materials to be sewn, support means having a first end portion and a secondary work supporting surface, said support means being mounted to said base for movement in a first direction for disposition of said support means in a first limit position wherein said secondary work supporting surface is substantially continuous with the primary work supporting surface of said elongated arm, said support means being movable in a first reverse direction opposite said first direction to a second limit position wherein the secondary work supporting surface is discontinuous from the primary work supporting surface of said elongated arm, said support means and said base further including means for effecting simultaneous movement of said support means in a second direction substantially normal to said first direction as said support means is moved in said first direction such that a clearance space is maintained between the first end portion of said support means and said base during movement of said support means in said first direction, said combination further including pivot means joining said support means to said base for pivotal movement of said support means in said first direction, and wherein said support means is slidably mounted on said pivot means for longitudinal movement of said support means in said second direction as said support means is pivoted in said first direction.

2. The combination of claim 1 further including detent means on said support means and said base for maintaining said support means in said first limit position.

3. The combination of claim 1 wherein said pivot means comprise at least one pivot rod member supported on said base, such that said support means is slidable and rotatable on said pivot rod, said combination further including biasing means on said base for urging said support means to longitudinally slide on said pivot rod member in said second reverse direction.

4. The combination of claim 3 wherein said pivot rod member comprises a screw having an unthreaded shoulder portion upon which said support means pivots, said screw having a head disposed at one end such that slidable movement of said support means on said shoulder is limited by said head.

5. The combination of claim 4 wherein said biasing means comprise a spring member coiled around said screw.

6. In combination with a sewing machine having a base with a work supporting bed including an elongated longitudinal arm having a primary work supporting surface for disposition of materials to be sewn, support means having a first end portion and a secondary work supporting surface, said support means being mounted to said base for movement in a first direction for disposition of said support means in a first limit position wherein said secondary work supporting surface is substantially continuous with the primary work supporting surface of said elongated arm, said support means being movable in a first reverse direction opposite said first direction to a second limit position wherein the secondary work supporting surface is discontinuous from the primary work supporting surface of said elongated arm, said support means and said base further including means for effecting simultaneous movement of said support means in a second direction substantially

normal to said first direction as said support means is moved in said first direction such that a clearance space is maintained between the first end portion of said support means and said base during movement of said support means in said first direction, and wherein said means for effecting simultaneous movement of said support means in said second direction comprise coacting cam means on said base and said support means, said coacting cam means interengaging during movement of said support means in said first direction to cause simultaneous movement of said support means in said second direction.

7. The combination of claim 6 further including biasing means on said base for urging said support means to move laterally in a second reverse direction opposite said second direction, said biasing means yielding to lateral movement of said support means in said second direction when said support means is moved from said first limit position to said second limit position, said biasing means moving said support to said second limit position, said biasing means moving said support means in said second reverse direction when said support means is moved from said second limit position to said first limit position.

8. The combination of claim 6 wherein said coacting means includes a cam surface on said base and a cam member on said support means, said cam member engaging said cam surface when said support means is moved in said first direction.

9. The combination of claim 6 further including detent means on said support means and said base for maintaining said support means in said first limit position.

10. In combination with a sewing machine having a base with a work supporting bed including an elongated longitudinal arm having a primary work supporting surface for disposition of materials to be sewn, support means having a first end portion and a secondary work supporting surface, said support means being mounted to said base for movement in a first direction for disposition of said support means in a first limit position wherein said secondary supporting surface is substantially continuous with the primary work supporting surface of said elongated arm, said support means being movable in a first reverse direction opposite said first direction to a second limit position wherein the secondary work supporting surface is discontinuous from the primary work supporting surface of said elongated arm, said support means and said base further including means for effecting simultaneous movement of said support means in a second direction substantially normal to said first direction as said support means is moved in said first direction such that a clearance space is maintained between the first end portion of said support means and said base during movement of said support means in said first direction, said combination further including biasing means on said base for urging said support means to move laterally in a second reverse direction opposite said second direction when said support means is moved from said second limit position to said first limit position, said biasing means yielding to lateral movement of said support means in said second direction when said support means is moved from said first limit position to said second limit position.