May 1, 1962 E. BROEDNER 3,031,990

SELF LUBRICATING NEEDLE BAR OSCILLATOR FRAME

Filed July 3, 1957

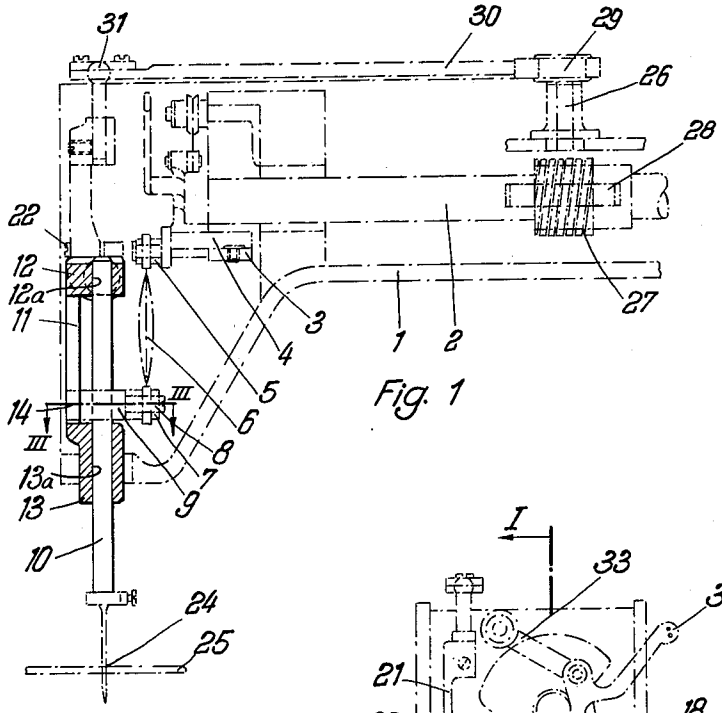


Fig. 1

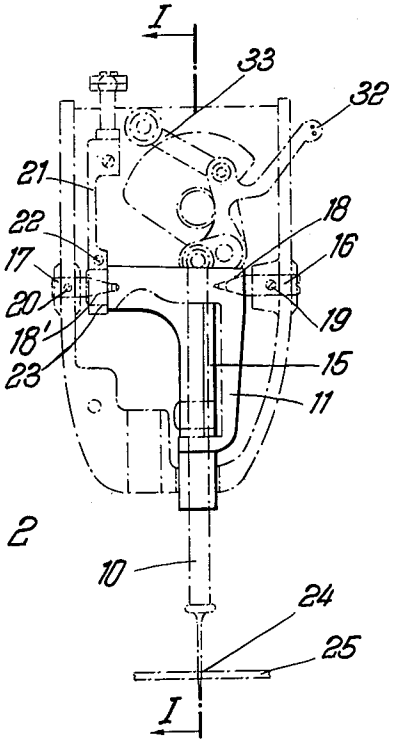


Fig. 2

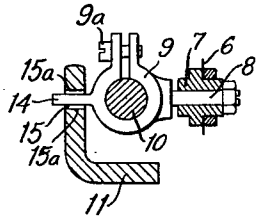


Fig. 3

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United States Patent Office

3,031,990
Patented May 1, 1962

3,031,990

SELF LUBRICATING NEEDLE BAR OSCILLATOR FRAME

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Filed July 3, 1957, Ser. No. 669,895
3 Claims. (Cl. 112—256)

The present invention relates to zig-zag sewing machines and in particular to zig-zag sewing machines of the type described in U.S. Patent No. 2,873,707 granted February 17, 1959, upon the joint application of Wolfgang Engel and Ernst Broedner, which include a needle bar oscillator which is adjustable in order to permit accurate positioning and movement of the needle.

In our aforesaid patent we have disclosed the feature of providing automatic lubrication of the bearing and sliding areas of the oscillator bar such as the pointed stud bores, the upper and lower needle bar bearings and the guide slot for the needle bar block by the simple expedient of making the entire oscillator bar of powdered metal and saturating the pores thereof in oil. The inventive concept of this feature disclosed but not claimed in the earlier application has become the subject matter of the present application.

It is the object of the present invention to decrease the number of lubricating points normally required by an oscillator bar and in fact to eliminate lubricating areas or points completely.

While it is conceivable to eliminate lubricating places by making various bearing or friction areas of self lubricating bearing material, for example, to provide conical self lubricating bearing members for the support of the oscillator bar in the head of the machine, or to embed self lubricating bearing material in the oscillator where it is engaged by the reciprocating needle bar or by the needle bar block, or to make the needle bar block of such self lubricating material, it is found that these expedients are disadvantageous because they would require additional expensive manufacturing operations, or add to the bulk of material, or again would make it necessary in view of the small space available to make the self lubricating bearings so thin as to require frequent replacement.

In accordance with the invention these shortcomings and disadvantages are overcome and separate lubricating areas or self lubricating bearings on the needle bar oscillator frame are avoided in that the entire needle bar oscillator is made of self lubricating material, such as oil soaked sintered metal.

This form of construction not only eliminates lubricating operations but it provides a large reservoir of lubricant in the form of the entire needle bar oscillator frame.

It is, therefore, another object of the invention to decrease production costs by making the guide surfaces for the needle bar and all other bearing or friction areas in the powder pressing operation by which the needle bar oscillator frame is produced.

It is still a further object and advantage of the invention to eliminate the grinding or finishing operations on the needle bar oscillator frame by providing in a preferred embodiment of the invention a guide slot for the needle bar block which is a longitudinal slot having guide planes which can be pressed to a finished condition eliminating finishing operations such as grinding or buffing.

Further objects and advantages of the invention will become apparent from the following description and with reference to the attached drawing in which:

FIG. 1 illustrates the needle bar oscillator frame in the head of the sewing machine in a view taken along line I—I in FIG. 2,

FIG. 2 is an end view of a machine head showing the oscillator frame, and

FIG. 3 is a sectional view taken along the line III—III in FIG. 1.

In both figures the machine head and the driving mechanism for the needle bar and the oscillator are indicated in dot and dash lines and these figures correspond to FIGS. 1 and 2 of the drawing in Ser. No. 636,069.

The shaft **2** is journalled in the arm **1** of the machine and supports at its forward end the crank **3** of the shaft to which is secured the crank stud **4** which is engaged by the eye **5** of the needle bar joint **6** constituting a universal joint. The other eye **7** of the joint member **6** engages the stud **8** of the needle bar block **9** secured to the needle bar **10** by clamping.

The needle bar **10** is guided along guiding surfaces **12***a*, **13***a*, in collar portions **12**, **13** in the needle bar oscillator frame **11**. A nose member **14** on the block **9** is in sliding engagement with guiding surfaces **15***a* of the slot **15** in the needle bar oscillator frame **11**, which in turn is journalled in pointed or tapered studs **16** and **17** mounted in the head **1** of the machine arm below the arm shaft **2**.

Needle bar oscillator frame **11** is provided on opposite sides with conical bores **18** and **18'** into which project pointed studs **16** and **17** which are adjustable in axial direction by means of lock screws **19** and **20**.

An adjusting lever **21** is secured to a stud **23** on the needle bar oscillator frame **11** by means of a lock screw **22**.

The pointed stud bearings and the adjusting lever **21** provide for alignment or adjustment of the needle bar oscillator **11** in two planes with respect to the needle stitch hole **24**.

In order to provide for effective lubrication of all bearing and friction or sliding areas of the needle bar oscillator frame **11**, such as the bores **18**, **18'**, the upper and lower collar bearings **12**, **13** for the needle bar and the guide slot **15** for the needle bar block, the entire needle bar oscillator frame **11** is pressed in a metal powder form and the pores of the needle bar oscillator frame **11** are saturated in a lubricant such as oil.

Having now fully described my invention with reference to the embodiment illustrated, I claim:

1. In a zig-zag sewing machine having a machine head presenting front and back wall portions, a drive shaft extending to said machine head, a needle bar mounted for reciprocating movement in generally vertical position in said machine head, a generally horizontally disposed block secured around the needle bar and operatively linked to said drive shaft on one side thereof and having a guide nose member on another side thereof, a needle bar oscillator frame mounted for pendulating movement in said machine head and disposed around said needle bar and extending substantially parallel thereto, said frame defining a source of lubricant and having a plurality of surfaces subject to friction including oppositely disposed pivotal bearing surfaces proximate the upper end thereof, a guiding collar defining a cylindrical bearing surface at its lower end having sliding engagement with said needle bar, and closely adjacent opposite walls extending longitudinally of said frame intermediate said upper end and said guiding collar, said opposite walls defining a guide slot in sliding engagement with said nose member, bearing studs extending through said front and back wall portions and into engagement with said bearing surfaces, said needle bar oscillator frame defining said source of lubricant being in the form of a pressed member of powdered material soaked in lubricant such as oil, said pivotal bearing surfaces, said cylindrical bearing surface and said guide slot walls constituting self lubricating bearings and the lubricant soaked areas of said frame inter-

mediate said bearing surfaces and walls constituting a lubricant reservoir in communication with said bearing surfaces, said cylindrical bearing surface and said guide slot walls.

2. A needle bar oscillator frame of generally longitudinal shape having one end presenting oppositely and transversely disposed pivotal bearing surfaces, another end presenting a cylindrical bearing surface and inner adjacent opposite walls defining a guide slot longitudinally of said frame, said frame defining a central source of lubricant and being formed of pressed powdered metal soaked in lubricant such as oil and said pivotal and cylindrical bearing surfaces, and said opposite walls constituting self lubricating bearing surfaces and the areas of said frame intermediate said self lubricating bearing surfaces constituting a lubricant reservoir in communication with said bearing surfaces and said opposite walls.

3. A needle bar oscillator frame of generally longitudinal configuration having opposite sides presenting pivotal bearing means adapted for engagement with corresponding stationary pivot means supporting said frame for

oscillating movement and a generally cylindrical bearing surface adapted to slidingly receive a needle bar for reciprocating movement relative to said oscillator, said frame defining a central source of lubricant and being pressed of powdered metal soaked in lubricant such as oil and said pivotal bearing means and said cylindrical bearing surface defining self lubricating bearing surfaces and the areas of said frame intermediate said self lubricating bearing surfaces constituting a lubricant reservoir in communication with said bearing means and said bearing surface.

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