

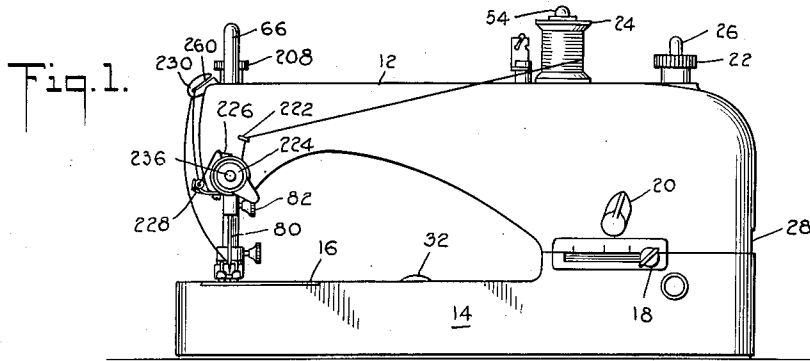
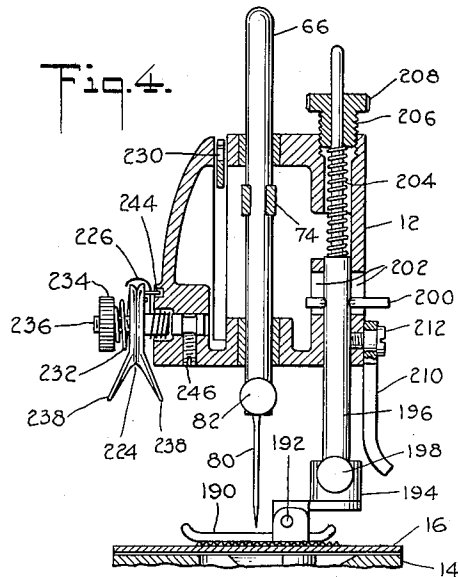
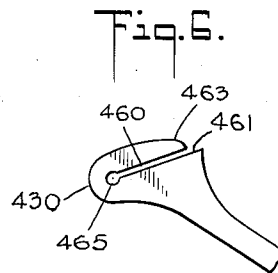
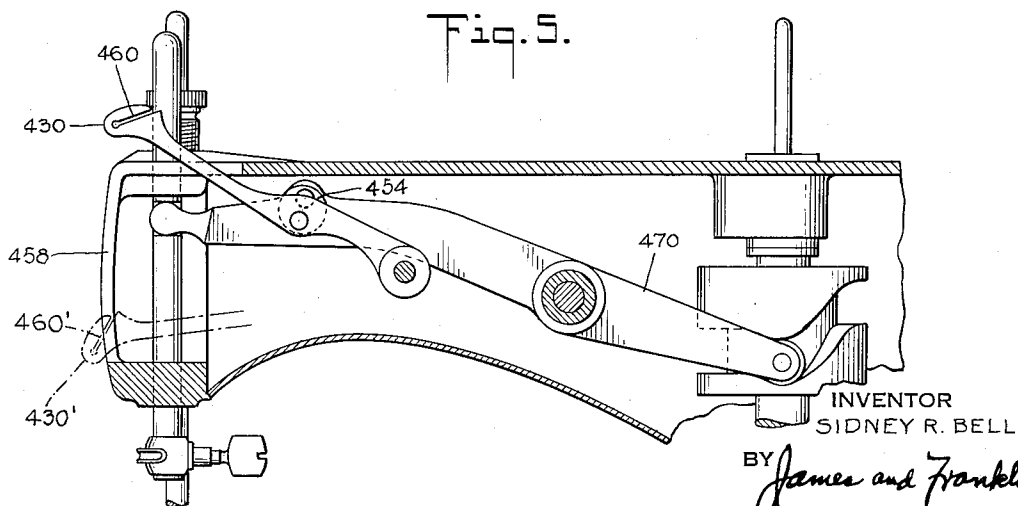
June 5, 1956

S. R. BELL
SEWING MACHINE

2,748,731

Filed July 17, 1952

2 Sheets-Sheet 1



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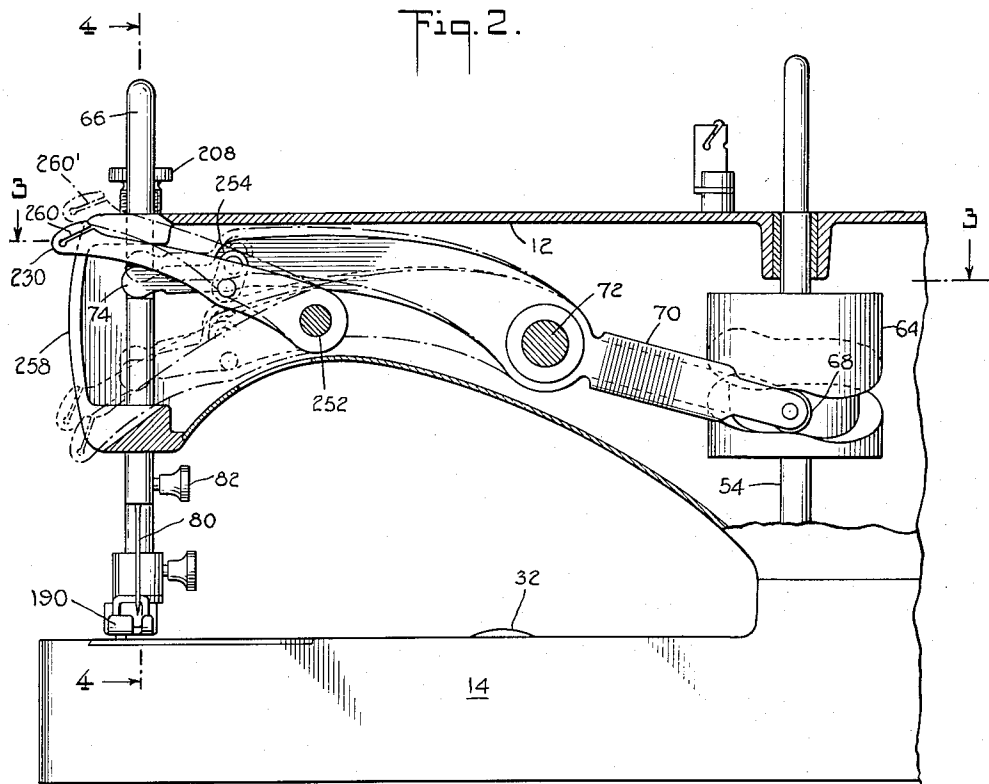
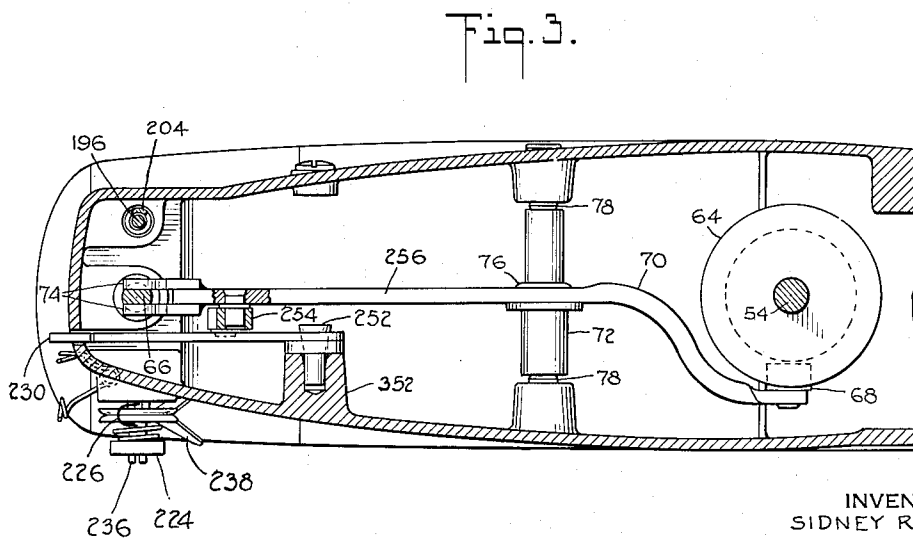
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SEWING MACHINE

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Application July 17, 1952, Serial No. 299,394

2 Claims. (Cl. 112—241)

This invention relates to sewing machines, and more particularly to a miniature, light-weight, electrically driven sewing machine.

The primary object of my invention is to generally improve sewing machines, especially small, light-weight sewing machines intended to be readily portable.

Another feature and object is to improve the thread take-up and tensioning mechanism to prevent accidental escape of the thread, yet to facilitate intentional release of the thread. Another object is to facilitate threading the machine.

Many features of the present sewing machine are not claimed herein but are claimed in my copending application Serial No. 85,191, filed April 2, 1949, now Patent No. 2,682,846, dated July 6, 1954, or in divisional or continuation-in-part applications thereof. Division of said parent application Serial No. 85,191 was required, and the present application is a continuation-in-part of one of the divided portions of said parent application.

To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, my invention resides in the sewing machine elements, and their relation one to another, as are hereinafter more particularly described in the following specification. The specification is accompanied by drawings in which:

Fig. 1 is a side elevation of a sewing machine embodying features of my invention;

Fig. 2 is a longitudinal section taken in elevation through a part of the sewing machine arm;

Fig. 3 is a horizontal section taken approximately in the plane of the line 3—3 of Fig. 2;

Fig. 4 is a transverse section taken approximately in the plane of the line 4—4 of Fig. 2;

Fig. 5 is a section similar to the upper part of Fig. 2, but showing a modified form of the invention; and

Fig. 6 is explanatory of a detail thereof.

Referring to the drawing, the sewing machine is shown in Fig. 1, it comprising an arm 12 overhanging a bed 14. The bed houses work feed and shuttle mechanism covered by a removable plate 16. The stitch length may be controlled by an adjustment indicated at 18. The direction of work feed may be reversed by a control handle indicated at 20. A bobbin from the shuttle may be re-wound with thread from spool 24 by means of a shaft end projecting at 26. The machine is electrically driven, connection being made at 28 by means of a suitable plug, not shown, the connection preferably including a suitable speed control rheostat, not shown, arranged to be operated by either the knee or the foot, as described in my Patent No. 2,561,556, granted July 24, 1951.

The sewing machine head is preferably arranged to be carried in a small carrying case, not shown in the present drawings, but illustrated and described in my copending application Serial No. 40,917, filed July 27, 1948, now Patent No. 2,677,341, dated May 4, 1954. The sewing machine is readily portable and very tiny in dimension. To increase the work table area and to steady the machine, as described in said copending application, it is received

in a mating opening in the case, which opening closely surrounds and comes flush with the top of the bed 14. To facilitate release of the then-surrounded needle plate 16, a pushbutton 32 is provided.

For the most part the sewing machine details are not described herein, being described in my aforesaid copending application Serial No. 85,191. The description there includes the main drive; the work feed mechanism; the stitch length control mechanism centering about the adjustment 18; the reverse feed mechanism centering about the control knob 20; the shuttle, the shuttle carrier and drive mechanism, and the relation between the shuttle and the needle 80 secured to reciprocable needle bar 66 by means of a thumbscrew 82; the thread tension mechanism centering about the parts 224 and 230; the bobbin wind mechanism utilizing the upper end of the motor shaft shown at 26; and the lamp and other miscellaneous details of the sewing machine.

The parts of the sewing machine are driven from a main cam shaft 54 (Figs. 3 and 4), preferably disposed vertically. Cam shaft 54 carries a cam 64 which reciprocates the needle bar 66 at the end of the sewing machine arm 12. Cam 64 is connected to needle bar 66 by means of a cam follower 68 and a lever 70 pivoted at 72. The forward end 74 of the lever is bifurcated and straddles the needle bar 66, the latter being notched to receive the ends 74, as shown in Figs. 2, 3 and 4. Fig. 3 shows how arm 70 is securely riveted at 76 to a solid pin or trunnion piece 72, the ends of which are received on stationary conical bearing pins 78. Reverting to Fig. 2, the ends 74 are rounded to accurately fit in the notches of the needle bar 66 during angular movement of the lever, as is illustrated by the solid and broken line positions in the drawing. This relation is also shown in Fig. 4. Fig. 4 further shows how a needle 80 is secured in the lower end of needle bar 66 by means of a thumbscrew 82.

The cam 64 is preferably a cylinder cam in order to positively control the needle bar in both directions.

Referring to Fig. 4 of the drawing, a presser foot 190 cooperates with the serrated edge of the feed plate. The presser foot 190 is pivoted at 192 on a bracket 194 detachably secured to rod 196 by means of a thumbscrew 198. The rod 196 is held against rotation by means of a pin 200 slidable in slots 202. The rod 196 is urged downwardly by a compression spring 204, the tension of which may be adjusted by means of a threaded bushing 206. This is knurled at 208 to facilitate rotation and adjustment of the spring pressure.

The pin 200 is prolonged for cooperation with a control handle 210. The handle is pivoted at 212 and may be swung to any of three positions. The position shown in Fig. 4 is the normal sewing position, in which the presser foot may descend to lowermost position, and in the absence of fabric bears directly against the feed plate.

Referring to Fig. 1, thread 220 from spool 24 passes through an eye 222, and thence between tension discs 224, and thence around a check spring 226 to an eye 228, and thence upwardly to a thread take-up arm 230 from which the thread passes downwardly to the eye of the needle 80.

The tension discs and check spring are best shown in Fig. 4, in which it will be seen that the discs 224 are urged together by means of a compression spring 232, the tension of which is adjusted by means of a threaded thumb wheel 234 received on a threaded stud 236. The discs 224 are each provided with a finger tab 238, the said tabs diverging as shown in Fig. 4. This is convenient because by simply pressing the tabs together the discs are separated, thus releasing the thread for free movement during the threading operation, and when removing the sewn work at end of the stitch run. The finger tabs

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238 are held in registration by reason of a tongue on one of the discs received in a mating hole in the other. The hole is formed by striking out another tongue 244, and the latter is received in a mating hole in the side wall of the sewing machine arm, as is clearly shown in Fig. 4, thereby preventing rotation of the discs. The tongue 244 also acts as a stop for check spring 226.

The stud 236 is itself locked in the sewing machine arm by means of a set screw 246. The stud is longitudinally slotted to receive the end of the check spring. The latter is coiled about the stud and its free end 226 receives the thread. The set screw may be released and the stud rotated to adjust the tension of the spring 226. The part 236 of the stud may be split to frictionally hold the adjustment of thumb wheel 234.

The thread take-up arm 230 is best shown in Figs. 2, 3 and 4. It is pivoted at 252. It is connected by means of a short generally upright link 254, to the forward end 256 of the lever 70 previously referred to. Thus the take-up arm is moved together with the arm 256, but over a much larger angle, because its axis 252 is far forward of the axis 72 of arm 256. The link 254 allows for changes in angularity. The take-up arm moves through the various positions shown in Fig. 2 from lowermost to uppermost position.

The thread take-up arm moves in a vertical slot 258 in the end of the sewing machine arm 12. The arm has a rearwardly directed slit 260 which receives the thread. The open rear end of slit 260 is within the slot 258, thereby preventing escape of thread from the take-up arm. However, when the take-up arm is moved to its uppermost position the slit moves above the sewing machine arm, as is indicated in Fig. 1, and also by the broken line position 260' in Fig. 2, thus exposing the open rear end of the slit to receive the thread. At this time the thread is taut and will not escape during operation of the machine.

In the present machine the motion of the thread take-up arm is in simple synchronism with the motion of the needle bar. Despite this simplification, the sewing operation is entirely satisfactory, for considerable tolerance in the matter of thread tension is obtained by use of the extra yieldable check spring 226 previously referred to.

The tapered bearing stud 252 (Fig. 3) for the thread take-up arm is received in an integral boss 352, and is locked in position by means of a set screw. This may be lowered and the tapered stud reset to take up wear.

A modified form of the invention is illustrated in Figs. 5 and 6 of the drawing. The main change is at the thread receiving slit 460 formed in the end of the thread take-up arm 430. In the modified arrangement the lower side 461 (Fig. 6) of the slit is made longer than the upper. This may be done by slightly cutting away or shortening the material at 463 forming the upper side of the slit, or by slightly enlarging the material forming the lower side of the slit, or both. In any event a stop is provided at the lower side of the slit, and this proves to be of great convenience when threading the machine because the operator may simply slide the thread downwardly over the curved end of the part 463 (Fig. 6) of the take-up arm until the thread strikes the surface 461, whereupon the thread is moved forwardly through the slit 460 to the enlargement 465.

It will be understood that the displacement or offset at 461 is not made so great as to defeat the advantage previously mentioned of having the open end of slit 460

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normally closed by the end 458 of the sewing machine arm. This will be seen by a reference to Fig. 5, and more particularly the dotted line position 430' of the thread take-up arm 430, for it will be seen that the open end of slit 460 lies within the slot 458 in the end of the sewing machine arm, so that the latter serves to close the slit and thus inhibits unintended escape of thread.

The modified arrangement of Fig. 5 differs somewhat from that shown in Fig. 2 in the more refined shape of the thread take-up arm 430, and in the substantially circular shape of the link 454 connecting the arm 470 to the thread take-up arm 430.

It is believed that the construction, operation and method of use, as well as the advantages of my improved thread take-up mechanism, will be apparent from the foregoing detailed description. It will be apparent that while I have shown and described the invention in several forms, changes may be made in the structures disclosed without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. In a sewing machine, an enclosed sewing machine head having a vertical slot at the forward end, said slot extending upward through the top of said head, a thread take-up arm the end of which projects forwardly through said slot, means for oscillating said arm in said slot over a pre-determined angle of movement between lowermost and uppermost positions, the end of said arm being reversely bifurcated by means of a sloping slit which is open rearwardly for receiving the thread, the open rear end of said slit being normally disposed within said slot in order to prevent escape of the thread from the arm, the free end of said arm when moved by said means to its uppermost position being moved to a point above the slot and the top of the head to expose the end of the arm including the open rear end of the slit for the insertion or removal of thread.

2. In a sewing machine, an enclosed sewing machine head having a vertical slot at the forward end, said slot extending upward through the top of said head, a thread take-up arm the end of which projects forwardly through said slot, means for oscillating said arm in said slot over a pre-determined angle of movement between lowermost and uppermost positions, the end of said arm having a rearwardly directed slit for receiving the thread, the rear end of said slit being open but normally disposed within said slot in order to prevent escape of the thread from the arm, the free end of said arm when moved by said means to its uppermost position being moved to a point above the slot and the top of the head to expose the end of the arm including the open rear end of the slit for the insertion or removal of thread, the part of said arm forming the top of the slit, being cut away or shortened at its rear end relative to the bottom of the slit, in order to facilitate the insertion of thread in the slit when the arm is in its uppermost position.

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