July 1, 1941. R. K. HOHMANN ET AL 2,247,383

CONVERTIBLE FLAT-BED CYLINDER ARM SEWING MACHINE

Original Filed Dec. 29, 1939

Fig. 1.

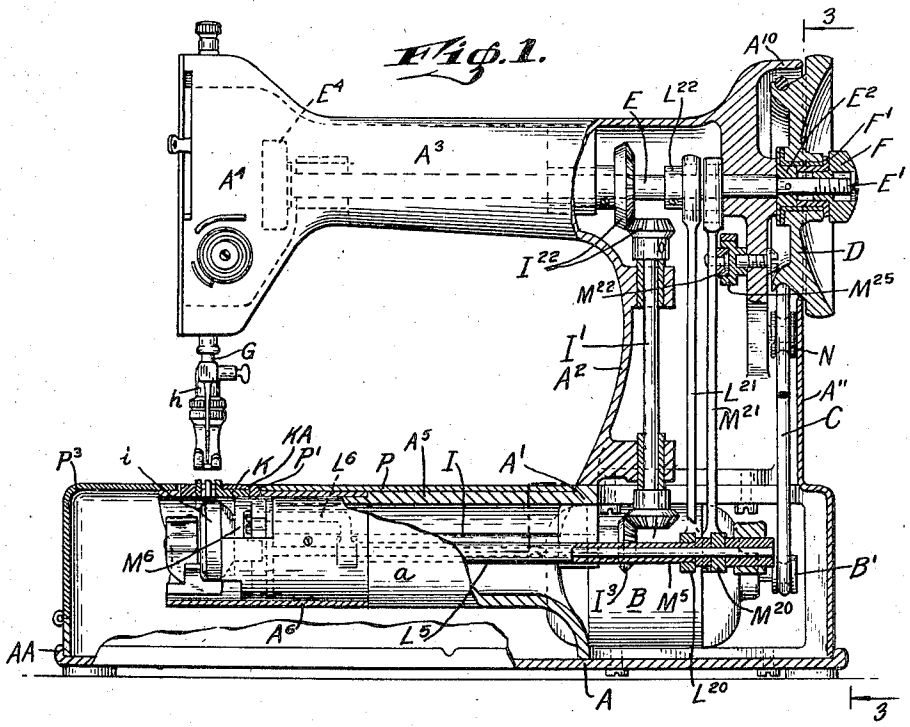


Fig. 3.

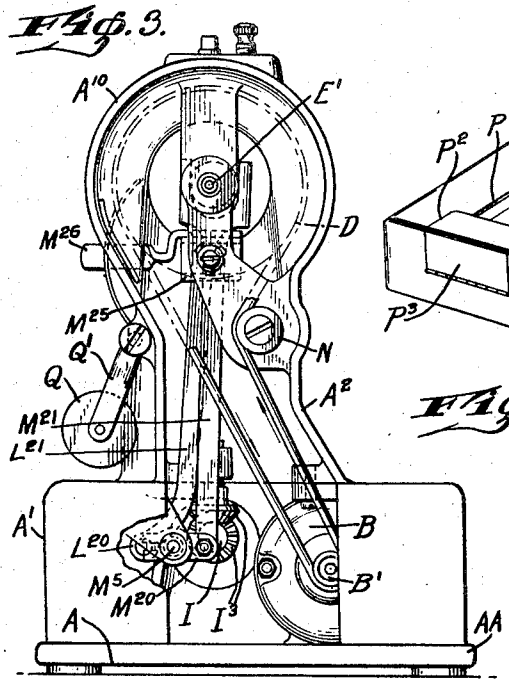
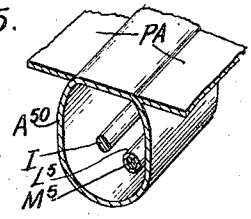


Fig. 5.



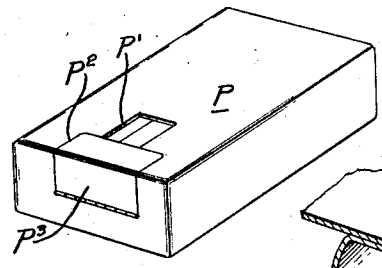


Fig. 6.

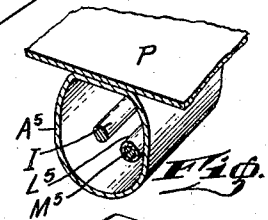


Fig. 4.

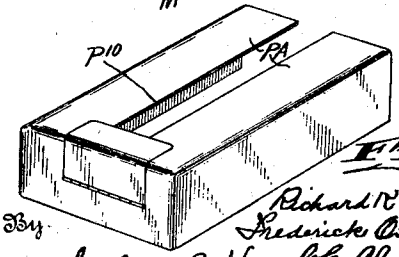


Fig. 2.

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UNITED STATES PATENT OFFICE

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CONVERTIBLE FLAT-BED CYLINDER ARM SEWING MACHINE

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Original application December 29, 1939, Serial No. 311,486. Divided and this application August 3, 1940, Serial No. 351,014

3 Claims. (Cl. 112—260)

Our prior application Serial No. 311,486, of which this application is a division, discloses a simple and effective sewing machine devised by us for interchangeable use as a darning machine and for ordinary sewing operations.

That machine is readily convertible from one to the other of two conditions, in one of which it is adapted for plain sewing and includes a flat work bed, which may be generally similar in form and disposition to the conventional work bed of a plain sewing machine, and in the other of which it is adapted for darning and is adapted to support stockings or other work to be darned, on a cylinder arm generally like, though preferably somewhat smaller in cross section than, the work supporting cylinder arms of ordinary darning machines. In its preferred form, the machine is adapted, however, for either plain sewing or darning operations, on flat bed and cylinder arm supported work.

The general object of the present invention is to provide a sewing machine and a flat work bed part which can be readily put in place in or removed from the machine, of such character that with the work bed part in place, has the general form and work supporting characteristics of an ordinary flat bed portable sewing machine, and with said part removed, the cylinder arm of the machine is fully exposed, and accessible for the free and unobstructed movements of stockings and other tubular work pieces onto and off said arm.

The various features of novelty which characterize the present invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, its advantages and specific objects attained with its use, reference should be had to the accompanying drawing and descriptive matter in which we have illustrated and described preferred forms of embodiment of the present invention.

Of the drawing:

Fig. 1 is an elevation, partly in section, of a sewing machine constituting a preferred embodiment of the present invention;

Fig. 2 is a perspective view of the removable flat work bed member shown in Fig. 5;

Fig. 3 is a section on the line 3—3 of Fig. 1 with parts broken away and removed;

Fig. 4 is a perspective view showing parts of the cylinder arm and flat work bed of Fig. 1 in section;

Fig. 5 is a view taken similarly to Fig. 4, illustrating the use of a flat work bed member of modified form; and

Fig. 6 is a perspective view of the removable flat bed part shown in Fig. 1.

The housing structure, or frame of the sewing machine illustrated in the drawing, comprises a rectangular supporting bottom plate A, and a sewing machine body frame member which is screw connected to the bottom plate and includes a rectangular base or bed portion A′, a standard A^2, and a horizontal cylinder arm comprising portions A^5 and A^6. The portion A^5 is an integral tubular extension of the base portion A′, and A^6 is a tubular part detachably secured to the front end of the part A^5 and forming an extension of the latter.

The machine comprises a driving motor B, mounted in the base portion A′ and having a pulley B′ on its shaft which is operatively connected by a belt C to a driving pulley D mounted on the adjacent end of the needle bar shaft E, which may be journalled in the arm A^3 in any usual or suitable manner. In the preferred construction shown, the rear end E′ of the needle bar shaft E is threaded, and supports a nut member F, which may be rotated about the shaft end E′ to thereby clamp the hub portion of the pulley D between the head of the nut member F and the radially extending flange of a part E^2 carried by and secured to the shaft E and comprising a tubular hub portion forming an elongated bearing for the pulley D. When the nut F is backed off, the pulley E may be displaced axially of the shaft E, from its normal position, to thereby move the inner, belt groove portion of the pulley out of its normal position within the arm A^3, so as to permit the belt C to be removed from and replaced on said pulley. As shown, a washer member F′, specially shaped and disposed as described in said prior application, is interposed between the nut F and the hub of the pulley D.

At its head end, the machine comprises means including a crank disc E^4 carried by the shaft E for actuating a needle bar G, mounted in the head A^4 in any usual or suitable manner for vertical reciprocatory movement.

At its head end, the machine is also provided with a presser bar *h*, and in our said prior application we disclose and claim novel actuating means for lifting said presser bar during each upstroke of the needle bar G, when the machine is in condition for darning use, but said actuating means need not be illustrated or described herein. Our sewing machine also includes ten-

sion and thread take-up provisions which may be of conventional type and hence do not require description herein.

The sewing machine mechanism shown, is of the rotary hook type, and comprises a hook shaft I, which is suitably journalled in the frame part A' and its cylinder arm extension A^5, and which carries a loop taker or hook element *i* adjacent the front of the machine. The hook shaft I is rotated bythe needle bar shaft E through a vertical shaft I' journalled in the standard A^2 and having its upper end connected to the shaft E by bevel gears I^{22} and having its lower end connected to the hook shaft I through bevel gears I^3. Desirably, and as shown, the gears are so proportioned that the shaft I will rotate with double the angular velocity of the shaft E.

The sewing machine includes work feeding means comprising a feed dog K adapted to extend up into and to move horizontally in the slot of a throat or needle plate part KA, of conventional flat form and supported by the cylinder arm part A^6. The work feeding means also comprises mechanism within the hollow cylindrical arm of the sewing machine for giving the feed dog its feeding movements, but the character of said mechanism forms no part of the invention claimed herein and need not be further referred to.

As shown in Fig. 3, the shaft of the motor B is parallel to the needle bar shaft E and hook shaft I, but is laterally displaced from the latter. To accommodate this displacement without requiring the standard A^2 to have an unconventional and undesirable form, an idler pulley N, normally engaged by the rear run of the belt, is so located as to deflect the lower portion of that belt run into or near parallelism with the belt front run which extends in a direction inclined to the vertical from the pulley B' to the pulley D. In the normal operating position, the upper portion of the belt groove in the pulley D is within and closely encircled by a cylindrical portion A^{10} of the framework. An opening formed in the standard A^2 and base member A', at the right hand end of the machine, as seen in Fig. 1, is normally closed by a removable cover plate or member A^{11}, which is removable to permit access to the portion of the belt and other mechanism within the hollow standard.

In the form shown in Fig. 1, the sewing machine includes a removable flat work bed member P, shown in perspective in Fig. 6. As shown in Figs. 1 and 6, the member P is in the form of a metal box, minus its bottom wall, and open at its end which, when the part is in use as shown in Fig. 1, is adjacent and bears against the sewing machine frame part A'. The part P is formed with an opening P' in its top wall to receive the throat plate member KA and with an adjacent opening P^2 partly in the top wall and partly in the closed end member. The opening P^2 is normally closed by a hinged cover member P^3 which when moved into open position, permits access to the bobbin case extending into the loop taker, for insertion and removal of bobbins.

As shown, the base plate A is formed with an uprising marginal flange AA in telescopic engagement with the lower portion of the bed plate part P, whereby the latter is anchored in position. With the part P in place, the machine as a whole, has the general appearance and operative capacity of an ordinary flat bed sewing machine. The cylinder arm work support A^5, A^6, is substantially above the top of the flange AA, and with the bed member P removed, no portion of the sewing machine obstructs movements of stockings or other tubular work parts onto and off the cylinder arm. As shown in Fig. 4, the tubular cylinder arm may advantageously be generally elliptical in cross section, but with its top portion flattened to provide a flat seat for the engaging top portion of the member P.

In lieu of the flat work bed part P shown in Figs. 1, 4 and 6, I may make use of the work bed part PA shown in Figs. 2 and 5. The part PA differs from the part P in that it is formed with a longitudinal slot P^{10} in its top wall adapted to receive the flattened top wall portion of the cylinder arm A^{50}, which to this end may differ in shape from the cylinder arm first described, in that its top wall portion is in the form of a flat rib shaped to fit into the slot P^{10}.

As shown, a bobbin winder wheel Q, carried by an arm Q' pivotally connected to the standard A^2, is adapted to be turned from its idle position, shown in Fig. 3 into the position in which the wheel Q extends through a slot formed for the purpose in the standard A^2, and frictionally engages the pulley D, which, during the bobbin winding operation is normally free to turn on the needle shaft E.

As previously stated, the machine may be used interchangeably in plain sewing and darning operations, either with the flat bed part P or PA in place, or removed so that the work may be supported on the cylinder arm. The flat bed parts P and PA are simple in form and easily put in place and removed. The sewing machine shown is of the portable type, but our improvements disclosed and claimed herein are adapted for use in sewing machines of the cabinet type, or of the convertible cabinet and portable type disclosed in the copending application Ser. No. 313,507, filed January 12, 1940, by Richard K. Hohmann, one of the petitioners herein.

While in accordance with the provisions of the statutes, we have illustrated and described the best form of embodiment of the invention now known to us, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of the invention as set forth in the appended claims and that in some cases certain features of our invention may be used to advantage without a corresponding use of other features.

Having now described our invention, what we claim and desire to secure by Letters Patent, is:

1. A sewing machine comprising in combination a frame including a base plate, a standard extending upward from the base plate adjacent one end of the latter and a work supporting cylinder arm extending away from said standard toward the opposite end of the base plate and spaced above the latter and a separable flat bed member detachably mounted on and supported by said frame and comprising a flat bed portion adapted to extend over said cylinder arm and a depending marginal portion adapted to engage said base plate adjacent its edge.

2. A sewing machine as specified in claim 1 including an uprising needle plate supported on said cylinder arm, and in which said flat bed portion of the flat bed member is formed with an opening adapted to receive said needle plate and in which said depending marginal portion of the flat bed member comprises side parts at opposite sides of said cylinder arm, and an end part transverse to said arm and at a distance

from said standard greater than the length of said arm.

3. A sewing machine as specified in claim 1 including bobbin-holding means mounted in said cylinder arm and in which said flat bed member is formed with an opening providing access to said bobbin-holding means and including a portion in said flat bed portion and another portion in said depending marginal portion, and in which a cover part is hinged to said flat bed member to move into and out of a position in which it closes said opening.

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