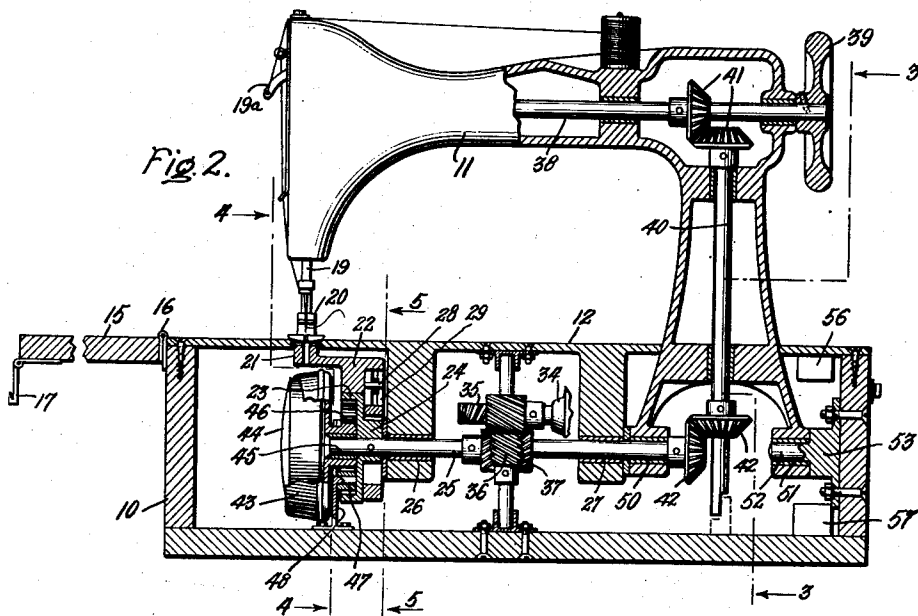
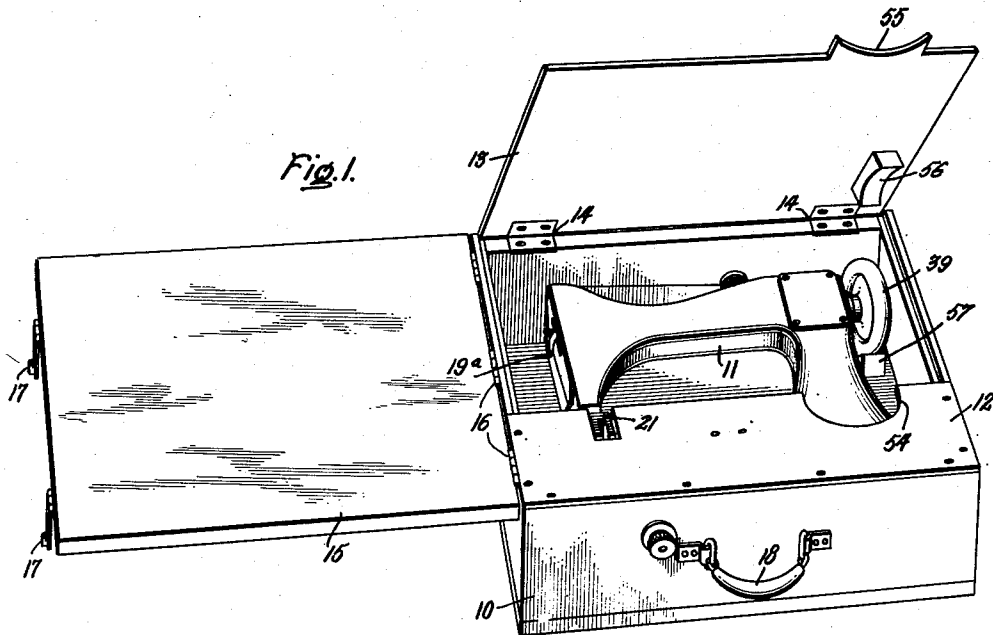


1,783,836

SEWING MACHINE

Filed Aug. 6, 1928

2 Sheets-Sheet 1



Inventor:
Frank E. Finlayson,
by *Charles E. Tuller*
His Attorney

Dec. 2, 1930.

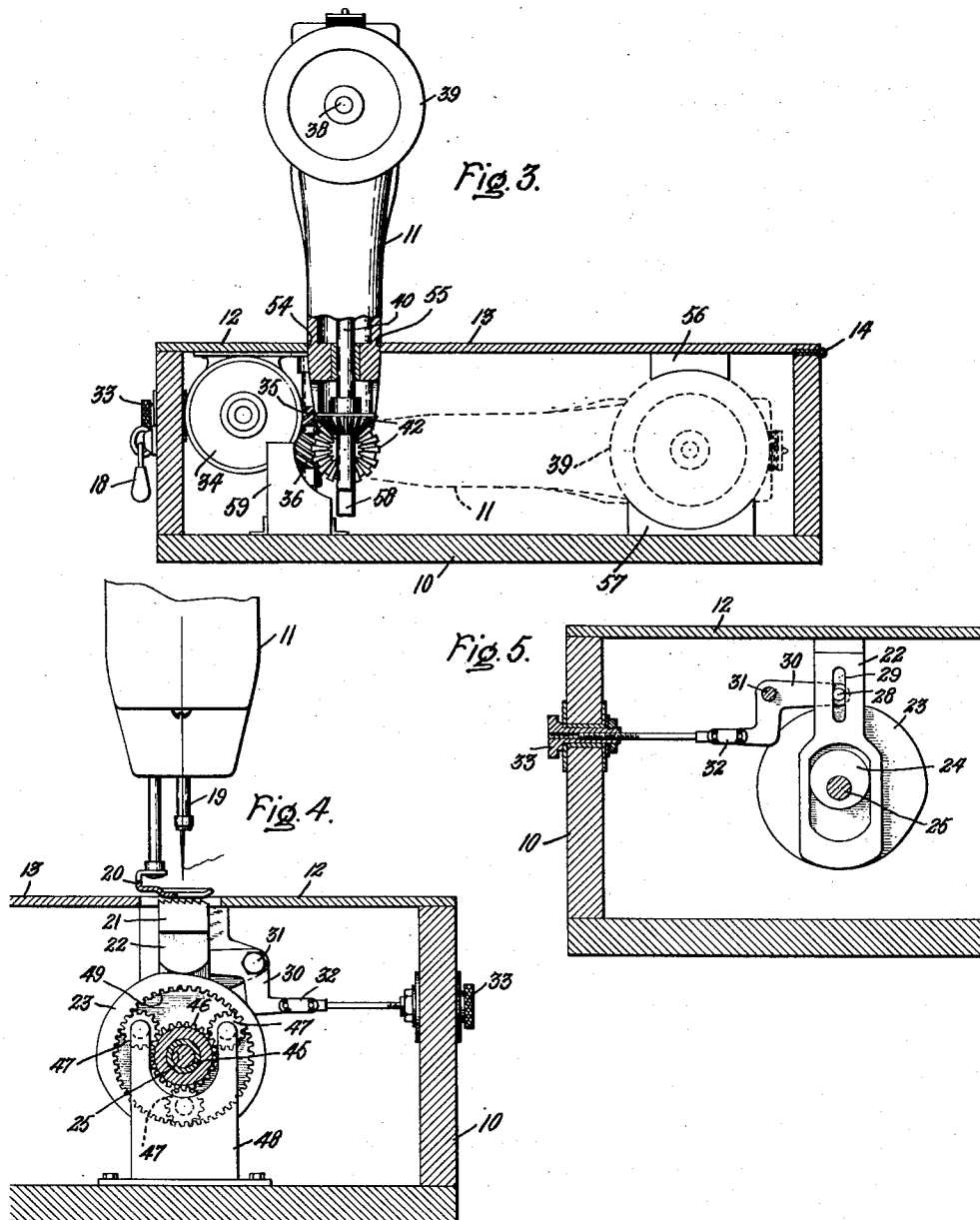
F. E. FINLAYSON

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SEWING MACHINE

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2 Sheets-Sheet 2



Inventor:
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His Attorney.

UNITED STATES PATENT OFFICE

FRANK E. FINLAYSON, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

SEWING MACHINE

Application filed August 6, 1928. Serial No. 297,617.

It has been the practice heretofore in constructing sewing machines to provide a bedplate having an arm integrally formed therewith or rigidly attached thereto, and to provide a stitch forming mechanism associated with the bedplate and the arm of the machine arranged to cooperate in forming stitches in the material to be sewn. In using a machine of this construction in a drop-head machine the compartment or cabinet into which the machine was swung when not in use was necessarily quite large because the bedplate of the machine, which was pivoted to one side of the supporting framework, was necessarily made wide enough to support the feeding mechanism of the machine, and also to provide a rigid supporting base for the machine. Furthermore, the space in the compartment or cabinet, into which the machine was swung, required to accommodate the driving motor in electrically driven machines added considerably to the size of the compartment or cabinet, because the driving motor was rigidly attached to the bedplate or arm of the machine.

The object of my invention is to provide a sewing machine construction which is particularly adapted for use in a drop-head or folding sewing machine in which the arm of the machine is swung into the cabinet in folding the machine, and in which the size of the compartment or cabinet required for the machine when it is folded or dropped into the compartment will be considerably less than in sewing machine constructions heretofore proposed. According to one aspect of my invention I accomplish this by providing a sewing machine having an arm and a bedplate with a stitch-forming mechanism associated therewith for forming stitches in the material being sewn, and movably supporting the arm of the machine on the bedplate to provide for moving the arm relative thereto in folding the machine. According to another aspect of my invention I accomplish this by providing a sewing machine having an arm and a stitch-forming mechanism associated therewith, and a driving motor for the stitch-forming mechanism which is pivotally connected thereto, so that the arm of

the machine can be swung relative to the driving motor in folding the machine.

My invention will be more fully set forth in the following description referring to the accompanying drawing, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed hereto and forming a part of this specification.

In the drawing, Fig. 1 is a perspective view of a folding sewing machine embodying my invention showing the arm of the machine swung into the cabinet on which the machine is mounted; Fig. 2 is a longitudinal sectional view of the machine with the cover swung open and the arm thereof in operative relation to the bedplate; Fig. 3 is a sectional view on the line 3—3 of Fig. 2; Fig. 4 is a sectional view on the line 4—4 of Fig. 2, and Fig. 5 is a sectional view on the line 5—5 of Fig. 2.

Referring to the drawing, the sewing machine, which I have shown as illustrative of one manner of carrying out my invention, comprises a cabinet 10 on which the arm 11 and bedplate 12 of the machine are supported in the open side thereof. A cover plate 13 is hinged to one edge of the cabinet at 14 which cooperates with the bedplate 12 to either close the cabinet when the arm 11 of the machine is swung therein, or to cooperate with the bedplate 12 to form a continuous cloth supporting surface across the top of the machine when the arm thereof is swung out of the cabinet into operative position as shown in Figs. 2 and 3. A lid 15, which is secured to the edge of the cabinet 10 by hinges 16, serves as a work-supporting table when the cover is open and the arm 11 is in operative position, and also serves as a cover when the arm 11 is swung into the cabinet and the cover plate 13 is in place, latches 17 are provided for fastening the cover 15 to the cabinet when the machine is folded, and a handle 18 is also provided for convenience in carrying the machine when it is folded into the cabinet.

The stitch forming mechanism of this machine comprises a take-up lever 19a, needle-bar 19 and a presser-foot 20 carried by the arm 11 and feed-dog 21 which is carried by the bedplate 12 associated with a suitable

mechanism for feeding the material being sewn under the presser-foot in the necessary time relation to the movement of the needle. The feeding mechanism may be of any suitable form, but the construction illustrated comprises a yoke 22 formed integrally with the feed-dog 21 engaging cams 23 and 24 which operate the feed-dog in a manner well understood in the art, to feed the material being sewn under the presser-foot in operation of the machine. The cams 23 and 24, which in this instance are formed integrally, are secured to a horizontal shaft 25 supported in bearings 26 and 27 arranged beneath the bedplate 12, and these cams raise and lower the feed-dog and oscillate and reciprocate the same on a pivot pin 28 which engages a slot 29 formed in the yoke 22. For convenience in adjusting the length of the stitch formed by the machine, the pivot pin 28 is mounted on a bell crank lever 30 which is pivotally supported at 31 to the bedplate of the machine and connected by a link 32 to an adjusting nut 33 carried by the cabinet 10 and arranged adjacent the handle 18 for convenience in adjusting the length of the stitch formed by the machine. The shaft 25 is driven by an electric motor 34 which is secured to the bedplate 12, and which is mechanically connected to the shaft 25 by reduction gears 35, 36 and 37. In order to operate the needle-bar in the necessary time relation to the movement of the feed-dog 21 the needle-bar operating crank shaft 38, having flywheel 39 mounted thereon, is connected to the shaft 25 by a vertical shaft 40 supported in the arm of the machine and beveled gears 41 and 42 in the arm and beneath the bedplate 12 respectively.

I provide means cooperating with the feeding mechanism and the needle bar to form stitches in the material being sewn during the operation of the machine which comprises a rotary loop-taker 43 having the usual bobbin case 44 loosely mounted therein. although it will be understood that any other form of loop-taker may be employed. It is well understood in the art that the loop-taker 43 must make one revolution to each stroke of the needle bar 19 so that the thread which will be pulled out of the loop-taker will be passed around the bobbin case 44 as required. In this machine I obtain this relation of the speed of rotation of the loop-taker to the movement of the needle-bar by making the beveled gears 41 and 42 connecting shafts 38, 40 and 25 in the ratio of 1 to 1, which causes the shafts 25 and 38 to run at the same speed, and then provide a device for driving the loop-taker 43 from the shaft 25 at twice the speed of rotation thereof. This is accomplished by mounting the loop-taker 43 loosely on the shaft 25 by a bearing 45 on the loop-taker, providing a pinion 46 formed integrally with the loop-taker, and driving this

pinion by means of planetary gears 47 which are supported on a bracket 48 bolted to the cabinet 10, and which are arranged to engage an internal gear 49 formed in the cam 23.

In accordance with my invention the arm 11 of the machine is movably supported on an axis substantially parallel to the arm so that the arm can be moved relative to the bedplate or the driving motor 34 and swung into the cabinet 10 upon raising the cover plate 13. This enables me to fold the machine into a much smaller space than has heretofore been required in folding or drop-head sewing machines, so that I can make the cabinet 10 of such size that it will be convenient to carry. In the construction which I have shown I make the machine so that it can be folded in this manner by providing means coaxial with the shaft 25 for pivotally supporting the arm 11 of the machine so that it can be swung relative to the bedplate 12 and motor 34 about the axis of the shaft 25 and into the cabinet 10. In the present instance this means comprises a bearing 50 arranged on the shaft 25 adjacent the bearing 27 and a bearing 51 on the stub-shaft 52 which is coaxial with the shaft 25 and which is attached to the cabinet 10 by a bracket 53 formed integrally therewith. The bedplate 12 is cut away at 54 so as to permit the arm 11 to be swung into a vertical position it is retained, as shown in Fig. 3, by the projection 55 formed integrally with the cover-plate 13 and shaped to conform to the arm of the machine, as shown in Fig. 3 when the same is in operative relation to the bedplate. Upon raising the cover plate 13, the arm 11 can be swung on its bearings 50 and 51 into the cabinet 10, as shown in Fig. 1 and indicated in dotted lines in Fig. 3. In order to rigidly support the machine when it is in this position blocks 56 and 57, which are attached to the cover plate 13 and the cabinet 10 respectively, are shaped to conform to the flywheel 39 of the machine so as to prevent the arm 11 swinging about the bearings 50 and 51 when the machine is folded.

It is apparent that if the arm 11 were swung relative to the bedplate 12 and into the cabinet 10 when the needle-bar 19 projected the needle carried thereby below the top of the bedplate 12, that the needle would be broken off. I therefore provide means for preventing swinging of the arm 11 about the bearings 50 and 52 until the stitch forming mechanism is in a predetermined portion of its cycle of operation. In the machine which I have illustrated it is clear that such means must be arranged to prevent folding of the machine until the needle bar 19 raises the needle above the bedplate 12. In this construction the means comprises a flattened portion 58 formed on the lower end of the vertical shaft 40 in the arm of the machine which is arranged to swing closely adjacent

a stop 59 secured to the inside of the bottom of the cabinet when the needle is above the bedplate. As will be observed in Fig. 2, the end of the shaft 40 extends below the axis of the bearings 50 and 52 and the flattened portion 58 is so arranged with respect to the stop 59 that the arm 11 cannot be swung about these bearings until the flattened portion 58 is turned into alignment with the face of the stop 59 as clearly indicated in Fig. 2. The flattened portion 58 of the shaft 40 is so arranged relative to the needle bar 19 that it does not come into alignment with the face of the stop 59 until the needle bar 19 has raised the needle above the bedplate.

Although I have shown my invention in connection with a portable folding sewing machine in which the arm of the machine is pivotally supported on the bedplate thereof, I do not desire to be limited to the construction shown and described except as defined in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. A sewing machine including a bedplate and an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, and means for movably supporting said arm on said bedplate for movement about an axis substantially parallel to said arm to provide for moving said arm relative thereto in folding the machine.

2. A sewing machine including a bedplate and an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, and means for pivotally supporting said arm on said bedplate to provide for swinging said arm relative to said bedplate in folding the machine, said supporting means having its axis substantially parallel to said arm.

3. A sewing machine including a bedplate and an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, said means including a rotatable shaft supported on said bedplate, and means coaxial with said shaft for pivotally connecting said arm to said bedplate to provide for swinging said arm relative to said bedplate in folding the machine.

4. A sewing machine including a bedplate and an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, said means including a rotatable shaft supported on said bedplate, and means including a bearing on said shaft for pivotally connecting said arm to said bedplate to provide for swinging said arm relative to said bedplate in folding the machine.

5. A sewing machine including a bedplate and an arm, a needle-bar and a presser-foot carried by said arm, a feeding mechanism carried by said bedplate adapted to cooperate with the needle and presser-foot in form-

ing stitches in the material being sewn, means for connecting said needle-bar and said feeding mechanism to operate them in the necessary time relation, and means for pivotally connecting said arm to said bedplate to provide for swinging said arm relative to said bedplate in folding the machine, said pivotal connection having an axis substantially parallel to said arm.

6. A sewing machine including a bedplate and an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, means for pivotally supporting said arm on said bedplate to provide for swinging said arm relative to said bedplate in folding the machine, and means for preventing swinging of said arm on said pivoted supporting means to fold the machine until said stitch-forming means is in a predetermined portion of its cycle of operation.

7. A sewing machine including a bedplate and an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, said means including a rotatable shaft supported on said bedplate, means including a bearing on said shaft for pivotally connecting said arm to said bedplate to provide for swinging said arm relative to said bedplate in folding the machine, and means for preventing swinging of said arm on said pivotal supporting means to fold the machine until said stitch-forming means is in a predetermined portion of its cycle of operation.

8. A sewing machine including a bedplate and an arm, a needle-bar and a presser-foot carried by said arm, a feeding mechanism carried by said bedplate adapted to cooperate with said needle and said presser-foot in forming stitches in the material being sewn, means for operating said needle-bar and said feeding mechanism in the necessary time relation, means for pivotally connecting said arm to said bedplate to provide for swinging said arm relative to said bedplate in folding the machine and means for preventing swinging of said arm on said pivotal support to fold the machine until the needle carried by said needle bar is raised above said bedplate.

9. A sewing machine including a cabinet, a bedplate supported on said cabinet having an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, and means for pivotally supporting said arm on said bedplate below the same to provide for swinging said arm relative to said bedplate and into said cabinet in folding the machine, said pivotal supporting means having its axis substantially parallel to said arm.

10. A sewing machine including a cabinet, a bedplate supported on said cabinet having an arm, a cover plate on said cabinet adjacent said bedplate, means carried by said

arm and said bedplate cooperating to form stitches in the material being sewn, means for pivotally supporting said arm on said bedplate to provide for swinging said arm relative said bedplate and into said cabinet upon raising said coverplate therefrom.

11. A sewing machine including a cabinet, a bedplate supported on said cabinet having an arm, a cover-plate on said cabinet and adjacent said bedplate, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, said stitch-forming means including a shaft carried by said bedplate, means coaxial with said shaft for pivotally supporting said arm on said bedplate to provide for swinging said arm relative to said bedplate and into said cabinet upon raising said cover-plate therefrom.

12. A sewing machine including a cabinet, a bedplate supported on said cabinet having an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, said stitch-forming means including a shaft carried by said bedplate, means coaxial with said shaft for pivotally supporting said arm on said bedplate and a cover-plate on said cabinet adjacent said bedplate arranged to retain said arm in operative relation to said bedplate, said arm being arranged to be swung into said cabinet upon raising said cover-plate therefrom.

13. A sewing machine including a cabinet, a bedplate supported on said cabinet having an arm, means carried by said arm, and said bedplate cooperating to form stitches in the material being sewn, said stitch-forming means including a shaft beneath said bedplate, means coaxial with said shaft for pivotally supporting said arm on said bedplate, and a coverplate on said cabinet adjacent said bedplate arranged to retain said arm in operative relation to said bedplate, said arm being arranged to be swung below said bedplate and inside of said cabinet upon raising said coverplate therefrom.

14. A sewing machine including a cabinet, a bedplate supported on said cabinet having an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, said stitch-forming means including a shaft beneath said bedplate, means associated with said shaft for driving the machine, means coaxial with said shaft for pivotally supporting said arm on said bedplate to provide for swinging said arm into said cabinet in folding the machine, and means for preventing swinging said arm relative to said bedplate until said stitch-forming mechanism is in a predetermined portion of its cycle of operation.

15. A sewing machine including a cabinet, a bedplate supported on said cabinet

having an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, said stitch-forming means including a shaft beneath said bedplate and a shaft carried by said arm, means for connecting said shafts, means coaxial with the shaft carried by said bedplate for pivotally supporting said arm on said bedplate to provide for swinging said arm into said cabinet in folding the machine, and means cooperating with the shaft carried by said arm for preventing swinging said arm relative to said bedplate until said stitch-forming mechanism is in a predetermined portion of its cycle of operation.

16. A sewing machine including a cabinet, a bedplate supported on said cabinet having an arm, means carried by said arm and said bedplate cooperating to form stitches in the material being sewn, said stitch-forming means including a shaft beneath said bedplate and a shaft carried by said arm, means for connecting said shafts, means for pivotally supporting said arm on said bedplate to provide for swinging said arm into said cabinet in folding the machine, a cover-plate carried by said cabinet arranged adjacent said bedplate for retaining said arm in operative relation to said bedplate, said arm being arranged to be swung into said cabinet upon raising said cover plate, and means carried by said connecting means for preventing swinging of said arm relative to said bedplate until said stitch-forming means is in a predetermined portion of its cycle of operation.

In witness whereof, I have hereunto set my hand this third day of August, 1928.

FRANK E. FINLAYSON.