March 28, 1939. T. E. MONROE 2,152,203

HAND SEWING MACHINE

Filed March 12, 1935 2 Sheets-Sheet 1

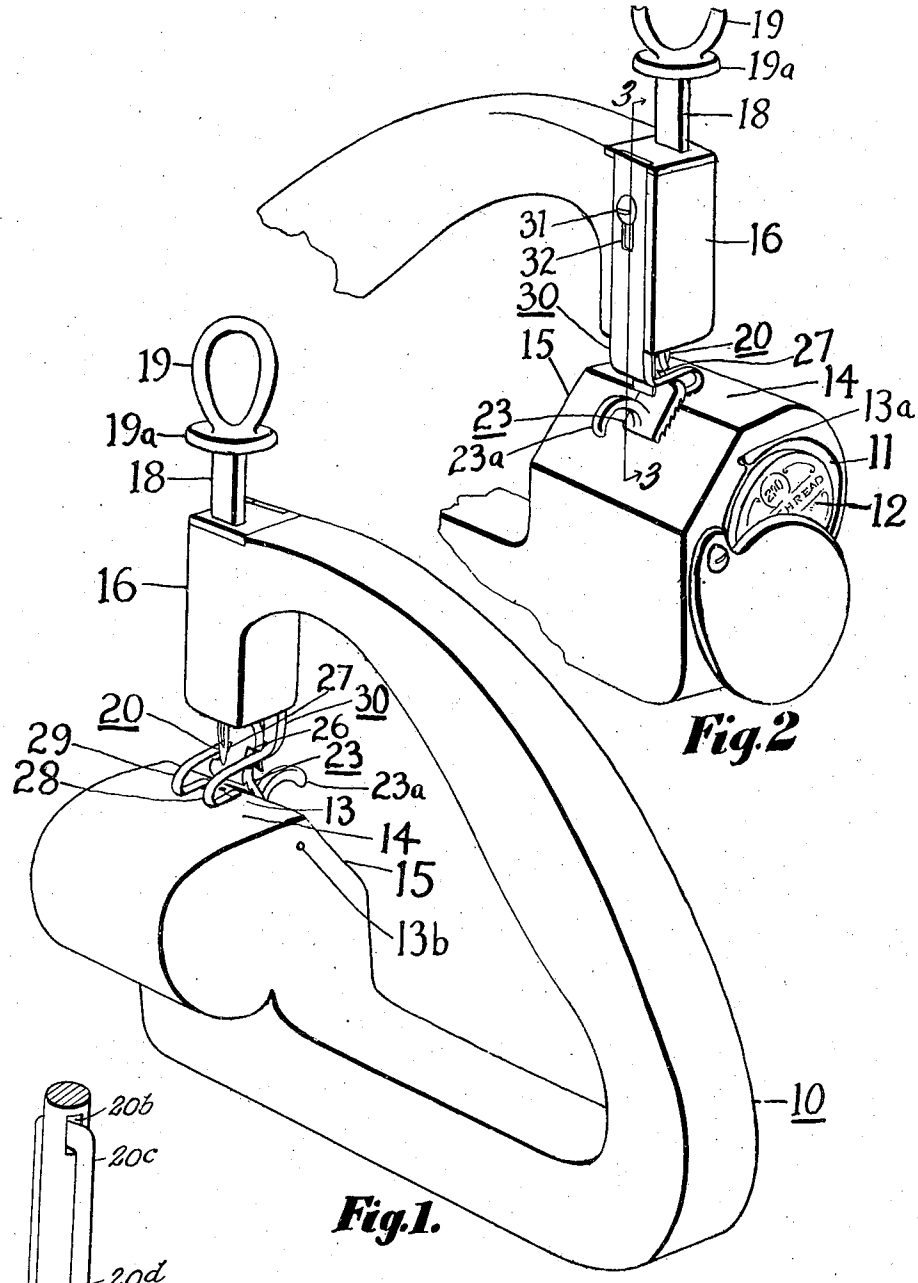


Fig. 2

Fig. 1.

Fig. 8.

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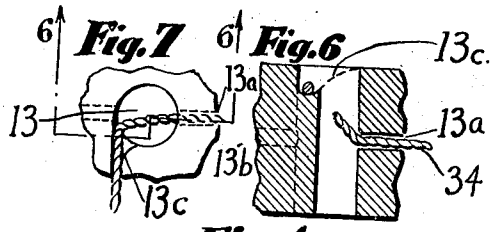


Fig. 7

Fig. 6

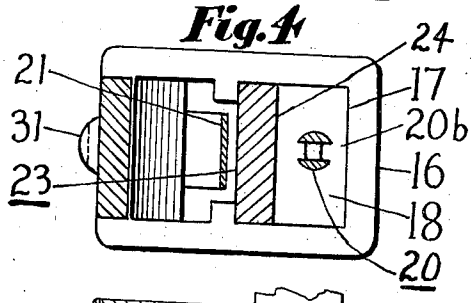


Fig. 4

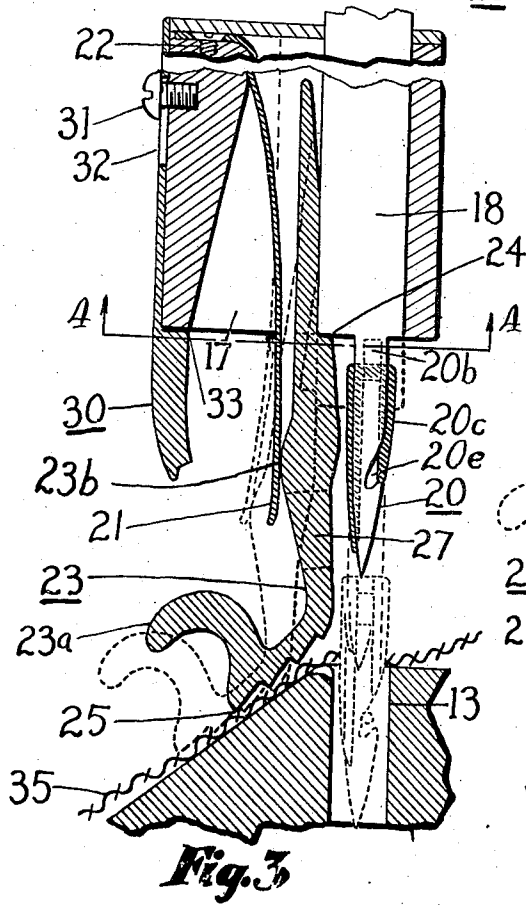


Fig. 3

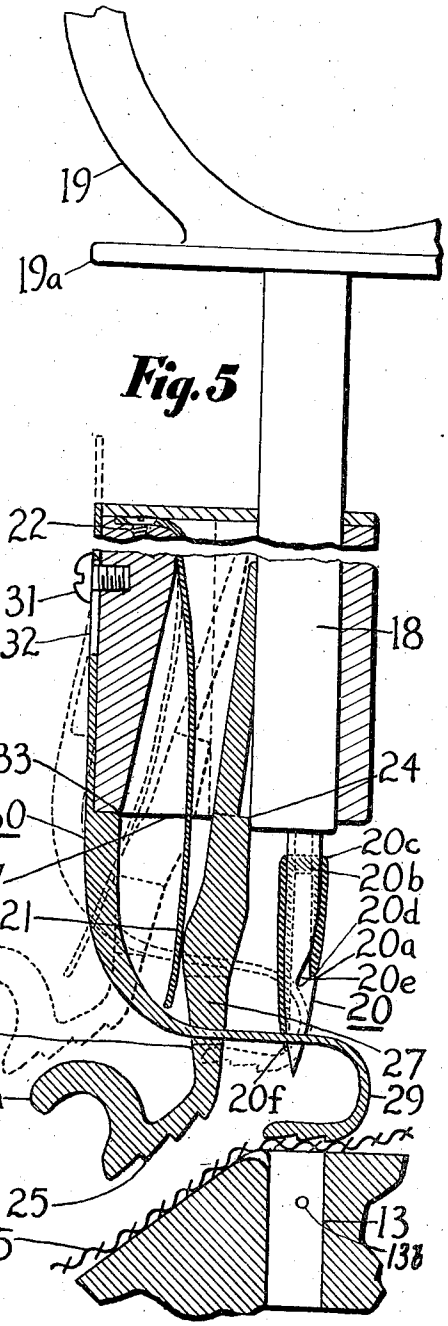


Fig. 5

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HAND SEWING MACHINE

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Application March 12, 1935, Serial No. 10,665

8 Claims. (Cl. 112—169)

This invention relates to sewing machines, and more particularly, to a new and improved fit-in-hand sewing machine having advantages and unique features made apparent through-out the further progress of this specification.

Sewing machines generally are of a heavy and complex nature, ranging from large devices supported by their own framework, to somewhat smaller machines intended to be placed upon a table or like structure preparatory to using; the devices in any event having considerable weight and bulk, and necessitating a more or less fixed position for an operator before the machine when it is being used. That is, the machine when in operative position is contemplated to be substantially immovable, which means that a user must accommodate his or her position to that of the machine, often having to bend over said device for long hours at a time in an uncomfortable or cramped position, with a result that fatigue is increased and efficiency of work impaired.

An object of this invention is to provide a hand sewing machine which may be held in the hands of a user in such a manner as to permit said user to assume a comfortable sitting position, and change said position from time to time without detracting from the quality or quantity of the work being done.

Another object is to provide a hand sewing machine of such small dimensions that it may be carried in a small space or compartment, thus affording a considerable convenience when travelling or journeying in out-of-the-way places.

A still further object is to provide a sewing machine of such light weight as to enable same to be readily handled and cheaply shipped.

Another object is to provide in a device of the instant character, simplicity of operation, and a minimum of parts.

Another object is to provide cheapness of construction and efficiency in operation in a device of the instant type.

These and other objects are accomplished by means of my fit-in-hand sewing machine, the structure and working of which is made clear by reference to the drawings herein, in which:

Fig. 1 is a view in perspective of a hand sewing machine embodying my invention.

Fig. 2 is a fragmentary view likewise in perspective, of the device illustrated in Fig. 1, said view being taken from a different angle, however, to better show certain features of the machine.

Fig. 3 is an enlarged vertical cross-sectional view of the upper portion of the device illustrated in Fig. 2, said view being taken along the line III—III of said figure.

Fig. 4 is a horizontal cross-sectional view of the machine illustrated in Fig. 3, said view being taken substantially along the line IV—IV of said figure.

Fig. 5 is an enlarged vertical cross-sectional view similar to Fig. 3, the dotted lines in said figures indicating the relative positions of various elements of the machine during successive phases of operation.

Figure 6 is an enlarged vertical section taken on the line 6—6 in Figure 7, which shows in detail the manner in which the thread passes through the needle hole.

Figure 7 is a fragmentary top view of the table showing the needle hole and the manner in which the thread passes through this hole.

Figure 8 is a perspective view showing the arrangement of the needle and slide locking member.

Like numerals indicate corresponding parts through-out the various figures of the drawings.

Referring now to the drawings, Figs. 1 and 2, my device comprises a support 10 which may be fabricated of wood, metal, or other suitable material, and which is preferably somewhat V-shaped, as illustrated, although any other shape found desirable and workable may be employed in this connection. At one end of the support 10 is a circular housing or chamber 11 in which is contained a spool of thread 12. Above chamber 11 is a flat working surface 14, one side of which may be angled as at 15, and working surface 14 is provided with a needle-receiving hole 13, the structure of which is described more in detail elsewhere herein.

Above the surface 14, and at right angles thereto is a casing 16 (Figs. 1 and 2) having an angular aperture 17 (Figs. 3 and 4) running the length thereof, in which aperture operates a plunger 18, at the upper end of which may be a circular ring 19 and base 19a through which the thumb is passed to facilitate actuation of the device; and at the lower end of which is a needle 20, the detailed structure of which will be made clear hereafter.

Likewise disposed in opening 17 and held in engagement with the plunger 18 by means of a flat spring 21, which may be suitably anchored at the top of casing 16 as by a screw 22; is a foot or impelling member 23 having a ledge or cam formed in its upper-central portion and engaging the bottom edge of plunger 18 (Fig. 3), said cam being designated by the numeral 24 on the draw-

ings. On the opposite side of foot 23 may be provided a projecting point or 'heel' for engagement with the spring 21, this point being indicated as 23b.

The bottom of impelling member 23 may be serrated as at 25 to provide notches or a roughened surface for the purpose of assisting in the positive movement of cloth through the machine during the sewing operation, said bottom portion being formed so as to normally lie in the same plane as the surface 15, and directly above said bottom portion may be formed two notches 26 and 27 (Fig. 1) through which pass wings 28 and 29 of an auxiliary foot or holding member 30, which member is slideably mounted on the side of casing 16 by means of screw 31 and associated vertical slot 32. The bottoms of wings 28 and 29 may be serrated as is the bottom of foot 23; and the middle portion of auxiliary foot 30 may be provided with a ledge 33 at the point where said element normally seats with the lower outside edge of casing 16.

Special attention is now directed to needle 20, which member consists of a sharply pointed and rounded piece of material such as steel, having a hook or barb 20a near the point thereof, and being provided with a slot 20b, in which slot an inverted U-shaped auxiliary needle or locking member 20c reciprocates. When 20c is in its lowermost position in relation to slot 20b, one end 20d registers or seats with 20a in such a manner as to completely enclose a thread passed through the eye 20e thus formed; while the opposite end 20f projects near the bottom of said needle in such a manner as to provide a slightly blunt surface at this point, which surface does not interfere in any way, however, with the passage of the composite element through the cloth, nor does the size of the element make an unduly large hole in the cloth when passed therethrough.

Figs. 6 and 7 illustrate an enlargement of hole 13, which hole is provided with an opening 13a in the wall thereof, which hole is of suitable size to permit the passage of a thread 34 therethrough, and communicates with thread chamber 11 (Fig. 2), the thread entering the hole 13 from the spool of thread 12 through said hole. On the opposite side of the hole 13 is provided a discharge hole 13b (Fig. 1) out of which the thread is passed when the machine is threaded preparatory to use.

At its top, hole 13 is provided with a sloping groove or cut-away portion 13c, along which the thread travels downwardly after being drawn out of the hole 13b on the initial stitch, the thread being shown in such position in Fig. 7.

In operation, my device works as follows. Assuming the machine to be threaded as heretofore described, and a piece of material 35 placed beneath needle 20, the device may be taken into a user's hands, and pressure exerted downwardly on operating plunger 18 as by pressing the thumb thereon, so as to lower the needle, and at the same time force foot 23 downwardly across the surface 15 to the point indicated in the dotted lines (Fig. 3), by virtue of the bottom of plunger 18 pressing on ledge 24. When this point is reached, the point of the needle is just about to penetrate the cloth, upon which occurrence the point 20f of locking member 20c so contacts with said cloth as to slide locking member 20c upwardly in slot 20b, thereby opening eye 20e. It will be noted that at this point, holding or auxiliary foot 30, and more specifically the wings 28 and 29 thereof, are firmly pressed against the cloth by means of the foot 23, the slots 26 and 27 thereof so engaging said wings as to hold them downwardly against the cloth, thereby holding the cloth firmly in position and permitting the efficient passage of the needle there-through.

The needle passes downwardly, penetrates the cloth, and hook 20a passes beneath thread 34. The action of plunger 18 is now reversed, the plunger having reached the full downward limit of its stroke, and an upward travel of said plunger and associated parts instituted. As this occurs, hook 20a engages thread 34 and pulls such upwardly in the form of a loop; the movement of plunger 18 at the same time pulling foot 23 upwardly from the surface 15 by virtue of the frictional engagement between the plunger and the foot, which friction has been greatly increased during the latter phase of the downward movement of the needle by plunger 18 passing over cam 24 and forcing the foot 23 outwardly and somewhat upwardly, as indicated in Fig. 5 of the drawings.

In other words, the friction of foot 23 at point 23b against spring 21 is less than the friction of plunger 18 with foot 23, because of the greater surface in contact in the latter instance, and accordingly, foot 23 tends to rise with the plunger 18, but plunger 18 is also sliding with foot 23 during this action, and shortly before the top of the stroke is reached, the lower edge of plunger 18 passes over ledge 24 and accordingly the elements are snapped back into the position indicated by Fig. 3, preparatory to the beginning of another stroke.

Pressure is now exerted on operating plunger 18, as by pressing with the thumb on circular ring 19 and its base 19a, the loop in the thread formed on the upward stroke having been securely retained the while by reason of being enclosed in eye 20e by the seating of the end 20d of locking member 20c against hook 20a, element 20c having been carried downwardly in slot 20b by the friction created by the upward passage of the needle through the cloth, and remaining in such position because of the force of gravity since said U-shaped member slides freely in slot 20b of the needle 20 at all times, as has been described heretofore. As the needle progresses downwardly, the action of all elements repeats itself as previously set forth, foot 23 impelling the cloth forward the length of one stitch in its movement across the surface 15, the position of foot 23 now being as indicated by the dotted lines on Fig. 3. The needle now penetrates the cloth auxiliary needle, 20c remaining stationary as this occurs, so as to open the eye 20e and discharge the loop or stitch formed thereby, onto the surface of the cloth, said loop being impaled and held in position by needle 20, which now descends to the limit of its stroke, and upon a reversal of movement, picks up a second loop or stitch which is enclosed in eye 20e by the downward movement of locking member 20c in needle 20, and drawn upwardly through the stitch resting on the cloth. The movement is repeated upon plunger 18 reaching the top of its stroke, the downward movement of said element serving to move the cloth forward, hold it in position, discharge the latest stitch, force the needle through the cloth, pick up a new stitch, and thus continue the sewing operation indefinitely; a chain stitch being produced thereby.

When it is desired to remove the cloth from the machine, auxiliary holding member or foot

30 may be elevated by grasping the foot 23 as by hook 23a and raising this member outwardly (Fig. 5), which causes slots 26 and 27 to so engage wings 28 and 29 as to exert a pressure thereon and thereby cause notch 33 to slip over the lower edge of casing 16 and the entire element 30 to slide upwardly in groove 32, as indicated by the dotted lines in said figure. This raises the wings from the cloth and permits the free removal of said cloth from the machine. When begininng operations, a reversal of the movement just described causes auxiliary foot 30 to snap into normal or working position.

From the foregoing it is apparent that I have disclosed a new and useful fit-in-hand sewing machine. That said device may be operated in entire comfort, since the user may sit in an easy chair and adjust his or her position at will and not be confined to the tedious, cramped position made necessary by conventional sewing machines. It is equally apparent that my device may be cheaply and economically made so as to provide sewing machine facilities to many who are now forced to do without such; that the machine may be carried by travellers and others with ease and economy; and that it may be shipped to all parts of the world at relatively small cost, and when so consigned make possible for the first time, sewing machines in out-of-the-way and even partially civilized countries. By combining simplicity of design with few working parts I have produced a device that requires but little upkeep, is easily and quickly repaired, and thoroughly efficient for all intended purposes.

While I have described in considerable detail herein one form of my invention, I do not intend to limit myself thereby, it being apparent that certain changes, modifications, additions, and even omissions may suggest themselves to one skilled in the art, and this being so I reserve to myself a broad interpretation and proper range of mechanical equivalents in considering the appended claims as applied to my fit-in-hand sewing machine.

I claim:

1. A fit-in-hand sewing machine comprising a support, said support having opposite ends in vertical alignment with each other, a circular housing in the lower of said ends, a needle-receiving hole disposed above and to one side of said housing, a passageway for thread communicating with said hole and housing, a second passageway communicating with said hole; an aperture in the upper of said ends, a plunger slideably mounted in said aperture, said plunger having a circular ring on the upper end thereof, a needle having a hook near one end disposed at the opposite end of said plunger, an inverted U-shaped member slideably mounted with said needle so as to register with said hook and form an eye when in its lower-most position, a primary foot in frictional engagement with said plunger, a flat spring holding said foot in such engagement, and an auxiliary foot interlaced with said primary foot and slideably mounted on the side of said upper end of said support.

2. A fit-in-hand sewing machine comprising a support of generally V-shaped contour, a thread-housing compartment disposed near one end of said support, a needle receiving hole at said end, means providing communication between said compartment and said hole and said hole and the exterior of said end; an aperture in the opposite end of said support, said aperture being in the same vertical plane as said hole, an actuating plunger disposed in said aperture, a needle having a hook near one end thereof joined to said plunger at the lower end thereof, means for closing one side of said hook for the purpose of forming an eye in said needle, a cloth impelling foot having a serrated lower portion, disposed in said aperture in frictional engagement with said plunger, spring means for maintaining said engagement, and a cloth-holding foot slideably anchored to said support and inter-laced with said first-mentioned foot in such a manner that a predetermined upward movement of said foot will raise said cloth-holding foot from its working surface.

3. A fit-in-hand sewing machine comprising a support of generally V-shaped contour, a thread-housing compartment disposed near one end of said support, a needle receiving hole at said end; an aperture in the opposite end of said support, said aperture being in the same vertical plane as said needle receiving hole, an actuating plunger disposed in said aperture, a needle having a hook near one end thereof anchored to said plunger at the lower end thereof, means for closing one side of said hook for the purpose of forming an eye in said needle, a cloth impelling foot having a serrated lower portion, disposed in said aperture in frictional engagement with said plunger, spring means for maintaining said engagement, and a cloth-holding foot slideably mounted to said support and inter-laced with said first-mentioned foot in such a manner that a predetermined downward movement of said foot will bring said cloth-holding foot into tighter gripping relationship with a piece of cloth on the working surface of said machine beneath said second-mentioned foot.

4. A fit-in-hand sewing machine comprising a supporting member having opposite ends in alignment with each other, a thread housing in one of said ends, a needle receiving hole in said end, an aperture formed in the other end of said member and in vertical alignment with said hole, an operating plunger disposed in said aperture, a needle on the lower end of said plunger, a primary foot held in frictional engagement with said plunger in said aperture, and a secondary foot slideably anchored to the side of said second-mentioned end, and disposed in spaced relationship to said primary foot.

5. A fit-in-hand sewing machine comprising a supporting frame, means for housing a spool of thread in said frame, means for receiving and threading a needle above said housing, a needle having a shuttle action disposed in the same vertical plane as said receiving means, above such and in operative relation thereto, means for impelling said needle, a foot in frictional engagement with said impelling means, and a cloth-holding foot in spaced relationship to said first foot.

6. A fit-in-hand sewing machine comprising a supporting member having opposite ends in alignment, a compartment for thread in one of said ends, a needle receiving and thread dispensing opening in said end, an aperture in the other of said ends and in alignment with said opening, an operating plunger slideably disposed in said aperture, a needle having a shuttle-like action anchored to the lower end of said plunger, a primary foot held in engagement with said plunger in said aperture, a flat spring bearing on said foot against the side thereof opposite said aperture, and a secondary foot mounted on the side of said second-mentioned end for the purpose of holding

cloth being sewn, and bearing thereon with increased pressure immediately before the penetration of the needle there-through.

7. A fit-in-hand sewing machine comprising a supporting frame, means for retaining a supply of thread housed within one extremity of the said frame, means for guiding and looping the thread formed in the same extremity, a plunger with a hooked needle mounted on the other extremity of the frame, means to open and close the hook of the said needle mounted on and operating as a part of the needle, a feeding foot frictionally operated by the said plunger, and a stripping foot for holding the cloth during the sewing operation.

8. In a sewing machine, a frame, a reciprocating plunger mounted in one end of the frame, a hooked needle mounted in the end of the plunger, a slideable element mounted on the needle, and adapted to reciprocate to open and close the hook of the needle, and a thread guiding and looping mechanism mounted in the other end of the frame.

THOMAS E. MONROE.