Sept. 9, 1924. 1,507,597

C. H. GREENWOOD

SEWING MACHINE

Filed Feb. 15, 1923 2 Sheets-Sheet 1

Fig. 1

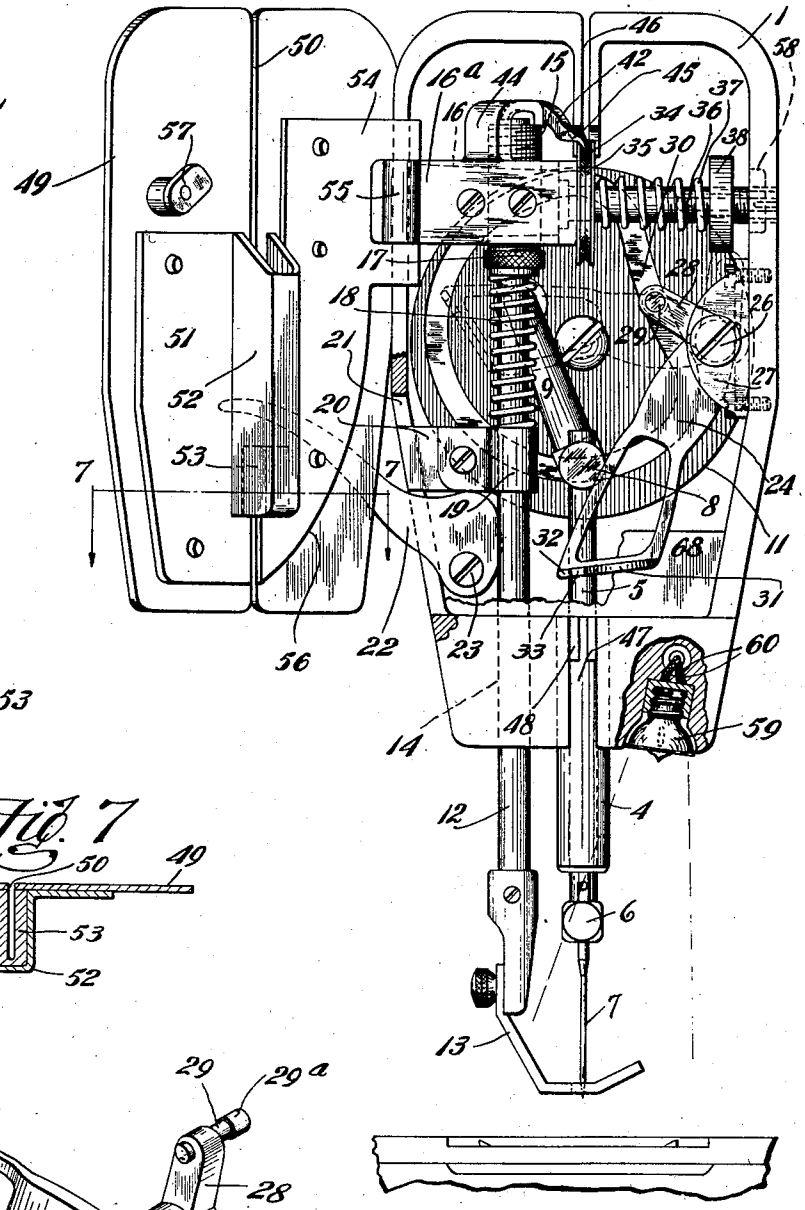


Fig. 8

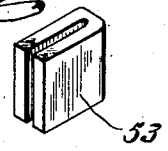


Fig. 7

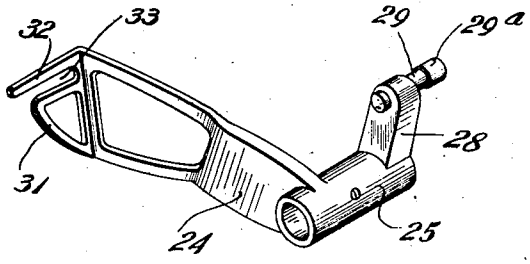


Fig. 6

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Filed Feb. 15, 1923 2 Sheets-Sheet 2

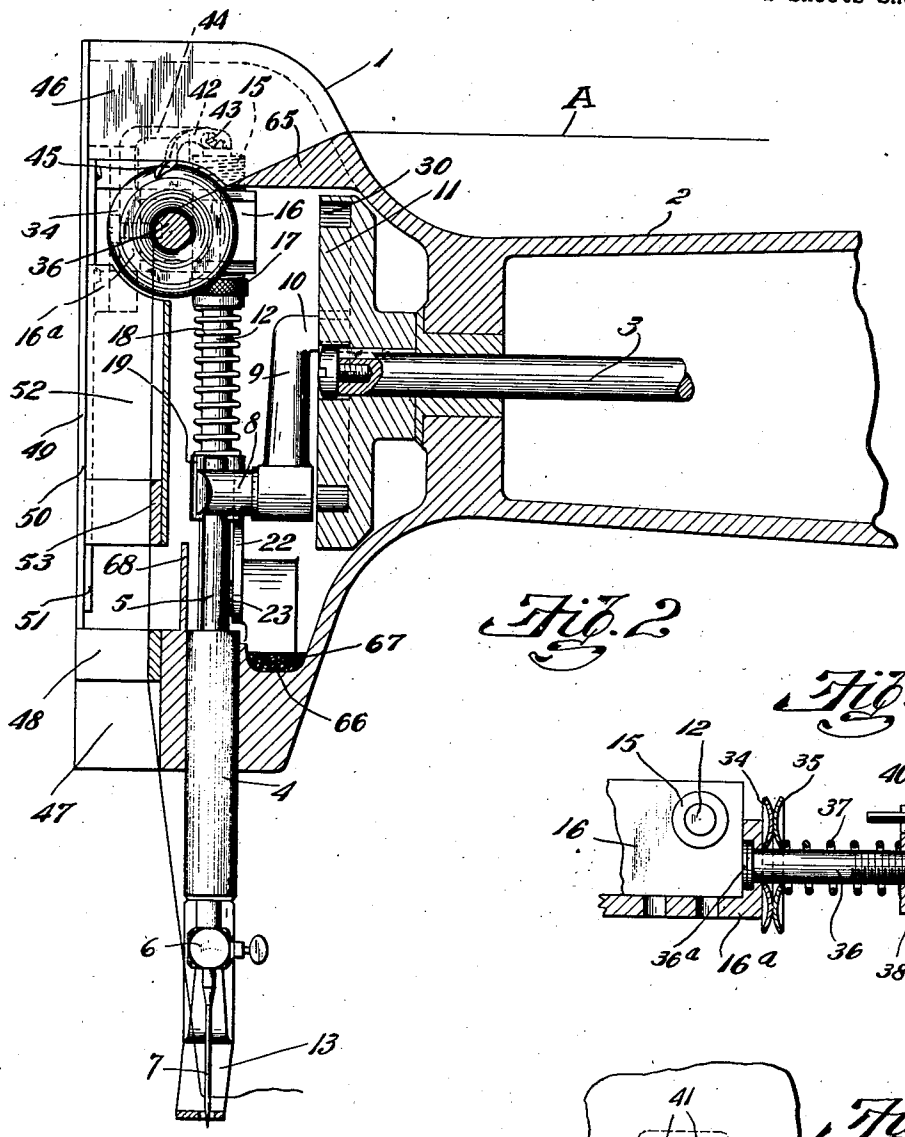


Fig. 2

Fig. 3

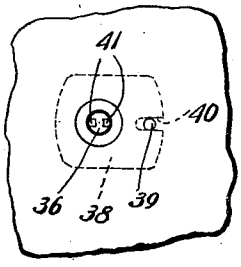


Fig. 5

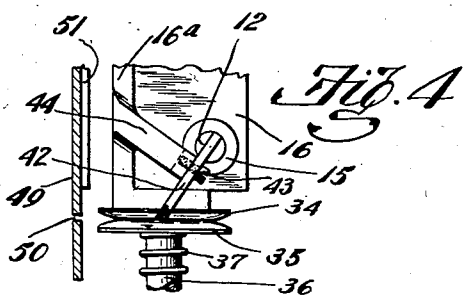


Fig. 4

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Patented Sept. 9, 1924. 1,507,597

UNITED STATES PATENT OFFICE.

CHARLES H. GREENWOOD, OF CANTON, OHIO.

SEWING MACHINE.

Application filed February 15, 1923. Serial No. 619,198.

To all whom it may concern:

Be it known that I, CHARLES H. GREENWOOD, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Sewing Machines, of which the following is a specification.

This invention relates to improvements in sewing machines and more particularly to the family or factory type of sewing machine, and is an improvement upon my former Patent No. 1,145,678 upon sewing machine, patented July 6, 1915.

The objects of the improvement are to provide a sewing machine head arranged to entirely enclose the tension, take-up and thread guides, as well as the upper portions of the needle bar and presser bar, and an electric lamp for illuminating the work, whereby all of these parts will be protected from accident and from disarrangement by children or others who may tamper with the machine in an attempt to readjust the parts, the head being normally closed by a hinged door provided with a lock, thus allowing access to the interior of the head to an authorized person only.

Another object is to locate the tension, take-up and thread guides in such position that the thread may be drawn by a single movement of the hand directly into the tension, take-up mechanism and thread guides, the take-up mechanism being so constructed that it will automatically thread itself regardless of the position of the same when the thread is drawn through the head of the machine.

Other objects of the invention are to provide a tension release automatically operated by the raising of the presser bar; to provide an electric light in the under side of the head in position to direct the light upon the work while the eyes of the operator are shaded from the light, the lamp being thus protected from breaking, and to generally improve and simplify the construction of sewing machines.

The above and ancillary objects may be attained by constructing the machine in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the head of a sewing machine embodying the invention, the hinged door being shown opened and the parts broken away to illustrate the interior of the head;

Fig. 2, a transverse, vertical section through the head;

Fig. 3, a horizontal section through the tension mechanism;

Fig. 4, a top plan view of the tension release;

Fig. 5, a fragmentary elevation of a portion of the head, showing the means for regulating the tension;

Fig. 6, a perspective view of the take-up lever;

Fig. 7, a section on the line 7—7, Fig. 1;

Fig. 8, a detail perspective view of one of the thread guides.

Similar numerals of reference indicate corresponding parts throughout the drawings.

As is well known, the usual family or factory sewing machine comprises a base plate with an arm rising therefrom and terminating in a rectangular head which carries the needle bar, presser foot, thread guides, tension and take-up mechanism, the complimentary stitch forming and feeding mechanism being usually located within or below the base plate.

Since the present improvement relates only to the mechanism carried by the head, only the head of the machine has been illustrated. Referring to the drawings, the head 1 is rectangular in form and is preferably formed integral with the usual arm 2, which encloses the main shaft 3 of the machine.

The needle bar bushing 4 is provided in the lower wall of the head and the needle bar 5 is mounted for vertical reciprocation through said bushing, the lower end thereof carrying the usual needle clamp 6 holding the needle 7.

The upper end of the needle bar 5 is pivotally connected as at 8 to the link 9, provided at its other end with the wrist pin 10 pivotally connected to the cam disk 11, which is mounted upon the main shaft 3 of the machine.

The presser bar 12 carries the usual presser foot 13 at its lower end, and is mounted for vertical reciprocation through the lower end of the head as at 14, the upper end of the presser bar being mounted for slidable movement within the bushing 15, which is provided with external threads by means

of which the same may be adjusted vertically to adjust the tension upon the presser foot within the lug 16 formed in the upper portion of the head.

The lower end of the bushing 15 may be provided with a knurled head 17 to facilitate turning of the bushing, and a coil spring 18 is located around the presser bar between the bushing and the collar 19. A flange 20 extends outward from the collar 19 into the vertical slot 21 formed in the side of the head and the usual cam lever 22 is pivoted as at 23 within the head and extends through the slot 21, engaging the flange 20 to raise and lower the presser foot.

The take-up lever 24 is provided with the bearing portion 25 mounted for oscillation upon the journal 26 which is carried by the bracket 27 fixed to one side of the head. A rocker arm 28 is fixed upon the bearing portion 25 and provided with a pin 29 and roller 29ª extended into the cam slot 30 of the disk 11.

The free end of the take-up lever is provided with a substantially triangular, outturned portion 31, the finger 32 being spaced from one side thereof, forming a slot 33 between these two parts. It should be noted that the finger 32 extends outward beyond the end of the triangular portion 31.

The tension device, which may be the usual pair of disks 34 and 35, is preferably mounted upon the screw threaded pin 36, secured in the head as best shown in Fig. 3, between one outer wall of the head and the plate 16ª, which is connected to the lug 16 which carries the presser bar bushing 15. A spring washer 36ª is interposed between the end of the pin 36 and the lug 16 to hold the pin in adjusted position.

The disk 35 may be yieldingly pressed against the disk 34 in the usual manner, by a helical spring 37 surrounding the pin 36 and its tension regulated by the slotted nut 38, a fixed stud 39 being carried in the side wall of the head and extending through the slot 40 of the nut. The outer end of the pin 36 is notched as at 41 to receive a special key for rotating the pin when it is desired to adjust the tension.

The tension release comprises the bent lever 42 pivoted as at 43 upon a bracket arm 44 formed upon the plate 16ª. One extermity of the lever 42 is provided with the curved, tapered end 45 extended between the disks 34 and 35 and the other end thereof is located in the path of the presser bar 12 and arranged to be operated when the presser bar is raised to its highest point, projecting the pointed exteremity 45 of the lever downward between the disks and slightly separating the same, releasing the tension.

The upper end of the head is provided with the vertical slot 46 in alignment with the meeting faces of the disks 34 and 35, a similar slot 47 being provided in the lower end of the head and in alignment with the upper slot 46, a thread guide 48 being mounted in the lower slot.

The open outer side of the head is normally closed by the hinged cover 49 provided with the vertical slot 50 which is located in the same vertical plane as the slots 46 and 47 of the head when the cover is in the closed position.

A plate 51 is mounted upon the inner face of the cover and provided with the inwardly extending, U-shaped portion 52 in which is mounted a thread guide 53 and with the hinge portion 54 which cooperates with the hinge portion 55 of the plate 16ª.

The plate 51 is provided with the arcuate edge 56 around which the extremity of the finger 32 travels as the take-up lever is operated, thus preventing the thread from slipping out of the slot 33 in the take-up lever and over the finger 32 thereof.

A suitable lock as shown at 57, is carried by the hinged door and arranged to engage a groove 58 in the adjusted side wall of the head, a special key preferably the same as used for adjusting the tension, being provided for operating this lock in order that the head may be normally closed, enclosing the parts therein and protecting the same from injury and also preventing children or inexperienced operators from having access to the working parts of the head and tampering with the same.

For the purpose of providing a suitable light for the operator of the machine, an electric lamp 59 is mounted within the lower end of the head in a position to direct the rays of light downward upon the work as it passes beneath the needle, while at the same time, protecting the eyes of the operator from the light, and being enclosed, is itself protected from injury. The wires 60 connected to the lamp may be extended through the head and the arm 2 and connected to any suitable source of electric energy.

In operation, the thread is led from the spool, which may be located as usual, upon the top of the sewing machine arm to the slot 46 in the upper end of the head and is then drawn directly downward into the slot 50 of the hinged cover and backward within the slot 47 in the lower end of the head, drawing the thread A, as shown in Fig. 2, into the tension device and into the thread guides 48 and 53, locating the thread in position to be engaged by the slot 33 of the take-up lever, as the same is moved into the position shown in Fig. 1, the inclined edge of the triangular portion 31 thereof guiding the thread into the slot 33, while the elongated finger 32 engaging the arcuate edge of the plate 51, prevents the thread

from being pulled over the outer side of the finger 32. The end of the thread is then passed through the eye of the needle and the machine is ready to be operated for sewing.

The present take-up mechanism is equally adapted for either the round bobbin or the long shuttle construction. For a great many reasons, the round bobbin is considered superior to the long shuttle, as it runs smoother, faster and more quietly than the long shuttle. However, there are two disadvantages to the round bobbin, the needle is frequently accidentally unthreaded in starting the machine again after work has been removed, therefrom. This is caused by the operator cutting the thread too short and as the needle starts to descend the end of the thread is pulled from the eye of the needle.

The improved take-up forming a part of this invention, overcomes these two difficulties as by giving off and taking up thread just as it is needed, the needle is not accidentally unthreaded and the thread is not given out fast enough to allow it to become loose and twisted to clog the shuttle race.

It is natural and customary for the operator in taking work out of the machine to watch the needle and to remove the work when the needle is at its highest point. With the present construction, the operator may remove the work in this manner without any danger of unthreading the needle when the machine is started again.

The cam is so shaped that the take-up lever does not start to pull the thread up until the needle eye is out of the cloth, but it acts so quickly that the take-up is at its highest point when the needle reaches the highest point.

Owing to the fact that in my improved machine, the tension is located closer to the stitch than in the usual machine, the thread passes in substantially a straight line from the tension to the eye of the needle and is frictionally engaged only by the take-up lever, between these points, it has been found by experience that a much wider range of work is possible with a given adjustment of the tension than can be obtained with the usual construction of sewing machine. It is further pointed out that owing to this reduction of friction upon the thread, very heavy material may be sewed with a comparatively light tension.

Attention is called to the fact that the thread, as it passes through the head is protected from oil which may be splashed from the cam disk 11 or the parts associated therewith. The upper partition wall 65 extends over the disk and protects the thread between the point where it enters the head and the point where it enters the tension device while the U-shaped portion 52, of the hinged cover protects the thread as it passes vertically through the head.

A well 66 is provided in the bottom of the head, beneath the cam disk and link, to receive any oil which may be splashed from said parts, preventing the oil from passing down along the needle bar or presser foot bar, and damaging the work. A piece of felt or the like, as shown at 67, may be placed in the well to absorb the oil and prevent the same from running out of the well when the head is tilted, this being an especially desirable feature in the drop head machine.

A partition wall 68 extends up from the bottom of the head, between the cam disk and link, on one side, and the thread where it passes down beneath the U-shaped plate of the cover, preventing oil from splashing upon the thread at this point and also obviating the possibility of oil passing down through the slot and on to the work.

I claim:—

1. In a sewing machine, a head provided with a vertical slot through one side thereof, a tension device and thread guides within the head and aligned with the slot and a take-up lever within the head provided with means for automatically engaging a thread drawn through the slot.

2. In a sewing machine, a head provided with a vertical slot through one side thereof, a tension device and thread guides within the head and aligned with the slot, a reciprocating needle bar mounted in the head, a take-up lever within the head and means for operating the take-up lever to cause it to start its upward movement as soon as the eye of the needle is out of the work and to move the take-up lever to its highest position when the needle reaches its highest position.

3. In a sewing machine, a head provided with a vertical slot through one side thereof, a tension device and thread guides within the head and aligned with the slot, a reciprocating needle bar mounted in the head, a take-up lever within the head, and a cam for operating the take-up lever to cause it to start its upward movement after the needle is out of the work and to move it to its highest position as the needle reaches its highest position.

4. In a sewing machine, a head provided with a slot through one side thereof through which the thread is arranged to be drawn and a take-up lever mounted within the head and provided with an inturned inclined slotted portion arranged to automatically engage the thread which is drawn through the slot and means for moving the take-up lever across the path of the thread.

5. In a sewing machine, a head provided with a slot through one side thereof through which the thread is arranged to be drawn, and a take-up lever mounted within the head

and provided with a slotted portion arranged to automatically engage the thread which is drawn through the slot and means for moving the take-up lever across the path of the thread.

6. In a sewing machine, a head provided with a slot through one side thereof through which the thread is arranged to be drawn, and a take-up lever mounted within the head and provided with an inturned portion arranged to automatically engage the thread which is drawn through the slot and means for moving the take-up lever across the path of the thread.

7. In a sewing machine, a head provided with a slot through one side thereof through which the thread is arranged to be drawn, a tension device within the head in line with the slot, and a take-up lever within the head provided with thread engaging means, and means for moving the take-up lever to cause the same to cross the path of the thread.

8. In a sewing machine, a head provided with a tension device located within the head and including a rotatable pin having a threaded portion, a pair of disks mounted upon the pin, a nut mounted upon the threaded portion of the pin, means for holding the nut against rotation, and means for rotating the pin.

9. In a sewing machine, a head provided with a tension device located within the head and including a rotatable pin having a threaded portion, a pair of disks mounted upon the pin, a nut mounted upon the threaded portion of the pin, means for holding the nut against rotation, and means for rotating the pin from the outside of the head.

10. In a sewing machine, a head provided with a tension device located within the head and including a rotatable pin having a threaded portion, a pair of disks mounted upon the pin, a nut mounted upon the threaded portion of the pin, the nut being provided with a groove, a stationary stud engaging the groove in the nut and preventing rotation thereof, and means for rotating the pin.

11. In a sewing machine, a head provided with a tension device located within the head and including a rotatable pin having a threaded portion, a pair of disks mounted upon the pin, a nut mounted upon the threaded portion of the pin, the nut being provided with a groove, a stationary stud engaging the groove in the nut and preventing rotation thereof, and means for rotating the pin from the outside of the head.

12. In a sewing machine, a head provided with a tension device located within the head and including a pin having a threaded portion, a pair of disks mounted upon the pin, a nut mounted upon the threaded portion of the pin, a spring interposed between the nut and the adjacent disk and means for adjusting the nut from the outside of the head.

13. In a sewing machine, a head provided with a tension device located within the head and including a tension member, a pin provided with a threaded portion, a nut mounted upon the threaded portion of the pin and operatively engaging the tension member and means for adjusting the nut from the outside of the head.

14. In a sewing machine, a head provided with a tension device located within the head and including a tension member, a threaded pin for adjusting the tension member and means for adjusting the threaded pin from the outside of the head.

15. In a sewing machine, a head open at one side, a hinged cover for said opening provided with a slot through which the thread is arranged to be drawn, a take-up lever mounted within the head and provided with an inturned, thread engaging finger, and an arcuate shoulder upon the inner face of the door arranged to be engaged by said finger to prevent the thead from being displaced from the take-up lever.

16. In a sewing machine, a head provided with a slot in one side through which the thread is arranged to be drawn, a needle bar mounted for reciprocation in the head, a take-up lever mounted within the head, means within the head for operating the needle bar and take-up lever, a partition wall within the head between the operating mechanism and the thread to prevent oil from the mechanism from splashing upon the thread.

In testimony that I claim the above, I have hereunto subscribed my name.

CHARLES H. GREENWOOD.