A. L. MADISON.

SEWING MACHINE.

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944,740.

Patented Dec. 28, 1909.

Fig. 1.

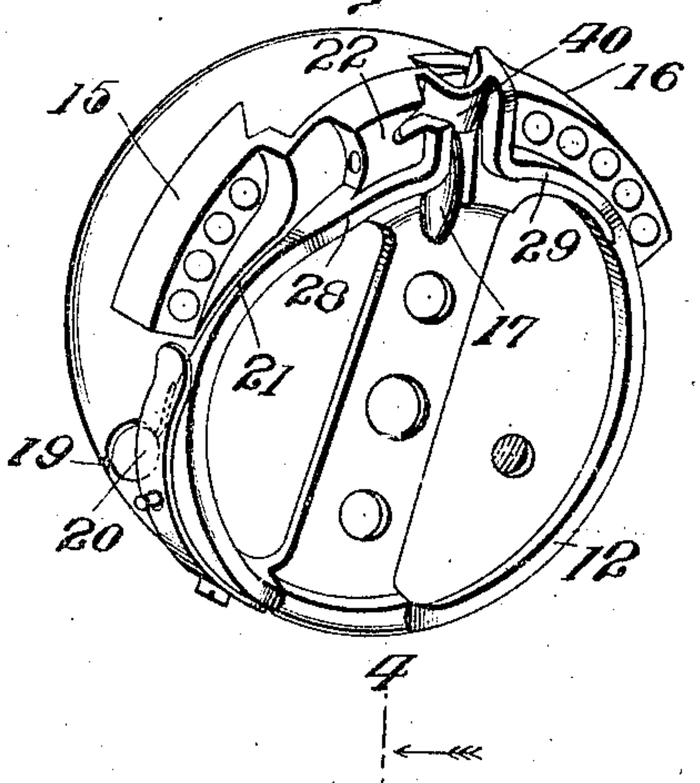


Fig. 2.

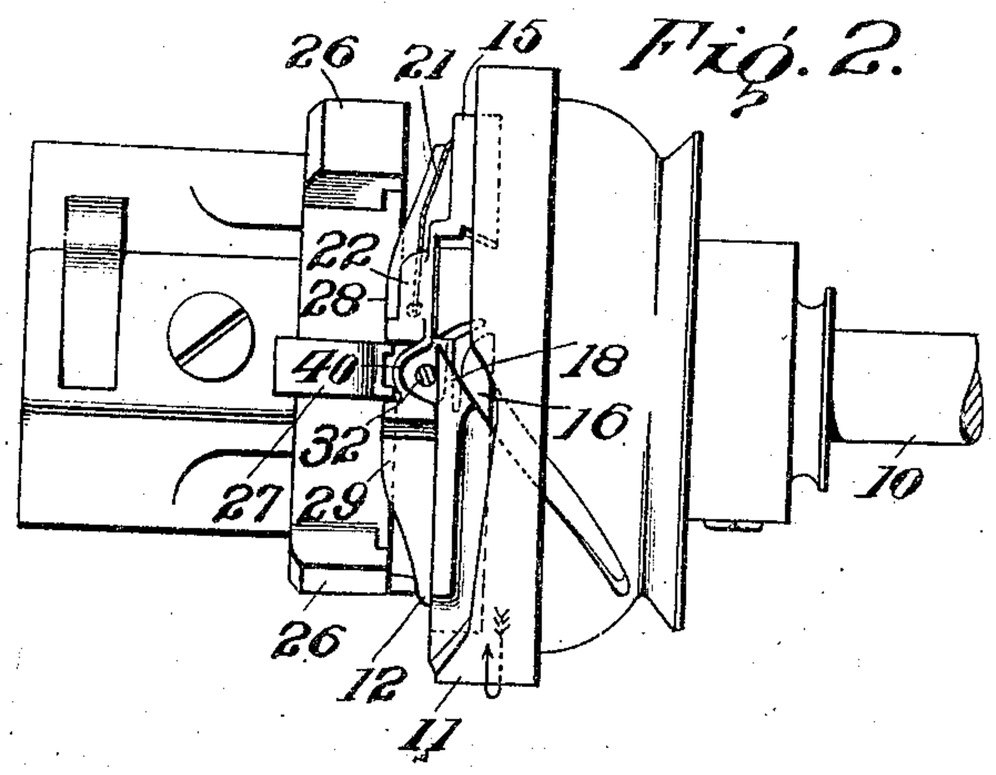


Fig. 3.

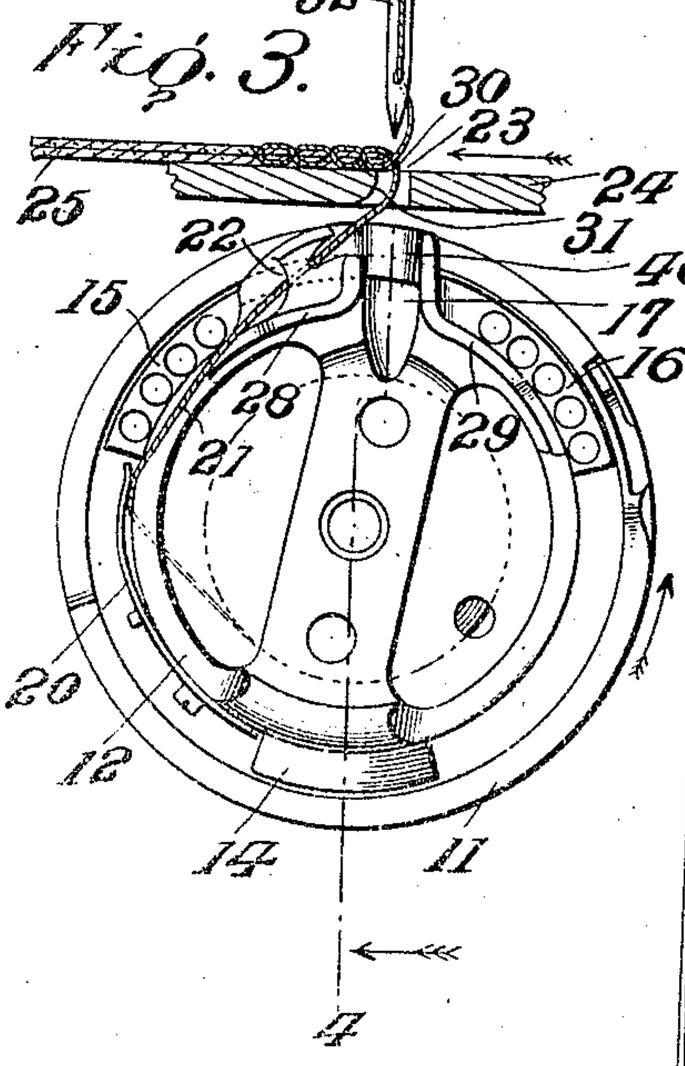
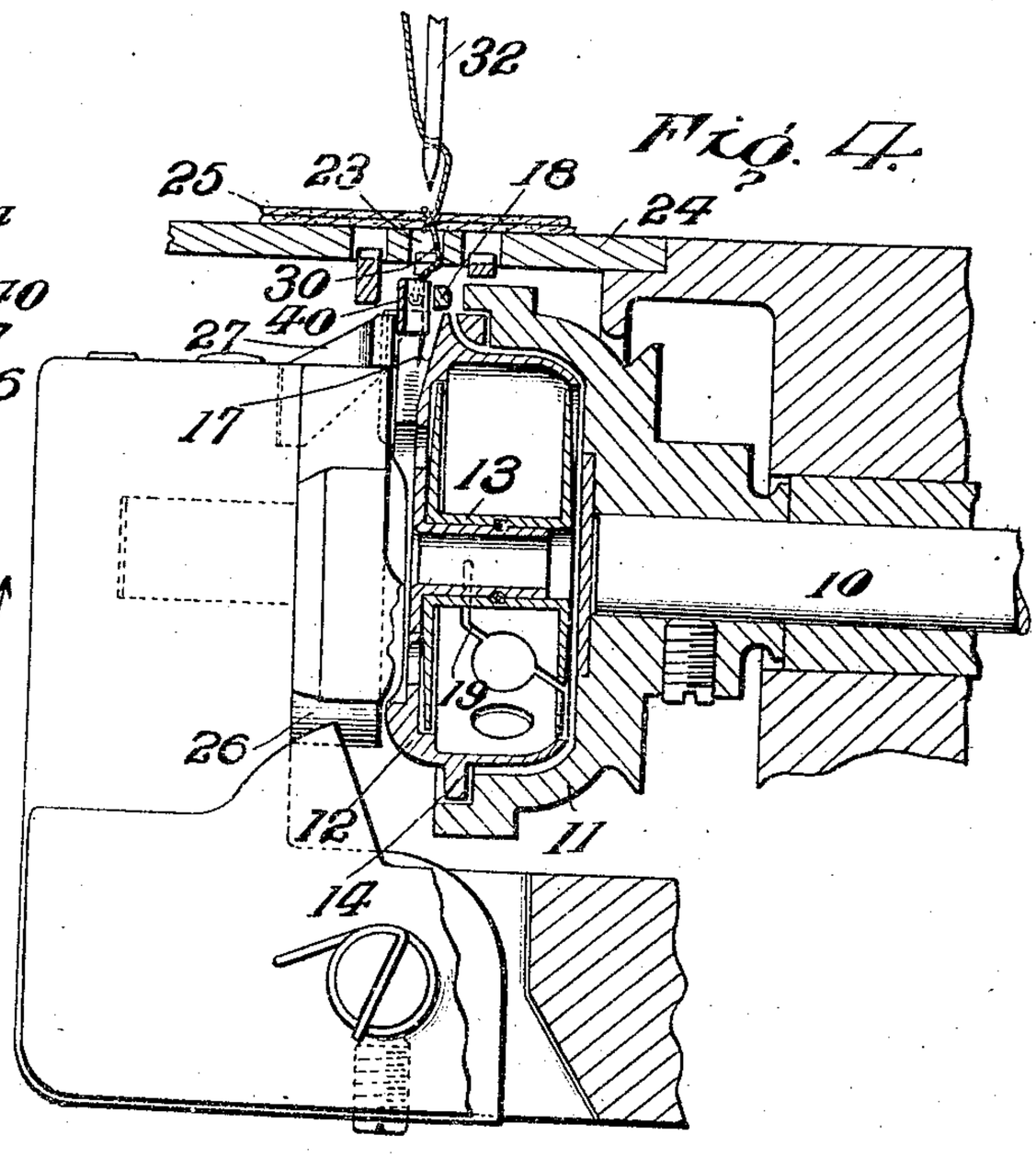


Fig. 4.



Witnesses.

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SEWING-MACHINE.

944,740. Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed December 1, 1905. Serial No. 289,808.

To all whom it may concern:

Be it known that I, ALFRED L. MADISON, a resident of Brooklyn, New York, have invented a new and useful Improvement in Sewing-Machines, which invention is fully set forth in the following specification.

My invention consists of improvements in lock-stitch sewing machines of the continuously revolving hook-type, whereby I prevent that portion of the lower or bobbin thread extending from the bobbin case to the goods from assuming a position in the path of the point of the rotating hook or in the path of the descending needle, as engagement of this thread by the hook or its impalement on the point of the needle both result in cutting or breaking the thread. In the ordinary running of such machines, this portion of the bobbin-thread is held taut and cannot assume such objectionable positions. But when the machine is caused to perform operations such as "tacking" or "chaining off" (more fully explained hereinafter) there is a slackening of the lower thread tending to cause the portion thereof extending from the bobbin-case to the work to assume the objectionable position above mentioned. By my invention I obviate the difficulty by providing special means which prevent the slackened thread from assuming the objectionable position. These means may be most conveniently explained in conjunction with the accompanying drawings, in which—

Figure 1 is a perspective view of a bobbin-case embodying the invention; Fig. 2 is a plan view showing a portion of a rotary hook, the bobbin-case and a portion of the bobbin-case hanger, all in operative relation; Fig. 3 shows the work-plate and the work in vertical section longitudinal to the line of feed, and the bobbin case and hook in elevation from the left in Figs. 2 and 4, the parts thus shown being in relative operative positions; and Fig. 4 is a vertical sectional view on line 4, Fig. 3, showing also the bobbin-case hanger in elevation.

Except for the means constituting my invention, the parts shown in the drawings are substantially the same as the corresponding parts of U. S. patent to Stockton Borton, No. 572,090, dated Nov. 24, 1906, to which reference may be made for a detailed description thereof.

10 (Fig. 4) is the hook-shaft which in the type of machine illustrated is organized to receive three revolutions to every one of the main shaft; consequently the rotary cup-shaped hook 11, fixed on the end of the shaft, makes three revolutions for every complete reciprocation of the needle. But the present invention is not limited to machines having these characteristics. The interior of the hook is made slightly larger than the stationary or non-rotatable bobbin-case 12, which contains bobbin 13, so as to afford room for the passage between the case and hook of the loop formed in the needle thread by the action of the hook in making each stitch, it being understood that in a machine in which the hook makes, for example, three revolutions to one reciprocation of the needle, this action of the hook in forming a loop takes place during only one of its revolutions, the hook being out of engagement with the needle thread during its other two revolutions. The rim of the bobbin case 12 is not continuous but is cut away, as best shown in Fig. 3, leaving three segments, 14, 15 and 16. The cut or notch 17 in front of one end of segment 16 is the passage or recess into which the needle descends; this notch is made sufficiently deep to afford ample room for the loop of the needle thread to spread out and be engaged by the point 18 of the hook. The bobbin thread is led from the bobbin through the end of a cut 19 (Fig. 4) in the bobbin case directly under the tension-spring 20, thence in a thread groove 21 along the base of segment 15, through a thread eye or guide 22 and thence upward from the bobbin-case in an oblique direction (opposite to that of the rotation of the hook) through the needle hole 23 in work plate 24 to the work or goods 25, the latter being represented in the drawing as two pieces of fabric to be sewed together.

26 is a disk-shaped bobbin-case hanger having on its upper edge a projection or stop 27. For suspending the bobbin-case from the hanger when its weight is not sustained by the bobbin-thread, said case has on its face flanges 28 and 29 at opposite sides of notch 17, respectively, providing curved shoulders which overlie and rest loosely upon the curved edge of the disk-shaped hanger, as clearly shown in Fig. 2.

A brief reference to the operation will, however, further facilitate an understanding

of the present invention. In the normal position of the parts for stitching, the lower thread 30 extends from thread-eye 22 upward at an angle toward the front of the machine, past the rear curved side 31 of the needle-hole 23, to the goods, as clearly shown in Fig. 3. When the feed devices or surfaces (not shown) advance the work in the direction of the arrow, Fig. 3, and also slightly lift it, thread 30 is pulled tightly around the curved edge 31 of the needle hole, and a certain amount of additional thread required for one stitch is pulled off the bobbin. In this position of the parts the lower thread is held taut by the tension spring 20, and the needle descending, the needle thread is looped around the bobbin-case by the action of the hook and pulled up against this lower bobbin thread, thus locking the stitch to the work. From the relation of the parts here explained, it will be apparent that with the lower thread thus tightly drawn against the back or surface 31 of the needle hole, there is no danger of its being caught either by the point 18 of hook 11, which passes it at one side, or by the needle 32 which descends in front of it. But it has been found that there is such danger when the work is manipulated to perform operations known as "tacking" and "chaining off" or the work for other reason pulled out of its normal position while the machine is stitching. "Tacking" is performed as follows: In running a lock-stitch seam off the edge of two or more superimposed pieces of fabric, it is found that the stitches at the extreme edge are not sufficiently secure to bind or hold the fabrics together and consequently in handling and use the connection at this point quickly becomes loose, leaving the pieces of fabric insecurely connected or practically disconnected for short distance at the end of the seam. The same difficulty is experienced where it is desired to stop the seam in the middle of two pieces of goods which it is desired to securely fasten together up to the very end of the seam. To overcome this objection it is customary for operatives to move the work back and forth, either in line with the seam or otherwise, so as to form a succession or cluster of stitches, either over the edge or within the body of the goods, and either superimposed or side by side. This operation is called "tacking". Difficulty is frequently experienced in performing this operation in machines heretofore used for the reason that the extraordinary movements given the goods, back and forth or sidewise, produce slack in the bobbin thread, particularly between the bobbin-case and goods, and tend to throw this slack thread in the path of the point 18 of the hook, which catches and breaks or cuts the thread, or in the path of the needle which impales the thread with resultant breakage. Such breaking of the thread of course interrupts and frequently interferes with the perfect operation of the entire stitch-forming mechanism, particularly necessitating rethreading of the bobbin-case, and sometimes rethreading of the needle.

In Figs. 3 and 4 the last stitch formed is over the edge of the two pieces of fabric, and the needle being elevated, it may be assumed that the operative is moving the goods in the direction opposite that in which the arrow points, and consequently opposite that in which the goods are normally fed. Instead of leaving the bobbin or lower thread 30 stretched taut around the curved edge 31 of needle opening 23, and consequently where it cannot assume a position in the path of the hook or the descending needle, which are the conditions in the normal operation of the machine, as already explained, this reverse movement of the goods slackens the lower thread by the amount which was bent around the curved edge 31 of opening 23 in feeding for the last preceding stitch. As already stated, it is possible, and frequently happens in machines not embodying my present invention, that this slacked thread, illustrated in Figs. 3 and 4, thus produced by abnormal movement of the work, will deflect or depend toward and into the path of the point of the hook and be cut by the latter, or be carried under the point of the needle and impaled thereon. There is a similar slackening of the under thread with like danger and results, in the operation of "chaining off", which operation consists in causing or permitting the sewing mechanism to form the thread into a succession of stitches after the work or goods have passed beyond the needle. This slackening of the thread may also occur in other manipulations of the work which need not here be detailed. According to the present invention, the slackened lower thread in such abnormal operations is prevented from assuming either of the injurious and objectionable positions mentioned by providing, between the thread-eye 22 of the bobbin-case, on the one hand, and the paths of the hook and descending needle, on the other hand, a guard or shield which prevents the slack thread from being carried into or holds it out of said path. As shown in the drawing, and in the preferred embodiment of the invention, this guard consists of a thin plate 40, carried by the bobbin-case and curving in approximately a semi-circle from the upper end of flange 29, across the upper end of notch or needle passage 17 to the back of thread eye 22, as clearly shown in Figs. 1, 2 and 3. This plate may be soldered or welded to, or formed integral with, the parts to which it is joined. The upper edge of the guard is as high, preferably higher (as clearly shown in Fig. 4), than the highest

point of the path of the point 18 of the hook, and the thread-eye 22 is so constructed and positioned that the upper or exit end of its opening is below the upper edge of the guard. When the thread is slackened, as heretofore explained, between the exit end of the thread-eye and its point of connection to the work, it bears intermediate of these points against the upper edge of the guard and is thereby held, spread or deflected away from the path of the hook-point so that it cannot possibly come in contact with the hook point as the latter passes. By carrying or bridging the guard partially around the path of the needle across and above the upper end of notch 17, the slackened thread is also deflected away from and cannot be carried into the needle path, and consequently the danger of its being impaled on the point of the needle is entirely obviated.

The invention is clearly not limited to the particular embodiment described and illustrated.

What is claimed is:

1. In a lock-stitch sewing machine, the combination of a rotary hook, a coöperating needle, a stationary bobbin case having at one side thereof at its outer edge a passage into which the needle descends, a guard on the bobbin case bridging across said needle passage, and a thread-eye or guide on the bobbin case having its exit end below the upper edge of said guard whereby the bobbin thread extends upward to the work past said guard.

2. In a lock-stitch sewing machine, the combination of a rotary hook, a coöperating needle, a stationary bobbin case having at one side thereof at its outer edge a passage into which the needle descends, a guard consisting of a plate or wall bowed or curved outward around the passage into which the needle descends and joining the bobbin case at its opposite ends, and a thread-eye or guide on the bobbin case having its exit end below the upper edge of said guard whereby the bobbin thread extends upward past said guard to the work.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALFRED L. MADISON.

Witnesses:
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