(No Model.) 4 Sheets—Sheet 1.

W. WEBSTER.

OVEREDGE SEWING MACHINE.

No. 346,248. Patented July 27, 1886.

Fig. 1.

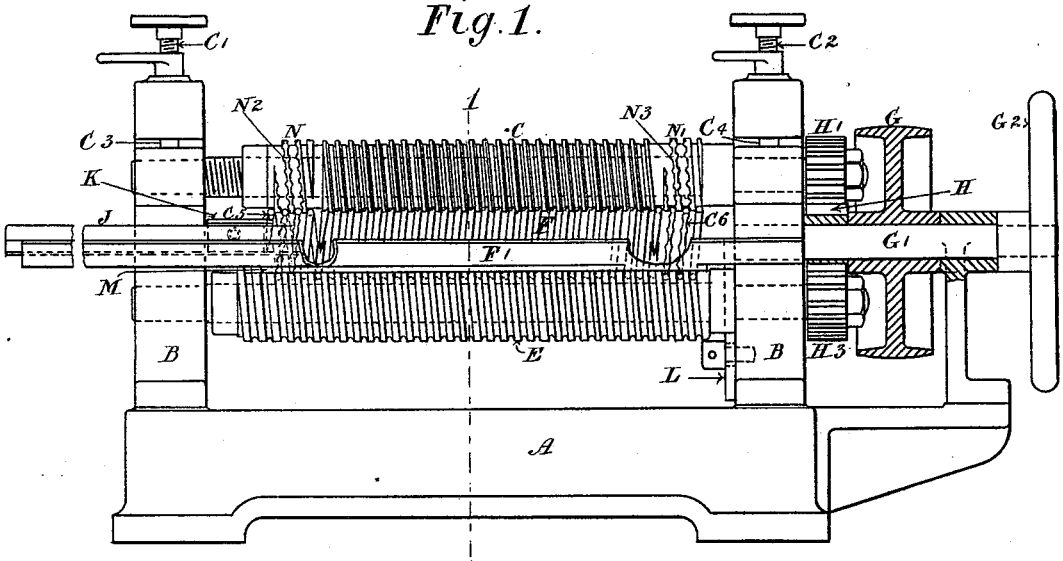

Fig. 2.

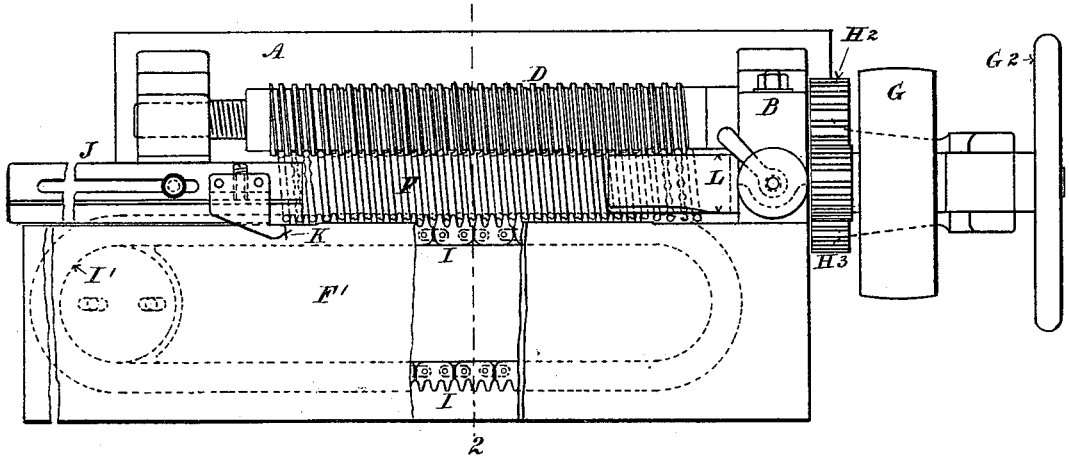

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Fig. 3.

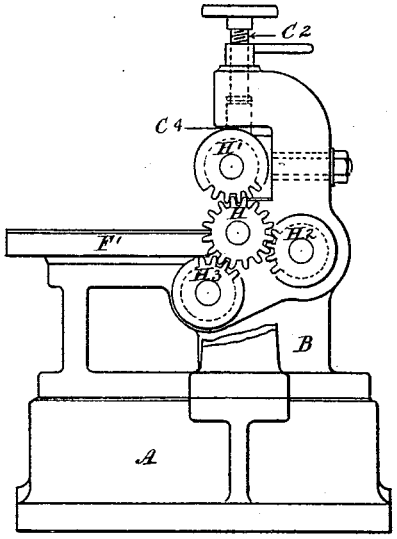

Fig. 4.

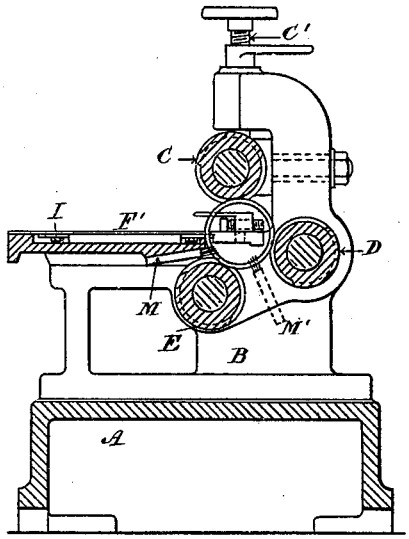

Fig. 5.

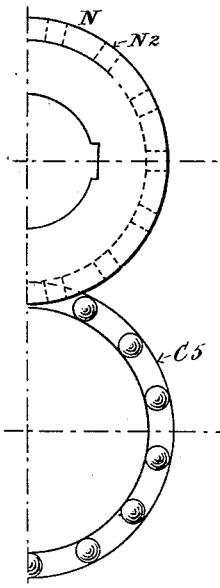

Fig. 6.

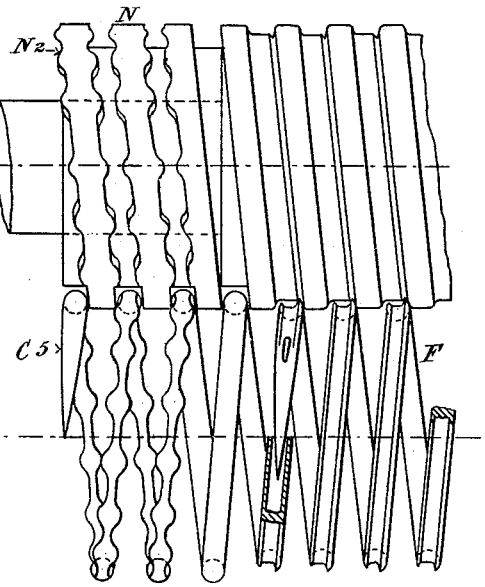

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Fig. 7.

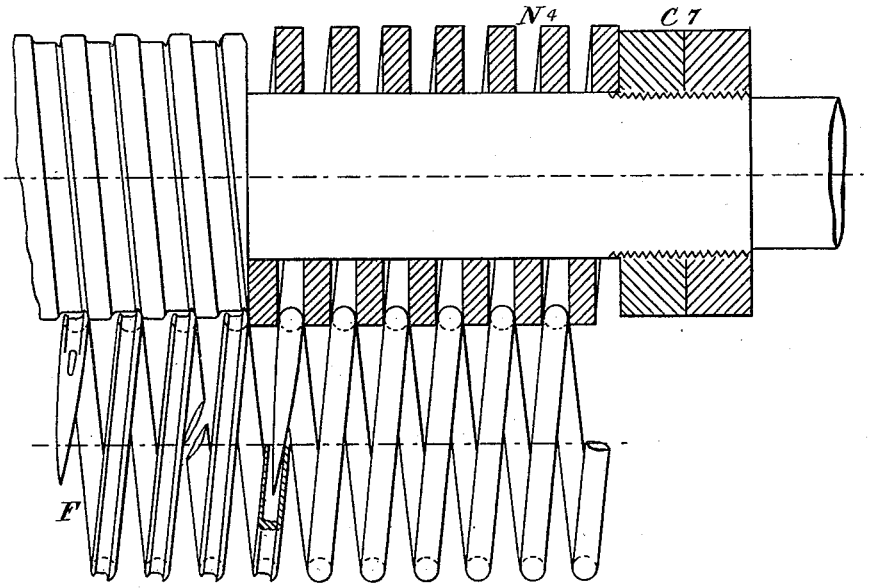

Fig. 8.

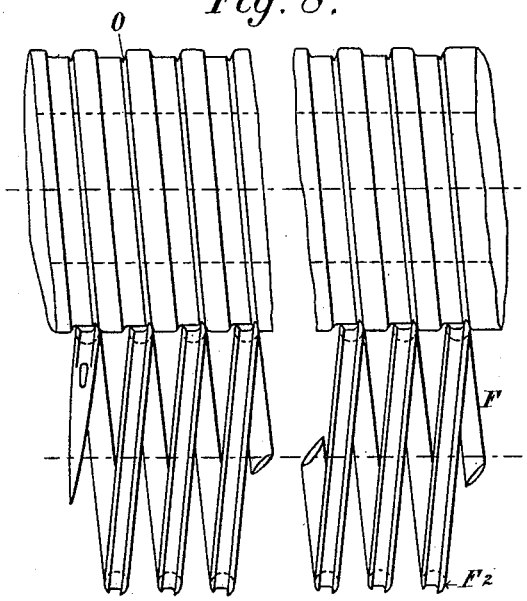

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Fig. 9.

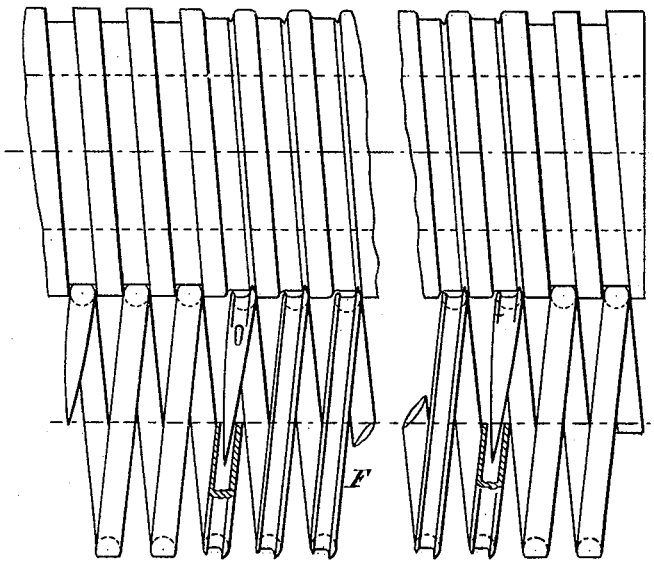


Fig. 10.

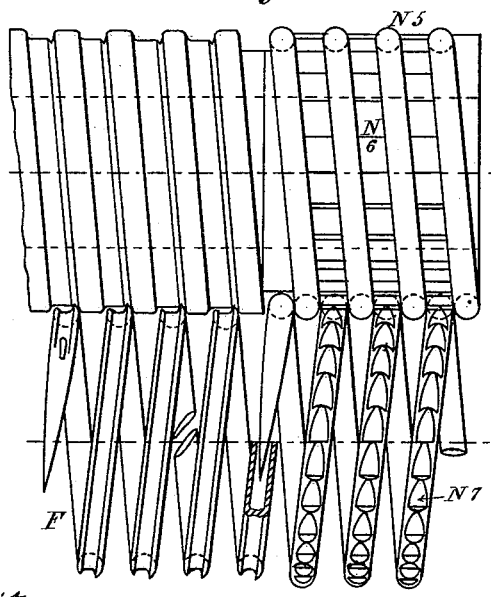
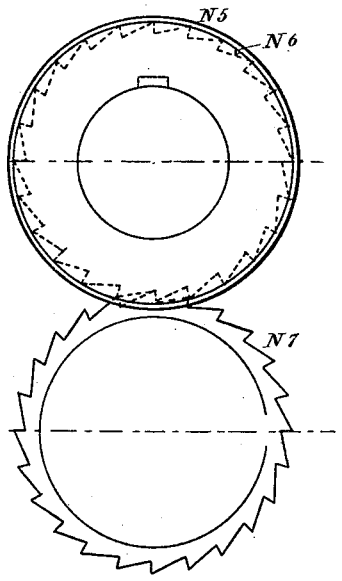


Fig. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM WEBSTER, OF ARMLEY, LEEDS, COUNTY OF YORK, ENGLAND.

OVER-EDGE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,248, dated July 27, 1886.

Application filed October 14, 1885. Serial No. 179,891. (No model.) Patented in England October 2, 1885, No. 11,768; in Germany October 13, 1885, No. 35,820, and in India February 26, 1886, No. 145.

To all whom it may concern:

Be it known that I, WILLIAM WEBSTER, a subject of the Queen of Great Britain and Ireland, residing at Armley, Leeds, in the county of York, Kingdom of Great Britain and Ireland, have invented new and useful Improvements in Over-Edge Sewing-Machines, (for which I have received patents in the following countries—viz., Great Britain October 2, 1885, No. 11,768; in Germany October 13, 1885, No. 35,820, and in India February 26, 1886, No. 145,) of which the following is a specification.

This invention relates to that class of over-edge sewing-machines wherein there is used a spiral needle, whereby, when in operation, a continuous feed is imparted to the article or material under treatment. The spiral needle is in outline approximately cylindrical—that is to say, it is not of tapering form. It is grooved on the periphery of the series of coils for the reception of a double thread or twine, and is of such length that it will contain a sufficient quantity of thread or twine for sewing the side of a sack or other article to be sewed. The said spiral needle is mounted between three rollers, which may have spiral grooves on their peripheries, so as to form screws of the same pitch as the spiral needle. In some cases I make these rollers or screws of metal, and in others I construct one, two, or all three of leather, paper, or other suitable material of an elastic nature. They may either be all plain, or all or part of them may be formed with spiral grooves. These rollers or screws are mounted in suitable standards—that one situated above the needle having movable bearings with springs, so as to yield to contraction or expansion of the spiral needle, to which it is liable during sewing. On one of the above-named rollers and at one or both ends I provide a driver or drivers of any suitable construction to suit the kind of material under treatment. When the material is very light, I use a simple helically-coiled needle, and slightly enlarge one or both ends of the rollers, or make the screw-thread shallower at such part or parts where the rollers act on the front or rear coils of the said needle, so that by slightly compressing it they obtain a sufficient grip thereon for propelling it through the work. I sometimes make such enlarged parts of the screwed rollers in short sections, which may be readily changed, as may be required. I also make one such roller with a sectional part or parts, that may be at one or both ends of the roller, such sectional part or parts having on one or both sides of the threads thereof projections taking into undulating parts on the sides of the coils of the needle or into undulating parts of short sections of the needle, and against projections thereon, (say, for about two coils,) which, on motion being imparted to the rollers, will cause the needle or its sectional part or parts to rotate. This is a positive driving medium, which I find is required when sewing very heavy material. When sectional parts of the needle are used, the front or leading part pierces the material. The next part of the needle, carrying the thread or twine, passes into the said piercings more easily than if it had to make its own perforations. I also use a driver consisting of a helical coil of rectangular section, and of which there may also be one at one end only, or one at each end of the driving-rollers. These just-mentioned coil or coils is or are capable of being compressed endwise upon the axis of the roller or rollers, (as the case may be,) so as to grip the needle or its sections by the sides, and so propel it or them. In some cases, and when a simple needle only is used, I drive it by the rollers or screws, these being suitably formed for gripping the needle by the bead on that side of the groove farthest away from the point, which bead (owing to the groove in the periphery of the needle being nearest the leading-in side of the needle) is higher or somewhat larger than the opposite bead, so that the needle is driven by the bead alone; and in order to obtain a superior grip on the needle, and to prevent its moving endwise in either direction, I arrange the axes of the rollers or screws in such wise that they converge either toward one end or the other, so that their lines of contact with the needle are slightly conical. I also, for some purposes, make a few coils of the needle, or the coils of its end sections, somewhat larger in diameter than the part having the groove

therein, and drive it by such enlarged parts, which may either be round or slightly flat on their periphery, the bead on the central part of the needle taking into grooves in the rollers, which at all times prevent the needle from oscillating; or, in other words, having an endwise to and fro movement. Another form of driver which has a positive action comprises teeth or serrations on the periphery of a roller or a section thereof, taking into corresponding serrations or teeth on the periphery of the needle or a section thereof. In all cases where the needle is in sectional parts the continuity of the helix is maintained by pointing the end of one part and drilling up the end of the other, so that the point of one part takes into the drilled hole of the other part. The needle, besides being grooved on its periphery for the reception of a double thread, as previously mentioned, is also provided with an eye for receiving the thread. A loop formed by folding the thread is pressed therein by any suitable instrument previous to commencing work. At a convenient part of the needle I remove a portion of the lowest bead in order to form what I will call a "cast-off." This is at a point where it is intended that the thread is to be thrown from the groove and the tightening of the stitches commence, one being tightened at each revolution of the needle, and so on, until the thread is exhausted therefrom. A table is provided in front of the needle, upon which the work or material is caused to pass by the rotating action of the needle in a continuous manner; and in order that the work or material may be supported against the action of the piercer or the needle—that is, the frictional action of the same—an endless chain is provided in the table, the flat links of which have teeth projecting into the spaces of the piercer and needle, (or needle alone when no piercer is used.) These teeth support the work during the stitching. An adjustable fence or guide is provided where the work enters the machine to regulate the extent of the "overstitch" from the edge to be sewed. At the rear end of the needle is a guide for leading the work away from the machine when either the whole spiral needle and driving or other spiral section or the whole needle, (in cases where no driver or other section is used,) as the case may be, have or has passed through the article under treatment. The last-mentioned guide is also adjustable within the needle for preventing any jumping action thereof. The rollers are all driven from one center (which they surround) by toothed gearing from any convenient source.

In the accompanying drawings, the same letters of reference are used to indicate like parts wherever they occur.

Figure 1 is a front elevation partly in section. Fig. 2 is a plan, partly in section, whereby the top roller or screw is not seen. Fig. 3 is an end elevation, the hand-wheel, the outer bearing of the driving-shaft, and the driving-pulley being removed. Fig. 4 is a transverse sectional elevation on the line 1 2 of a machine according to my invention. Figs. 5 to 11, inclusive, show sundry details to an enlarged scale, and hereinafter referred to.

A is the bed of the machine; B B, the standards in which the rollers or screws C D E, for carrying the spiral needle F and sections thereof, are mounted.

F′ is the table.

G is the driving-pulley on the shaft G′.

G^2 is a hand-wheel, by means of which the operator can adjust the needle for the insertion of the thread previous to starting.

H is the driving-pinion on the shaft G′.

H′ H^2 H^3 are pinions on the rollers or screws C D E, respectively, and taking into and receiving motion from the pinion H. The top roller or screw, C, is adjustable by the screws C′ C^2, each having either a spiral spring or an elastic cushion of india-rubber, C^3 and C^4, for affording a yielding pressure on the needle and its sections in the event of expansion or contraction of the same through heating or cooling, and maintaining a gentle pressure thereon under all conditions.

I is the endless toothed chain carried within the table, its teeth taking into the spaces of the spiral needle or the needle and its sections, as previously referred to. The dead-pulley I′, around which the chain travels at one end, is adjustable for taking up any slackness thereof.

J is the adjustable guide for leading or guiding the material into the machine. This guide is mounted on one end of table F′, and made adjustable thereon by means of a transverse slot (not shown) in the table and a longitudinal slot in the guide, the guide being secured to the table by a screw-bolt, Fig. 2, passing through said slots.

K is a guard for protecting the operator's fingers by preventing them from coming into contact with the piercer or the needle. This guard is mounted on guide J, and is made adjustable on said guide by a screw, *k*, passing through the guard and taking against the vertical flange of the guide, as clearly shown in Fig. 4.

L is a guide for leading the article or material away from the machine on the completion of the stitching, and also for preventing the needle from jumping. This guide consists of a horizontal portion and a vertical portion, the latter of which is secured to one of the standards B, as in Fig. 1, and the horizontal portion stands normally at the end of the needle, having one side cut sloping for gradually guiding the cloth away from the needle, as shown in Fig. 2. Should the needle have a tendency to jump while in operation, the guide can be pushed within the needle to hold it down by cam *l*, Fig. 2, mounted on standard B.

M is a brush beneath the table, or it may be placed as indicated by dotted lines at M′, and arranged to press upon the needle as it rotates and upon the thread, to assist in imparting a proper tension thereto when the stitch is being tightened.

N N′ are drivers on the roller or screw C, with projections N^2 N^3, respectively, on the sides of the screw-threads, N^2 taking into undulations in the piercer C^5, and N^3 taking into those of the section C^6 at the rear end of the needle F; or they (the projections N^3) may take into similar undulations in the needle F. These drivers, with their projections, are shown to an enlarged scale in Figs. 5 and 6.

Fig. 7 shows the method of driving the needle F by means of the helical coil N^4, of rectangular section, capable of being contracted endwise by the nuts C^7, and thus gently gripping the coils of the needle F or sectional parts thereof and propelling the same.

Fig. 8 shows, on an enlarged scale, the method of driving the needle F by a groove, O, in each of the rollers or screws C D E, acting on the bead F^2 of the needle F and preventing to and fro movement thereof. The said groove may be on one or more of the said rollers or screws, or otherwise.

Fig. 9 shows the method of driving the needle F, by forming each end portion somewhat larger than the intermediate portion, these end portions being without groove. The cross-section of the coils may either be round, or they may be flattened on their periphery, and the screws or rollers pressing thereon. The ends may be separate sections and act as piercer and driver, respectively, as desired.

Figs. 10, 11 show a method of driving the needle F or separate ends thereof by means of a sectional part, N^5, of one roller or screw—say two coils thereof—having teeth or serrations N^6 on a sunk periphery, taking into corresponding teeth or serrations, N^7, on the needle F or sectional parts thereof. This method of driving may be used at both ends of the needle, if desired.

What I claim in an over-edge sewing-machine is—

1. The combination, with a spiral needle having a bead, of three needle-operating rollers, one or more of the rollers being grooved for engagement with the bead on the needle, and suitable mechanism for driving the rollers, substantially as described.

2. The combination, with a spiral needle, one or more of whose end coils at one or both ends of the needle are round or flat on the periphery and larger in diameter than the remaining coils, which latter are beaded, of three needle-operating rollers, one or more of said rollers being grooved, and suitable mechanism for driving the rollers, the needle being driven by frictional contact of the rollers with its enlarged ends, and prevented from moving laterally by engagement of its bead with the groove or grooves in the roller or rollers, substantially as described.

3. The combination, with a spiral needle, of three needle-operating rollers, one or more of said rollers being larger in circumference at the ends than at the intermediate portion, in order to drive the needle by frictional contact with its ends, substantially as described.

4. The combination, with a spiral needle, rollers for operating the needle, and mechanism for driving the rollers, of a piercer arranged on the front end of the needle, to precede it in its passage through the fabric, substantially as described.

5. The combination, with a spiral needle, rollers for operating the needle, and mechanism for driving the rollers, of a brush arranged to press upon the needle to increase the tension of the thread, substantially as described.

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