3 Sheets—Sheet 1.

GROVER, BAKER & CO.

Sewing Machine.

No. 25,730. Patented Oct. 11, 1859.

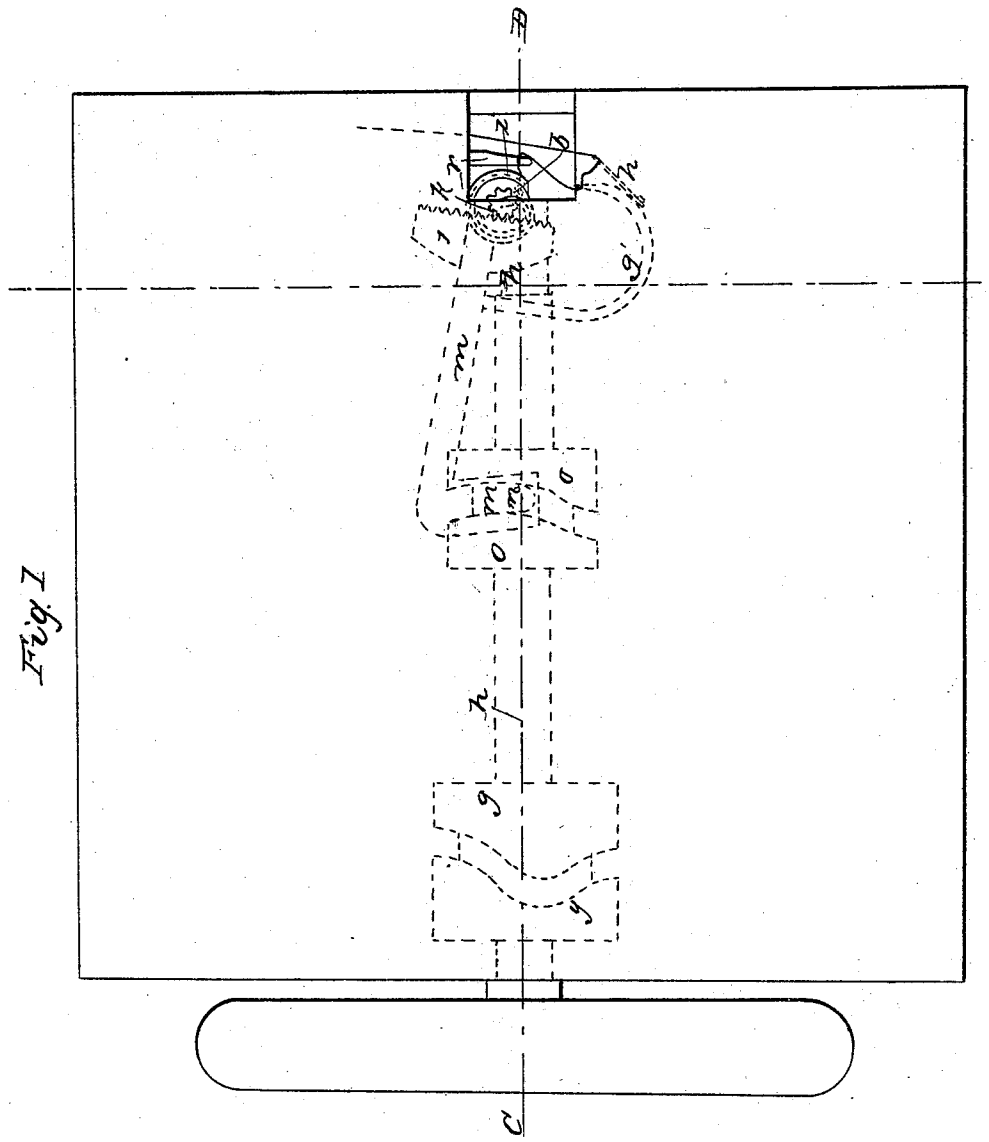


Fig. 1

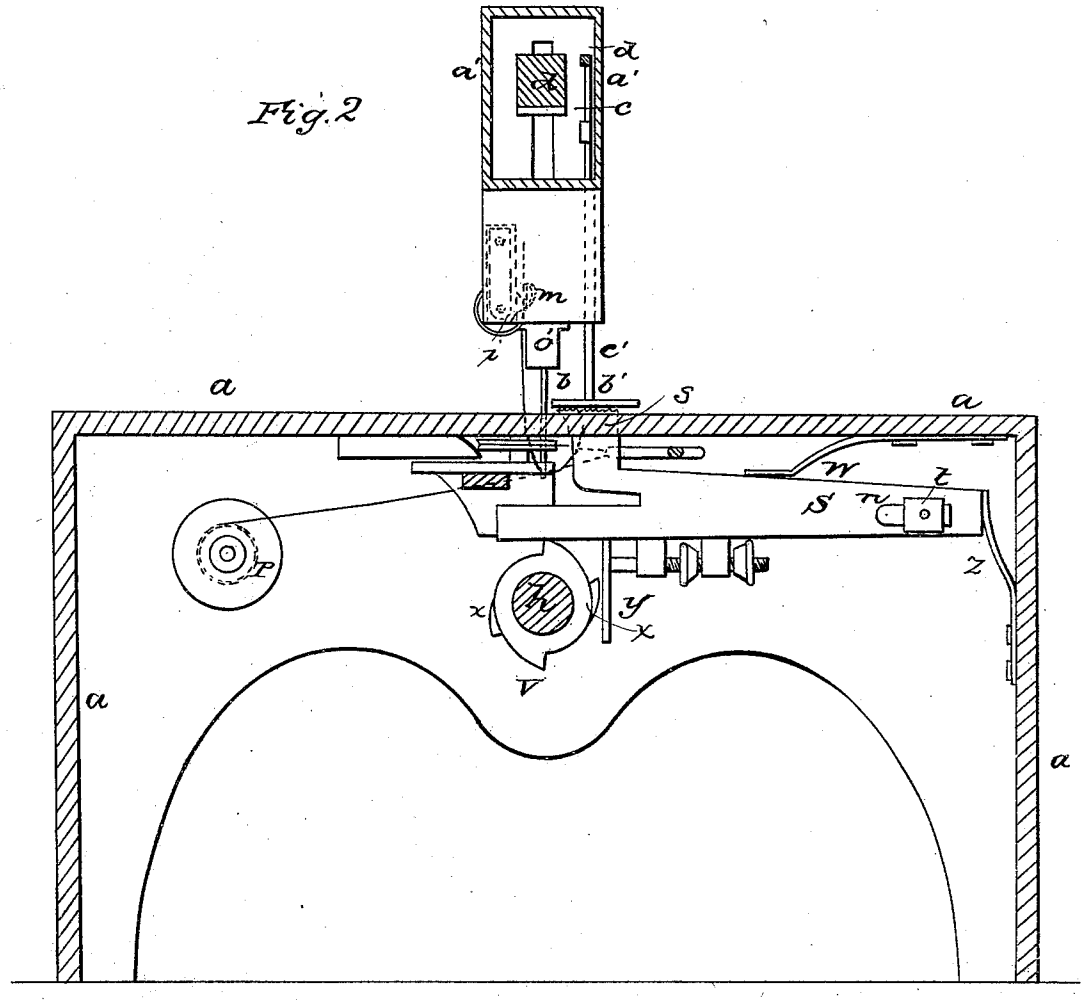
3 Sheets—Sheet 2.

GROVER, BAKER & CO.

Sewing Machine.

No. 25,730. Patented Oct. 11, 1859.

Fig. 2



3 Sheets—Sheet 3.

GROVER, BAKER & CO.

Sewing Machine.

No. 25,730. Patented Oct. 11, 1859.

Fig. 3

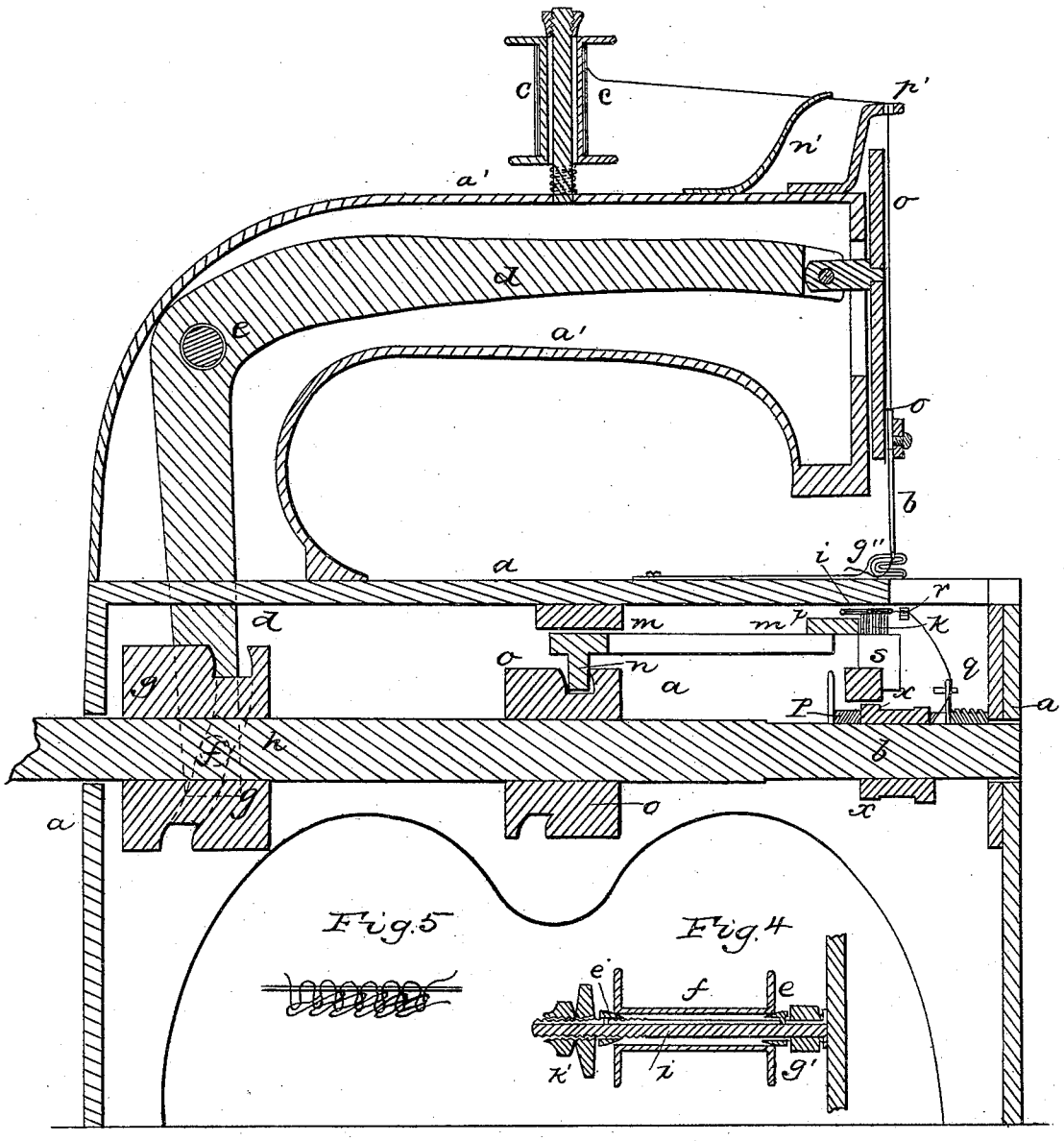


Fig. 5

Fig. 4

UNITED STATES PATENT OFFICE.

GROVER, BAKER & CO., OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **25,730**, dated October 11, 1859.

To all whom it may concern:

Be it known that we, WILLIAM O. GROVER and WILLIAM E. BAKER, of Boston, Suffolk county, Massachusetts, and O. B. POTTER, at present residing in the city of New York, have invented certain new and useful Improvements in Sewing-Machines; and we do hereby declare that the following schedule, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is a plan of the platform of the machine, showing the contrivances for moving the lower needle and regulating the slack of the thread thereof. Fig. 2 is a vertical section through the machine on the line A B of Fig. 1. Fig. 3 is also a vertical section of the same on the line C D of Fig. 1. Fig. 4 is a vertical section through the center of a thread-bobbin and the contrivance devised by us for regulating the resistance opposed to the drawing off or unwinding of thread; and Fig. 5 is a view of the stitch made by the machine, upon a large scale and not drawn up, so as to show the method of interlocking the threads.

The nature of the first part of our invention consists in combining with a reciprocating perforating eye-pointed needle and a non-perforating eye-pointed instrument a suitable apparatus for clamping the thread of the needle to its bar or shank at proper points in the stroke thereof, so as to cause a double-looped stitch to be formed with certainty and accuracy, the combination being substantially such as is hereinafter described.

The nature of the second part of our invention consists in confining a bobbin in place by means of cones which remain stationary while the bobbin turns, and oppose resistance to the revolution of the bobbin, thereby making tension upon thread unwound from such a bobbin, substantially in the manner and for the purpose described.

These improvements are all shown in the drawings as applied to a Grover & Baker "circular-needle" machine, (commonly so termed,) which we will proceed to describe only so far as is necessary to illustrate the invention set forth in this specification, the machine being well known to those conversant with sewing-machines. It is a machine of that variety which makes a double-looped stitch, in which that portion of the thread used by the piercing-needle for each stitch is withdrawn from the bobbin when the needle is about to pierce or is advancing through the material to be sewed, in which the stitch just made is tightened up by the piercing-needle while advancing through the cloth, after it has pierced it, for the purpose of forming the succeeding stitch, and in which the instrument which passes another thread through the loop of the piercing-needle thread does not carry a bobbin, and requires only a small space between that thread and its needle for the entrance of such instrument, and in a machine having these peculiarities the first part of our invention is useful. After the needle has entered the cloth, or just before it enters it, it is useful to clamp the thread to the needle-bar, for the reason that the loop of upper thread cast off by the non-penetrating eye-pointed instrument is pulled up with certainty by the needle in its descent, although the tension on its thread, or the resistance to the turning of the spool on which it is wound, may be but slight, and although the spring ordinarily used in sewing-machines to govern the slack of thread between the bobbin and the needle is a weak one; and it is useful to clamp the thread to the needle in the upstroke thereof, or while backing out of the cloth, as a loop is thus left upon one side only of the needle, thereby obviating any risk of a small-sized or small-pointed instrument controlling another thread entering two loops, one on each side of the piercing-needle at the same time, and to effect this clamping we have, as the best means known to us, used a contrivance now to be described. On the needle bar or slide moving with the needle, such as *o'*, is a small projection or knob, *m'*, and upon some stationary part of the machine is pivoted, as at *t'*, a vibrating bar, on the other end of which is mounted a roller, *l'*, and some spring suitably arranged presses the roller toward the knob or projection. The thread supplied to this needle is delivered from a bobbin, *c c*, whence it passes through an eye in the tension-spring, such as *n'*, thence through a hole, *p'*, and then along the side of the knob nearest the roller, and thence through the eye of the needle.

The operation will be as follows: When the needle descends so far that the surface of the roller comes in contact with the surface of the

knob, the thread will be pinched or grasped between the roller and the knob, and the thread will therefore be practically clamped to the needle arm or stock, or a body moving coincidently with the needle, and will continue so clamped both on the piercing and withdrawing motions of the needle so long as any part of the surface of the knob is in contact with the roller, (the thread being interposed,) just in the same manner as if the thread were held upon the needle-bar by a jaw attached to that bar, and it will be clear that such clamping will produce the useful effects hereinbefore described, and that the period during which the clamping is operative may be varied by varying the position of the roller or the length of acting surface of the knob, or both of them, and we intend to make this clamping more positive, when necessary, by taking a round turn of thread around the knob.

The non-piercing instrument, which controls a thread and passes it through the loops of upper needle thread, is in the machine represented in the drawings a circular eye-pointed instrument, such as *i*, mounted in a suitably-supported pinion, *k*, which is caused to oscillate to and fro, as the purposes of sewing may require, by means of a rack, *l*, attached to a vibrating lever, *m m*, which is actuated by a cam, *o o*, acting upon a pin or roller, *n*. The thread is supplied to this instrument from a bobbin, P, and passes thence through a hole in the free end of a small spring, *p'*, thence through another hole in an arm, *g'*, attached to the vibrating lever, thence through an eye in a stationary rod, *r*, and finally through the eye of the needle *i*. This needle is grooved in its outer surface, and by looking at the drawings it will be perceived that the combined movements of the arm *g'* and the needle are such that the hole in the arm is nearest the eye in the rod *r*, when the needle is in such angular position that most thread is wound around it in the groove, and as the thread is unwound from the needle its slack is taken up by the arm retreating away from the eye or hole in the rod *r*, and it will also be perceived that the small spring upon the arm *g'* will take up or let off small quantities of thread which may be left slack, or may be required for winding upon the needle if it should so happen that the arm is not moved through the precise distances required to produce the desired effects.

It will be perceived also from the drawings (the second figure being taken as if looking from the point *c* toward the point D) that the instrument controlling the lower thread enters between the upper needle-thread and the needle on that side of the latter opposite or farthest from the clamping-roller. The loop is therefore formed on the proper side of the piercing-needle for the entrance of the lower needle when the piercing-needle rises, and on the other side of the piercing-needle all the thread is taken up as the needle rises, and no loop is formed.

Various plans have been proposed prior to our invention for preventing the free or unimpeded revolution of thread-bobbins of sewing-machines, all more or less successful, but none sufficiently perfect to meet our views. We have therefore devised the following contrivance: A small rod, such as *i'*, is to be fastened to any proper part of the machine, and over it is to be slipped an india-rubber or other spring, such as *y'*, and then a conical frustum, such as *c'*, pierced with a hole so large that it may slide freely on the rod, and having also a small pin or projection, as clearly shown in the drawings, which enters a groove or slot, running lengthwise of the rod, the object of the groove and slot being to prevent the revolution of the cone, while at the same time it is permitted to move lengthwise of the rod. The bobbin is then put upon the rod, with the cone entering the cylindrical hole therein, and another cone, like the former in all respects, is put over the rod, with its apex entering the other end of the hole in the spool or bobbin. A nut, such as *k'*, is then run down upon a screw-thread cut on the end of the rod until the spring is so far compressed as to secure the desired tension of thread or resistance to the turning of the bobbin. Bobbins of various sizes having holes through them of different diameters will be truly centered by the use of such cones, thus preventing the bobbin from revolving eccentrically, causing the thread to pass off more easily at one portion of a revolution than another, and when the cones, or that one nearest the screw, are prevented from revolving in the manner described there is no tendency to turn the nut by the revolution of the bobbin, thus varying the tension.

It will be apparent from the above description to those skilled in the art that the clamping apparatus and piercing-needle will act in the same manner, in combination with non-penetrating instruments formed and moved differently from the precise instrument represented in the drawings, so long as such instrument operates in combination with a piercing-needle to make a double-looped stitch; and we consider all instruments, however shaped and moved, to be the equivalents of the circular lower needle herein described, in the combination which we have invented, so long as they act in combination with an upper piercing-needle to make an interlocking of threads, which, when pulled up, makes a double-looped stitch like that shown in the drawings, our combination having been invented for the special purpose of making such a double-looped stitch with accuracy and certainty, by reason of the proper pulling up of the stitch on the descending motion of the needle when the thread is clamped and when a loop of upper thread is cast off by the circular needle, and by reason of the clamping acting to lift up the upper needle-thread on one side of the needle at the same speed that the needle is lifted, whereby a loop is formed on one side

only of the piercing-needle, and there is no danger of the lower needle entering two loops of thread on opposite sides of the upper needle at the same time.

Now, we are aware of the fact that Letters Patent for a sewing-machine have been granted prior to the date of this application in which there is described a contrivance for clamping the thread of the piercing-needle to the bar or arm of that needle at and about that period of its motion when the needle is farthest from the material to be sewed, such clamping being for the purpose of tightening up the stitch that had just been made, and not, as in our case, the preceding stitch. We do not, therefore, claim, broadly, clamping the thread to the needle-arm for the purpose of drawing up any stitch; nor do we claim clamping the thread to the needle-arm irrespective of the object to be attained, or out of the combination which we have devised, in which combination the clamping apparatus performs certain specific functions.

Having thus described our improvements in sewing-machines, we claim as of our own invention—

1. A non-penetrating instrument and a piercing eye-pointed needle acting together to make an interlocking of threads, substantially such as is represented, in combination with a clamping apparatus, acting substantially as specified, the combination being substantially such as is set forth, and acting to make a double-looped stitch, substantially in the manner described.

2. Mounting a spool or bobbin from which thread is to be delivered, for the purpose of sewing by machinery, upon two truncated cones, substantially as hereinbefore set forth.

In testimony whereof we have hereunto subscribed our names, in the city of Boston, on this 23d day of December, A. D. 1858.

W. O. GROVER.
WM. E. BAKER.
ORLANDO B. POTTER.

In presence of—
S. J. GORDON,
GEORGE C. YEATON.