(No Model.) 2 Sheets—Sheet 1.

H. P. BAILEY & A. A. HURD.

SEWING MACHINE.

No. 286,988. Patented Oct. 23, 1883.

Fig. 9.

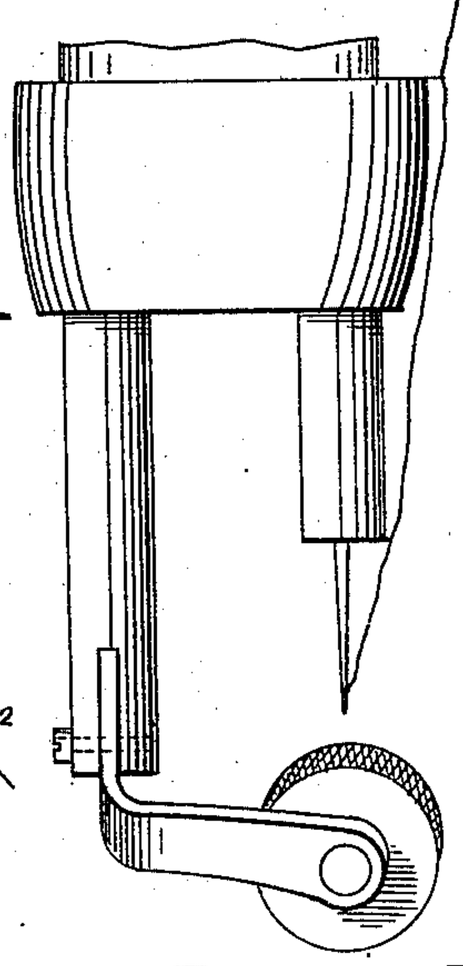

Fig 2.

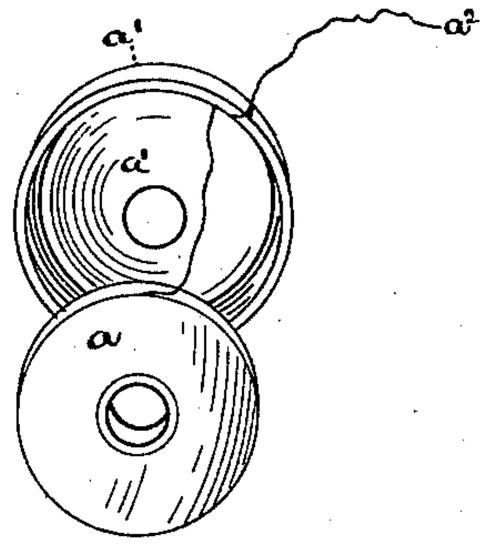

Fig. 8.

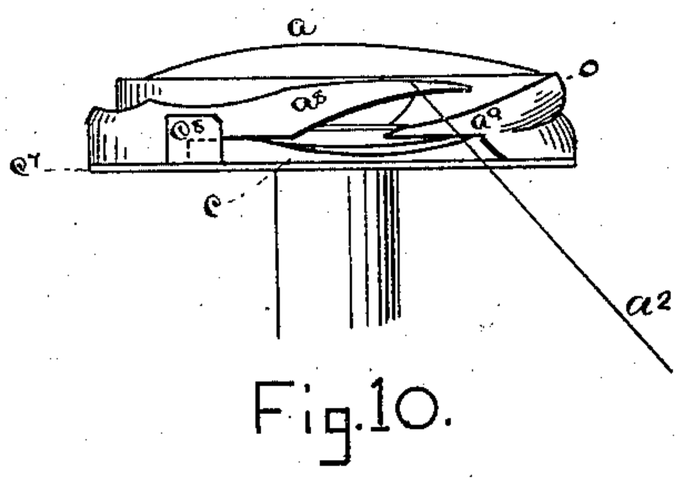

Fig. 10.

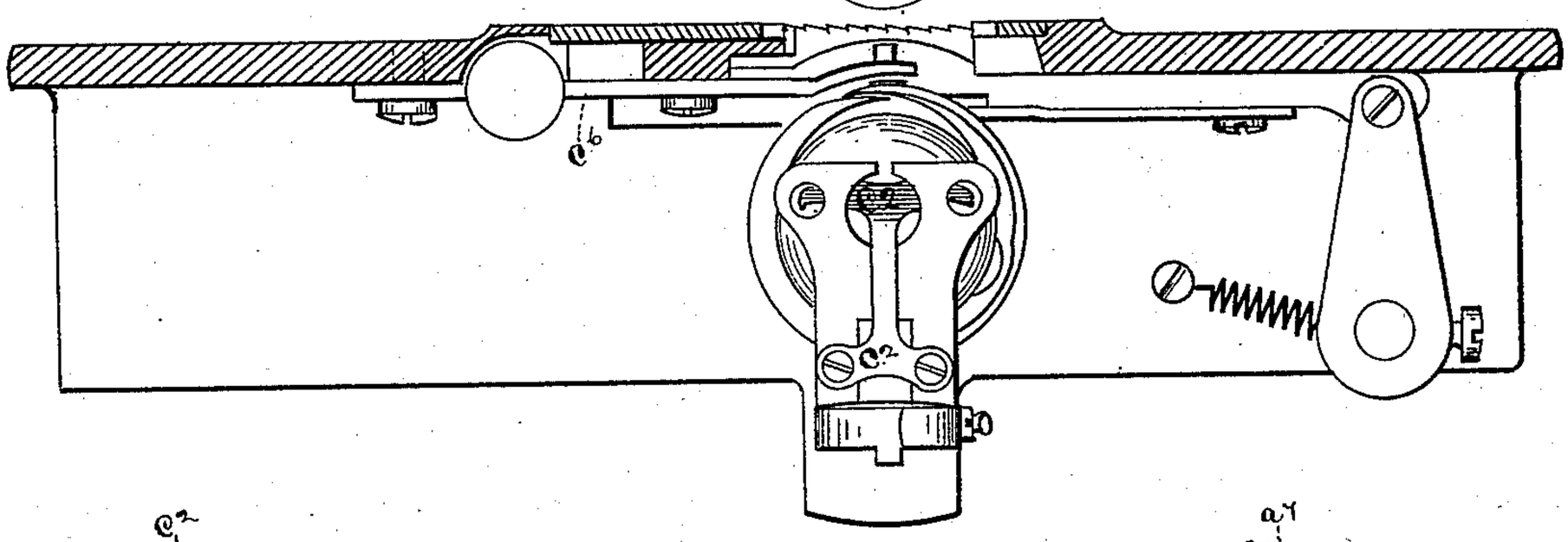

Fig. 1.

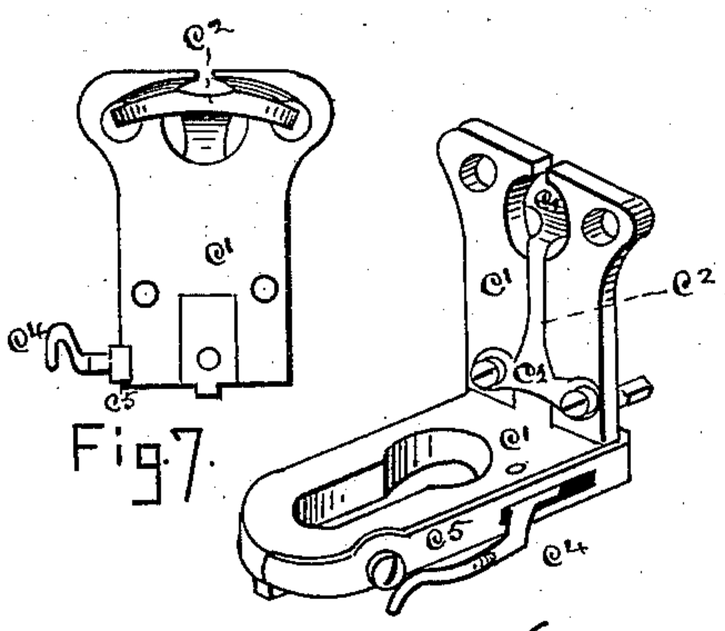

Fig. 7.

Fig. 6.

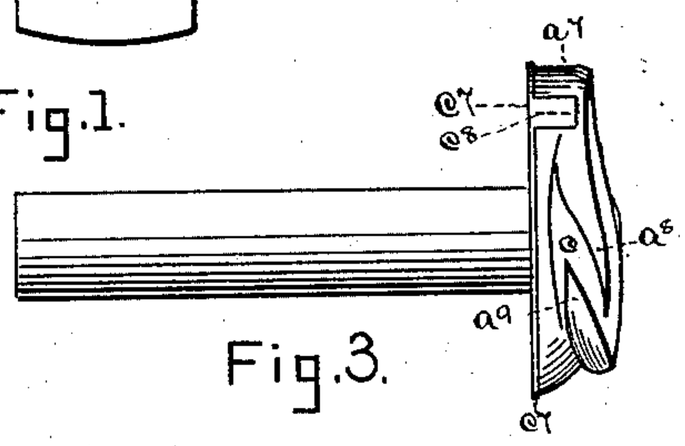

Fig. 3.

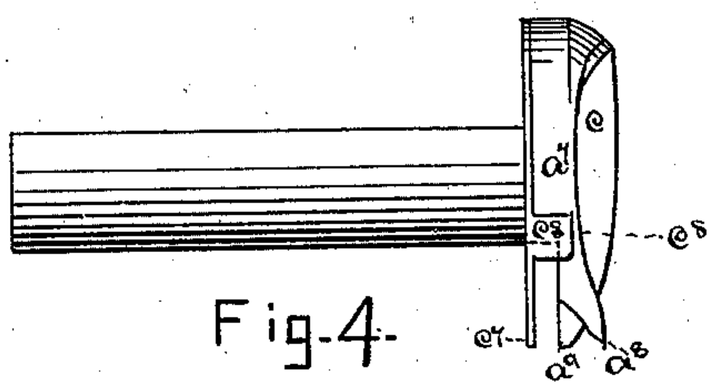

Fig. 4.

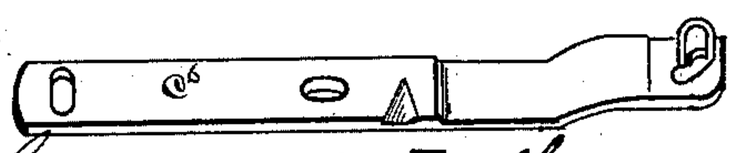

Fig. 5.

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(No Model.) 2 Sheets—Sheet 2.

H. P. BAILEY & A. A. HURD.

SEWING MACHINE.

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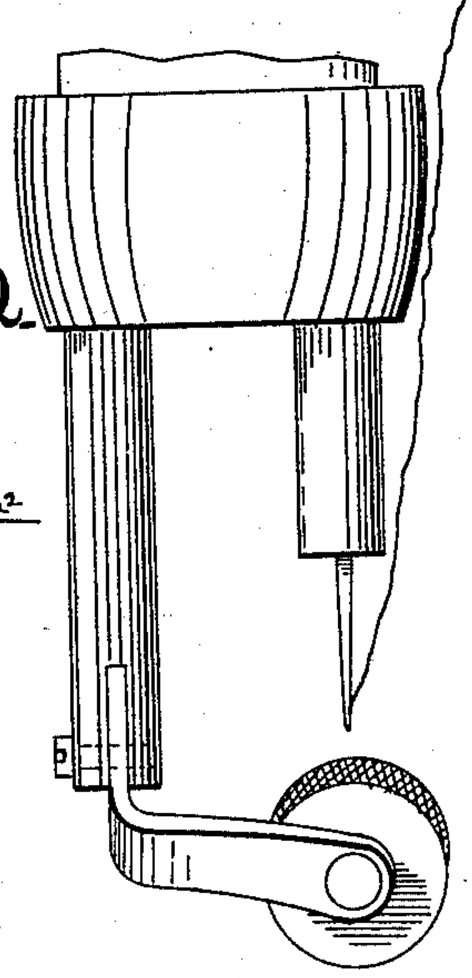
Fig. 9.



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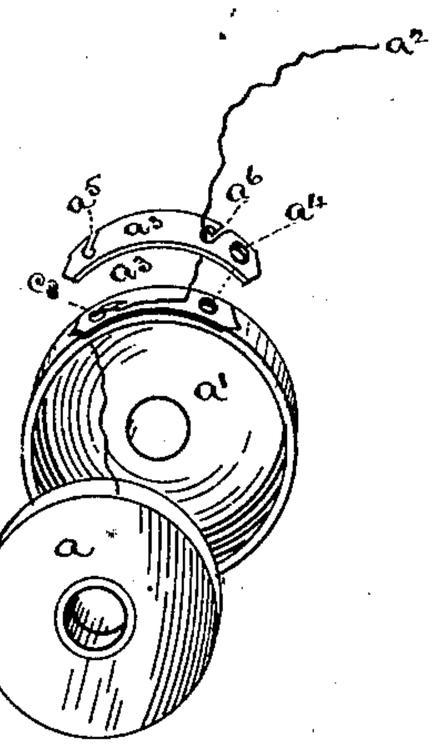

Fig. 8.

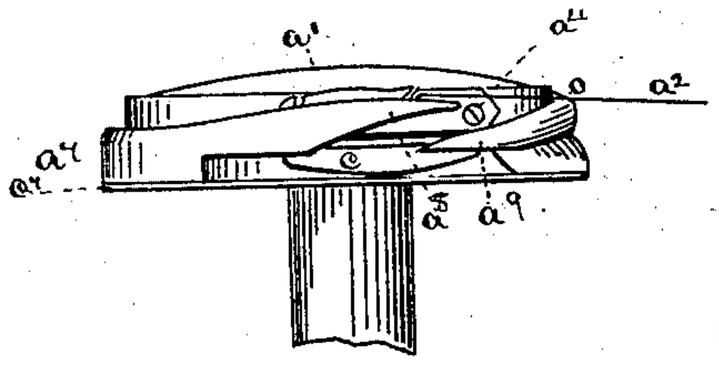

Fig. 10.

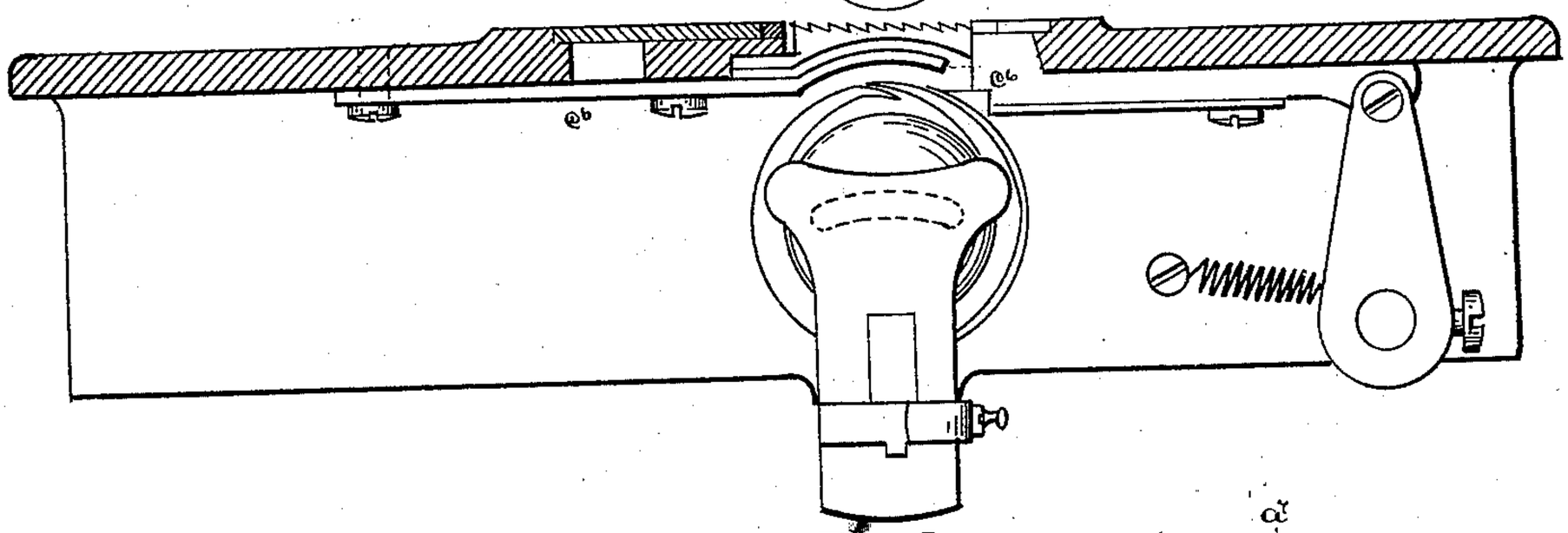

Fig. 1.

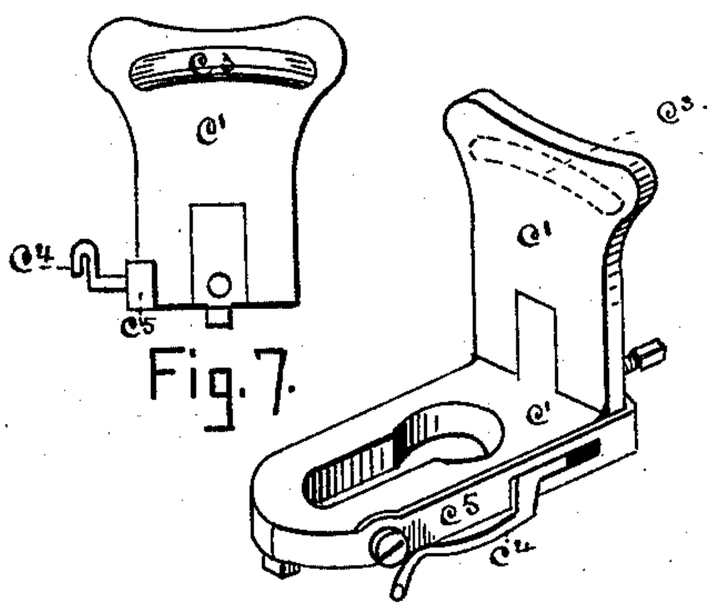

Fig. 7.

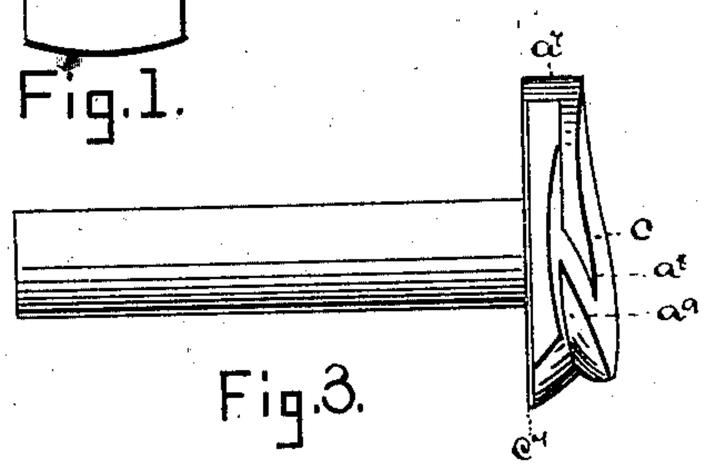

Fig. 3.

Fig. 6

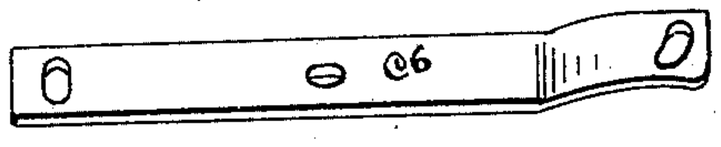

Fig. 5.

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UNITED STATES PATENT OFFICE.

HENRY P. BAILEY, OF BOSTON, MASSACHUSETTS, AND ALONZO A. HURD, OF NORTHWOOD, NEW HAMPSHIRE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 286,988, dated October 23, 1883.

Application filed May 9, 1883. (No model.)

To all whom it may concern:

Be it known that we, HENRY PLUMMER BAILEY, of Boston, in the county of Suffolk and State of Massachusetts, and ALONZO AUGUSTUS HURD, of Northwood, in the county of Rockingham and State of New Hampshire, have invented a new and useful Improvement in Sewing-Machines, of which the following is a specification.

Our invention relates to that class of sewing-machines known as the "Wheeler & Wilson sewing-machine," the object of it being to regulate and render uniform and positive the tension of the under thread as it reels off the bobbin; and it consists in the devices for that purpose hereinafter described and shown.

In the Wheeler & Wilson sewing-machine as heretofore and now made the tension on the under thread has been intermittent, and the devices producing it were only intended to perform their functions while the stitch was being drawn up, thus leaving the under thread without any tension or control at other times, and rendering the machine somewhat uncertain in its effects and liable to make stitches imperfectly or unevenly drawn, so that when threads of two colors are used the seam will frequently show the color of the under thread on the upper side of the work and the color of the upper thread on the under side of the work, and often loops of thread are made on the under side of the work in consequence of the stitches not being well drawn up. By the use of our improvement in the tension devices for the Wheeler & Wilson machine these defects will be perfectly remedied, and the stitches will at all times be locked in the middle of the work, so that the under thread cannot show on the upper side of the work and the upper thread cannot show on the under side of the work, and all the stitches will be regularly and uniformly drawn, so that no loops of thread will be left on the under side of the work, by keeping all the time a constantly positive and uniform tension on the under thread.

In order to more clearly describe the tension devices constituting our invention, and to distinguish them from the tension devices heretofore and now in use in the Wheeler & Wilson sewing-machine, we annex hereto two sheets of drawings, Sheet No. 1 showing a machine with the tension devices now in use, and Sheet No. 2 showing our improved tension devices.

Figures 1 and 2 on Sheet 1 and Sheet 2 show an end view of the machine and a front view of the needle-bar, needle and presser-bar, roller presser-foot, the rotating hook, bobbin-holder, bobbin, bobbin-case, and the tension devices. Fig. 3 on Sheet 1 and Sheet 2 shows a side view of the rotating hook and its spindle, the point of the hook and the tail of the hook in front. Fig. 4, Sheet 1, shows another view of the rotating hook. Fig. 5, Sheet 1, shows a perspective of what is termed the "lower tension-finger," which is more fully described below, which is not used with our invention. Fig. 5, Sheet 2, shows a perspective of what we term the "loop-guard," which resembles the lower tension-finger in general form, and which we put in the same place on the machine which the lower tension-finger occupies on a machine as now made. This will be more fully described below. Fig. 6, Sheet 1, shows an outside view of the bobbin-holder as heretofore made. Fig. 6, Sheet 2, shows an outside front view of the bobbin-holder as we make it. Fig. 7, Sheet 1, shows an inside view of the bobbin-holder or the side next to the bobbin. Fig. 7, Sheet 2, shows the side of the bobbin-holder next the bobbin as used in our improved device. Fig. 8, Sheet 1, shows a front and edge view of the bobbin-case and bobbin separated, with the thread, as heretofore used. Fig. 8, Sheet 2, shows a front and edge view of the bobbin-case and bobbin separated, with the thread and tension-spring, as used in our improved device. Fig. 9, Sheet 1, shows an edge view of the bobbin-case with the bobbin in it, as heretofore used. Fig. 9, Sheet 2, shows an edge view of the bobbin-case with the bobbin in it, and the tension-spring, as made in our device, on the front edge of the bobbin-case. Fig. 10, Sheet 1, shows an edge view of the rotating hook with a bobbin-case and a bobbin in it, as heretofore made, and its washer and tension-pad, the point and the tail of the hook in front, and the under thread as it reels

from the bobbin under the lower edge of the bobbin-case and passes upward over the tail of the hook, and thence to the work. Fig. 10, Sheet 2, shows an edge view of the rotating hook with a bobbin-case and bobbin in it as we make it for use in our improved device, showing the tension-spring and the under thread, as it reels from the bobbin, passing under the tension-spring to the work.

We will mark with letters and describe the parts which relate to the tension devices.

a, Fig. 8, is the bobbin—a flat spool with a groove around the edge—in which the under thread is wound for use. The edge and one side of the bobbin are covered by a case, the other side of it, when in use, resting against the bottom of a cavity in the rotating hook.

a' is the bobbin-case. The thread from the bobbin in the Wheeler & Wilson machine, as heretofore made, is carried over one edge of the bobbin around the overlapping edge of the bobbin-case, as shown in Fig. 8, Sheet 1.

a^2 is the thread. In our improved device, as shown in Fig. 8, Sheet 2, the thread, instead of being carried around the edge of the bobbin-case, is carried from the bobbin through a hole (marked c^8) made for it in the edge of the bobbin-case, which is under an opening through the tension-spring.

a^3, Fig. 8, Sheet 2, is the tension-spring used in our improved device. It is secured in a bed or recess made for it on the outside of the edge of the bobbin-case by a screw. (Marked a^4.) It has an opening through it, (marked a^5,) through which the thread is drawn after it has been passed through the hole in the edge of the bobbin-case. The tension-spring is curved to correspond to the circle of the bobbin-case. When the tension-spring is secured by the screw a^4 in the bed or recess made for it in the bobbin-case, the thread is passed out through the opening c^8 in the bobbin-case and the opening a^5 in the tension-spring, and thence is drawn under the tension-spring to another opening in the tension-spring, (marked a^6,) from whence it is passed to the work. This tension-spring may be placed in the inside of the bobbin-case, instead of on the outside; but we think it will be more satisfactory in use if placed on the outside, as described and shown, as it will be more convenient, and it is desirable to have the inside of the bobbin-case perfectly smooth. The only purpose of the hole a^5 in the tension-spring a^3 is to permit the end of the thread, as it comes from the bobbin *a* through the hole c^8 in the bobbin-case, to pass outside of the tension-spring, so that the operator can take hold of it and draw it under the tension-spring to the hole a^6 in the tension-spring, from whence it passes through the loop-guard to the work. The pressure of the tension-spring upon the thread between it and the bobbin-case is regulated by the screw a^4, which is adjusted by turning it in or out, and the pressure of the tension-spring so adjusted is constant and uniform, and keeps the under thread drawn to the desired tension at all times.

a^7, Figs. 3, 4, and 10, Sheet 1, is the rotating hook as heretofore constructed for use in the Wheeler & Wilson machine.

a^7, Figs. 3 and 10, Sheet 2, is the rotating hook as we construct it for use with our improved tension devices. It differs from the rotating hook as shown on Sheet 1 in the form, as shown at the point marked *o* and in the form of the tail of the hook a^8. The tail of the hook is not required to keep the lower thread from the point of the hook, as it is in the machine as heretofore made.

a^8, Sheet 1, is the tail of the rotating hook as heretofore made, its principal function being to prevent the under thread from getting behind the point of the hook, as it might if not held away from the point of the hook by it.

a^8, Sheet 2, is the tail of the rotating hook as constructed for our improved device. This differs from the tail of the hook as heretofore made and shown at a^8, Sheet 1, in that the front of the tail is cut away about one-eighth of an inch, thus bringing the front surface so much nearer the plane of the rear surface of the hook. This is done to prevent its striking the thread with so much force as it would if not so cut away, and thereby causing it to vibrate too much and draw off more thread than is necessary for a stitch.

a^9 is the point of the rotating hook, the form of which we do not change.

c is the cavity in the rotating hook, in which the bobbin-case, with the bobbin in it, is placed.

c', Figs. 6 and 7, Sheet 1, is the bobbin-holder as heretofore constructed for the Wheeler & Wilson machine, the upright part of which is hinged to the horizontal part, so that it may be turned down on the horizontal part.

c', Figs. 6 and 7, Sheet 2, is the bobbin-holder as we construct it for our improved tension. This differs from the bobbin-holder, as shown on Sheet 1, by the omission of the spring c^2, and by the addition of the curved rib c^3.

c^2, Figs. 6 and 7, Sheet 1, is the bobbin-holder spring. This is dispensed with in our improved device, there being no need for it. Its function in the machine, as heretofore made, is to press the bobbin-case and the bobbin in it against the bottom of the cavity in the rotating hook, to keep them in place in the hook, and to aid in giving tension to the under thread by retarding the rotation of the bobbin by pressing the side of it against the bottom of the cavity in the rotating hook. If this spring loses its elasticity, or by any accident becomes displaced or bent, its pressure on the bobbin-case will be too light, or on one side more than on the other, and the tension it produces will become less than it should be, or uncertain and irregular, and defective work will be made in consequence.

c^3, Figs. 6 and 7, Sheet 2, is a curved rib raised

on and across the face of the bobbin-holder next the bobbin-case. This rib is elevated above the plane of the surface of the bobbin-holder about one-eighth of an inch, and is made of brass or other suitable metal, and brazed or soldered onto the face of the bobbin-holder. When the part of the bobbin-holder to which it is affixed is in a vertical position, the face of this rib will be very close to the bobbin-case, though not pressing against it, but not near enough so that if a thread comes between them it will be compressed by them, and not so but that the thread will readily pass when drawn. Thus the rib c^3 keeps the bobbin-case and bobbin in it in place in the cavity in the rotating hook without pressure against the bobbin-case, and leaves it entirely free to move in the cavity in the rotating hook, and regulates, and to some extent controls, the passing of the upper thread between it and the bobbin-case, and none of the difficulties mentioned as likely to occur in the use of the spring c^2 will be experienced.

c^4 is the thumb-lever, by which the vertical part of the bobbin-holder is released from the spring c^5, so that it may be turned down on the horizontal part.

c^5 is a spring, which secures the vertical part of the bobbin-holder in its upright position.

c^6, Fig. 5, Sheet 1, is used in the machine as heretofore constructed, and is termed the "lower tension-finger." The function of the tension-finger c^6, Fig. 5, Sheet 1, is to grip the under thread as it reels from the bobbin between it and the tension-pad, hereinafter described, when, by the motion of the rotating hook, the tension-pad comes under it, and hold the thread for an instant while the stitch is drawn up. As the tension-pad leaves the contact with this tension-finger the thread is released, and is under no tension, except such as is produced by the pressure of the spring c^2, until the pad comes around again.

c^6, Fig. 5, Sheet 2, is what we term the "loop-guard," which is similar in general form to the tension-finger c^6, Fig. 5, Sheet 1, described, and occupies the same position on the machine; but it has nothing to do with the tension, its only function being to keep the under thread from contact with the feeding devices.

c^7, Figs. 3, 4, and 10, Sheet 1, and Figs. 3 and 9, Sheet 2, is a washer on the spindle of the rotating hook, affixed so that it moves with the rotating hook.

c^8, Figs, 3, 4, and 10, Sheet 1, is called the "tension-pad." It is a lip of metal affixed to the edge of the washer c^7, at a right angle to the plane of the washer, curved to conform to the circle of the washer, and is so adjusted that it moves with the rotating hook to come under and in slight contact with the tension-finger at the right instant for gripping the under thread between it and the tension-finger, and holding it while the stitch is drawn, thus making, in connection with the friction of the thread drawn around the edge of the bobbin-case, as shown in Figs. 8 and 9, Sheet 1, and the pressure of the spring c^2, Figs. 1, 6, and 7, Sheet 1, the imperfect tension in the Wheeler & Wilson machine as heretofore and now made and used. This tension-pad is not required in our improved tension device.

c^8, Fig. 8, Sheet 2, is the hole for the passage of the thread through the bobbin-case. Carrying the thread through the hole allows it to reel off the bobbin in a direct line, instead of carrying it around the edge of the bobbin-case and over the tail of the hook, as has been necessary with the tension devices heretofore used, as shown in Fig. 10, Sheet 1.

O, Fig. 10, Sheet 1, shows a part of the rotating hook back of the point of the hook, which, in modifying the form of the hook for use with our improved tension devices, we cut away, as explained below.

O, Fig. 10, Sheet 2, shows the point on the rotating hook back of the point of the hook, where the form of the hook, as heretofore made, is changed by cutting away a portion of its substance—about one-sixteenth of an inch in thickness. The object of the change in form is to give the thread, as it is drawn by the looping with the upper thread, place to lie in a straight line and not be hit by the projection on the hook, as heretofore made, at the point O, as it rotates rapidly. Thus by passing the under thread, as it unwinds from the bobbin, through the hole c^8 in the bobbin-case, and under the tension-spring a^3, Fig. 8, Sheet 2, and through the opening a^6 in the tension-spring, and thence through the loop-guard c^6 and the throat-plate to the work, and by relieving the upper thread from the pressure of the spring c^2, as heretofore used, a constant and uniform tension on the under thread will be produced, and, when properly adjusted, the machine will make perfect stitches with the loop in the center of the fabric.

It will be perceived that by the use of our devices the pressure against the bobbin-case by the bobbin-holder spring is entirely dispensed with, and the bobbin-case left perfectly free in the cavity in the rotating hook. The friction of the thread passing around the edge of the bobbin-case is also relieved by passing it through the hole in the bobbin-case, and that by passing the thread under the tension-spring properly adjusted, it is steadily held by it, but not so firmly but that it will pass forward as wanted for the work, making the tension constantly uniform and just sufficient to bring the lock of the stitch in the middle of the goods being stitched.

Having thus described the tension devices heretofore used in the Wheeler & Wilson sewing-machine, and our improved devices for the same purpose, we claim as new and our invention—

1. The combination, in a rotating-hook sewing-machine, of the bobbin-case a', having a hole, c^8, through the edge of the shell, a recess

for the tension-spring a^3, said tension-spring being provided with the threading-slot a^5 and the opening a^6, and means for securing the tension-spring to the bobbin-case.

2. In a sewing-machine, the combination and arrangement of the bobbin-holder c', having the curved rib c^3 thereon, and the bobbin-case a', having the hole c^8, and provided with a tension-spring having the threading-slot a^5 and the opening a^6, substantially as and for the purpose described.

3. In a sewing-machine, the combination of the rotating hook cut away at the point marked *o*, as described, the bobbin-case a', having the hole c^8 in the shell, midway of the rim, and the tension-spring provided with the openings through it, a^5 and a^6, the said openings and the hole c^8 in the bobbin-case being in the same vertical plane, substantially as and for the purpose set forth.

4. The combination of devices for producing uniform tension of the under thread in a sewing-machine, consisting of the bobbin-case a', provided with a hole, c^8, midway of its rim, the bobbin-holder c', provided with the rib c^3, the tension-spring a^3, provided with the openings a^5 a^6, and the hole c^8, occupying the same vertical plane, and the loop-guard c^6, through which the thread passes to the work, all substantially as and for the purpose described.

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