

S. W. WARDWELL, Jr.
Sewing-Machine.

No. 128,684.

Patented July 2, 1872.

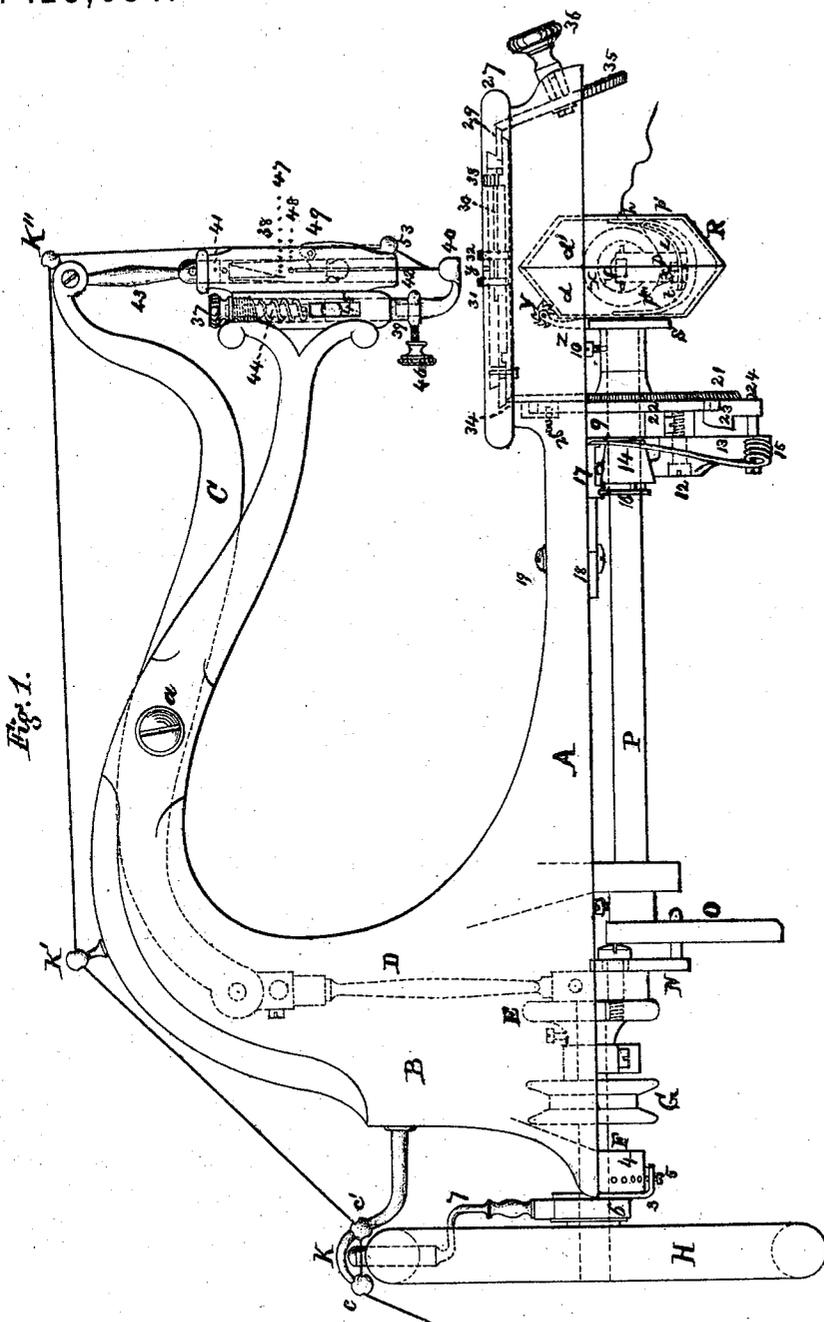


Fig. 1.

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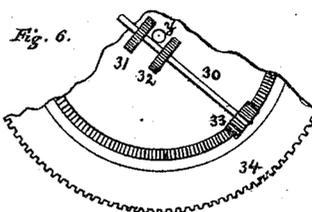
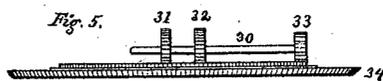
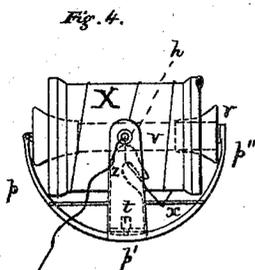
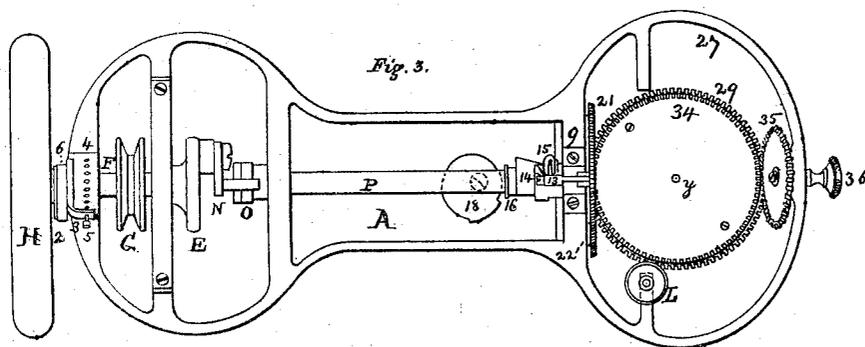
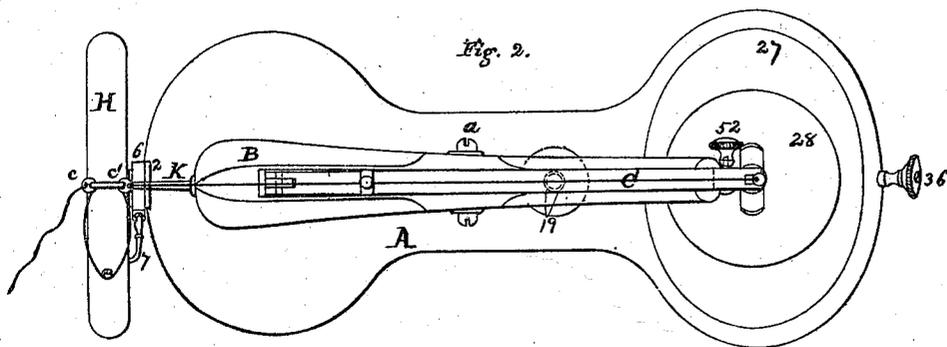
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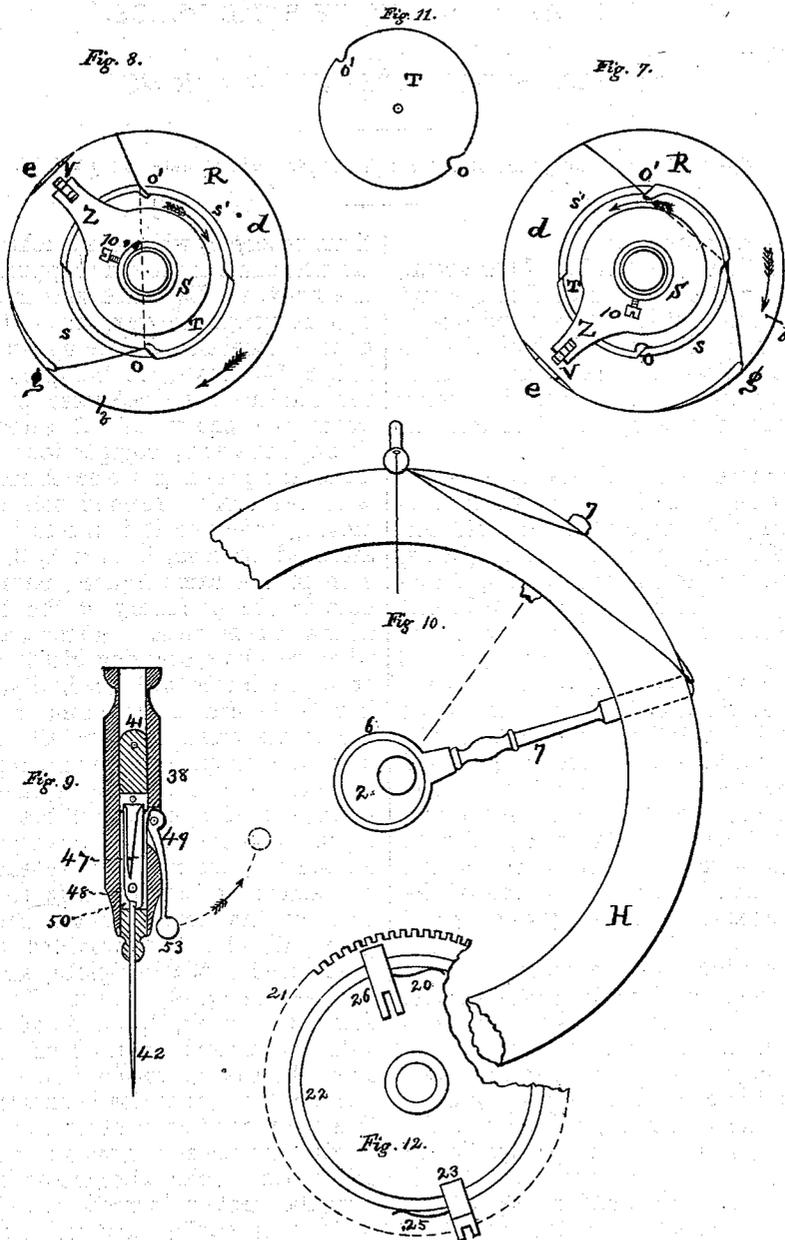
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UNITED STATES PATENT OFFICE.

SIMON W. WARDWELL, JR., OF ST. LOUIS, MISSOURI, ASSIGNOR TO HIMSELF
AND GEO. W. SHAW, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 128,684, dated July 2, 1872.

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, Jr., of the city and county of St. Louis, State of Missouri, have invented a new and useful Improved Sewing-Machine, of which the following is a full, clear, and exact description, reference being had to the annexed drawing making a part of this specification, and in which—

Figure 1 represents a side elevation of my machine. (Scale, three-fourths of an inch to one inch.) Figs. 2 and 3 represent, respectively, top and bottom plans of same. (Scale, one-half of an inch to one inch.) Fig. 4 represents the spool with its holder. (Full size.) Fig. 5 represents a perspective view of the feed device. (Full size.) Fig. 6 represents a plan of portion of same. (Full size.) Figs. 7 and 8 represent views of the inner face of the spool-case, with the different positions of the loop of the upper thread. (Full size.) Fig. 9 represents the needle and its holder in section. (Full size.) Fig. 10 represents a portion of rotary take-up. (Full size.) Fig. 11 represents the movable disk of the spool-case. (Full size.) Fig. 12 represents a plan of the wheel which actuates the feed device. (Full size.)

Similar letters indicate like parts.

The main features of my invention consist in forming the "lock-stitch" with two ordinary spools, thus saving any rewinding of thread in forming it on the one-loop principle, and, though doing away with a vibrating shuttle or its equivalent, completing one and the same stitch at each throw of the needle; in having a rotary take-up so arranged that it will draw the upper thread sufficiently to complete the stitch while the vertical needle is moving a very short distance; in having a universal feed and a self-setting needle.

A, Figs. 1, 2, 3, is the bed-plate, having a fixed hollow arm, B, Figs. 1, 2, slotted to receive the vibrating arm C, which is so pivoted at *a* as to be balanced. On the inner end of the vibrating arm is a pitman, D, uniting it with a crank-plate, E, Figs. 1, 3, on the shaft F, having its bearings beneath the bed-plate, as seen, the connection between arm and pitman, and pitman and plate, being by double joints, so as to allow of the two mo-

tions necessary when the machine is operated. On this shaft is the driving-pulley G and also the fly-wheel H, which serves as the "take-up," as we will now explain. On this shaft is a loose eccentric, 2, having an arm, 3, Figs. 1, 2, 3, 10, curved at the end, as seen, over the semicircular perforated projection 4, beneath the bed-plate. A screw, 5, passing through the arm, engages with these perforations, and prevents the eccentric from moving with the shaft. Around this eccentric, and moving freely on it, is a collar, 6, to which is attached an arm, 7, Figs. 1, 2, 10, which, as seen in the same figures, passes through a hole in the periphery of the balance-wheel. This arm is made so short that, as the balance-wheel revolves, carrying with it, of course, this arm, the latter will gradually, as shown in Fig. 10, be drawn more and more within the rim of the wheel, so as finally to present no portion of its point above the rim. The point at which this total disappearance occurs can be regulated by means of the arm 3 by simply moving it in the one direction or the other on the projection 4; for by such movement the action of the eccentric on the collar 6 changes the center of the radial arm. A guide, K, Figs. 1, 2, provided with eyes *c c'*, is attached to the bed-plate, and passes over the balance-wheel, as seen. To the plate E is attached a crank, N, the pin of which engages with the slotted crank O on the end of the arbor P, having its forward bearing in the offset 9, through which it passes, the effect of this manner of connecting the cranks being to give the necessary irregular motion to the arbor, and, unlike other methods, having that irregular motion increase and decrease regularly, thus saving any jerking motion, and also preventing noise. On the extremity of this arbor is the spool-case R, Figs. 1, 7, 8, made in two parts, *d d'*, as seen in Fig. 1, the parts being connected by a hinge, *e*, Figs. 7, 8, and a catch, not shown. There is a slot in the line of union of the parts of the case, extending from the hinge to the point *b*, as shown clearly in Figs. 7, 8. One edge of the slot is cut so as to form a hook, *g*, Figs. 7, 8, on the side *d*. The manner of attaching this case to the shaft so that, while revolving with it, it may catch the upper thread, make a loop,

and pass through it, as is necessary in order to make the stitch, is as follows: A metal plate, S, Figs. 1, 7, 8, is keyed to the end of the shaft by a screw, 10, and on the face of this is a loose disk, T, Figs. 7, 8, 11, having two notches, $o o'$, shown more clearly in the last figure. This disk is united loosely to the spool-case by two flanges, $s s'$, Figs. 7, 8, on the face d of the spool-case. The disk turns freely in either direction on the arbor. A curved arm, Z, Figs. 1, 7, 8, forming a part of the plate S, has on its end a ratchet-pinion, V, which enters a slot in the face of the spool-case, thus causing the shaft, in its revolution, to carry with it the spool-case. The device for holding the under spool X, Figs. 1, 4, which is the ordinary wooden one, consists of four curved arms, $p p'$, &c., $p p' p''$ being seen in Fig. 1, and $p p' p''$ being seen in Fig. 4. To p is hinged a rod, v , having on its other end a movable head, v' , Fig. 4, which rests in a slot in the top of p'' . This head being removed, the spool is slipped on the rod, the head replaced, and the rod returned to its former position, as seen. Two pivots, one on p' and the other on p'' , find bearings in the side of the spool-case, so that the spool and holder swing freely in it, as seen in Fig. 1, so as not to revolve with the case. The pivot p' has an eye, h , shown clearly in Fig. 4, while beneath the spool is a rod, x , connecting p and p'' . A hooked spring, z , is attached by a set-screw, t , as seen, to p' , so that its pressure upon p'' —in other words, the tension of the under thread—may be regulated by the screw. The thread is carried from the spool around the rod x under the hook of the spring, and then through the eye h , as seen in Fig. 4, out through an opening in the spool-case, as seen in Fig. 1. Pivoted beneath the shaft P at 12, Figs. 1, 3, is the feed-lever 13, the upper end of which plays against the conical feed-cam 14, keyed to the shaft so as to revolve with it, and yet be able to slide laterally on the shaft. The other end of the lever is connected with the spring 15, thus serving to keep the free end of the lever in close contact with the cam. A flange, 16, on the edge of the cam, engages with the sliding plate 17 attached to the bed-plate, one end of the plate being in contact with the eccentric 18, while against the other plays the free end of the spring 15. This eccentric is operated by an arm, 19, Figs. 1, 2, curved and pointed, as seen, so as to engage with the holes arranged in a circle on the top of the bed-plate, for the purpose of determining the extent of its motion and to hold it at any given point in the circle. On the shaft P is a bevel-gear, 21, having on its inner face, a ring, 22. A dog, 23, Figs. 1, 12, slotted on one edge, receives this ring, while in a slot in the end of the dog is the pin 24, passing through the lower end of the feed-lever. A spring, 25, Fig. 12, attached to this dog, has its free end playing against the outer face of the ring, while another similar dog, 26, Figs. 1, 12, attached to a pin in the bed-plate, as seen in the former figure,

has a similar spring, 20, the free end of which plays against the inner face of the ring. The free ends of the springs point in opposite directions, so that the vibrating motion of the feed-lever, caused by the action of the feed-cam and spring 15, may give a regular intermittent motion to the wheel 21, the one spring serving to move the wheel, while the other spring prevents the wheel retrograding while the moving spring is carried back to give another "bite," the length of the stroke of the active spring being regulated by the feed-cam, which being cone-shaped, as seen, may be made, by means of the eccentric 18, to present a longer or shorter radius to the lever, as desired, for the purpose of changing the length of the stitch. The cloth-plate 27, Figs. 1, 2, 3, is made with a downward flange to fit over the bed-plate, as seen in Fig. 1, and is held firmly by a pin passing through the bed-plate, and having on its end a thumb-screw, L, Fig. 3. This pin acts as a pivot, upon which, by simply releasing the thumb-screw and pressing upon it, the cloth-plate may be raised so as to release the flange from the bed-plate and then swung entirely away, so as to leave the under spool easily accessible. In the center of the cloth-plate is a circular plate, 28, Fig. 2, having secured to its under side a bevel-gear, 29, Figs. 1, 3, a slot being left between the outer edges of the two to receive the edge of the bed-plate, which thus affords a bearing for the plate and gear. To the under side of plate 28 is attached, by suitable bearings, the arbor 30, Figs. 1, 5, 6, of the feed-wheels 31, 32, made, as shown, very small, and having serrated or roughened peripheries. On the other end of the arbor is a pinion, 33. This arbor is placed, as seen in Fig. 6, in front of the needle-hole y in the plate, and the wheels are, as seen, arranged one on each side of the hole. Fitting between the upper face of the gear 29 and the lower face of the plate 28, on the inner periphery of the former, which is channeled to receive it, is a flanged ring, to which is screwed the bevel-plate gear 34, Figs. 1, 3, 5, 6, having on its upper face cogs, which engage with the the pinion 33. This connection is such that the gear 34 may revolve independently of gear 29; but the latter cannot revolve without carrying with it the former, as the resistance of the flanged ring is stronger than the friction of the dogs on the ring of gear 21. The gear 29 engages with the gear 35, having a thumb-screw, 36, Figs. 1, 3, so that, by means of the thumb-screw, the gear 29, and of course the plate 28, to which it is attached, may be made to revolve in either direction in continuous circles, and thus make a universal feed. Attached to the fixed arm B are two cylinders, 37, 38, the former being shown in Fig. 1 and the latter in Figs. 1, 9. In the cylinder 37 is the piston 39 of the presser-foot 40, while in the other cylinder is the piston 41, Figs. 1, 9, carrying the straight, grooved, eye-pointed needle 42, the piston being attached by a connecting-rod, 43, to the vibrating arm. The piston of the

presser-foot has a spiral spring, 44, and a guiding-shoulder 45 working in a slot in the cylinder, as seen, and also a thumb-screw, 52, Fig. 2, by which it may be raised and retained, as seen. The presser-foot is attached to its piston by a thumb-screw, 46. The needle piston is slotted so as to receive a double-armed spring, 47, pivoted at 48, Figs. 1, 9. By means of a cam-lever, 49, the arms of the spring may be pressed together so as to allow the needle 42 to be inserted between the piston and the free end of the spring, the hook 50 on the end of which engages with the notch in the needle as seen in Fig. 9, and by its pressure holds it firmly. The needles being all made of such length as will allow their heads, when properly set for use, to press against the end of the spring, all that is necessary in inserting the needle is to press the needle "home," no adjustment being necessary.

I think the pressure of the spring would be sufficient to hold the needle even though there were no notch in the latter, but in practice it will be more certain to make the needle with such notch. The upper thread is taken from the ordinary wooden spool placed on any suitable spindle having a tension attachment, as I do not contemplate any change in the ordinary mode of arranging the upper spool or giving tension to the thread, all that is necessary being to have the spool directly back of the balance-wheel. The thread is led through the eyes of the guides K K' K'' down through the groove in the face of the needle-lever and the eye 53 in its point, to and through the eye of the needle, which is threaded in the usual way, the ends of both the upper and lower thread being left loose. The article to be sewed being then placed on the cloth-plate beneath the presser-foot, (which is raised for the purpose and then dropped,) and power being connected with the driving-pulley and the machine set in operation, the downward thrust of the needle carries the upper thread through the cloth and into the slot of the spool-case so far that the point of the hook *g* shall catch the thread on the upward stroke of the needle, the spool-case being so adjusted on the shaft that just before the eye of the needle is withdrawn from the slot the hook shall pass above the eye between the thread and needle and catch the thread and carry it around with it. As the thread is carried along by the hook the spool-case divides the loop, passes through it, and forms the stitch as follows: The spool-case hook revolving, carries with it the loop, which gradually opens, allowing the case to enter it until reaching the position shown in Fig. 7, one side of the loop drops between the disk T and case, as shown. Up to this point the disk revolves with the case, but now, as the case continues to revolve, the loop draws against the notch *o'*, causing the disk to revolve in the opposite direction, as indicated by the arrows, until the case assumes the position shown in Fig. 8, when the thread, slipping notch *o'*, enters notch *o*, which is just

put in position to receive it, and at this point the "take-up" begins to act, and drawing on the loop causes the disk to revolve in the other direction, as indicated by the arrows, thus releasing the thread from the disk and then drawing the loop through the ratchet-wheel V up into the cloth, thus completing the stitch, the take-up being so arranged that it shall draw the stitch tight before the needle reaches the cloth in its downward thrust. The take-up, as shown, will of course take up a length of thread equal to twice the distance traveled by the radial arm, but if it should be found that the length taken up was not sufficient, as in large machines where large spools are used, this may easily be remedied by making the radial arm forked at its outer end, and adding another eye to the guide K, so that the arm will carry along with it two loops instead of one.

By simply turning the thumb-screw 36 the direction of the feed may be changed as desired without removing the work, but to do this it is, of course, necessary to raise the presser-foot, though for making the ordinary circles and turns the foot need not be raised, as the surface presented by the feed-wheels is made so small as not to interfere with such motion, while yet entirely sufficing, with the aid of the presser-foot, to move the cloth. Using two feed-wheels, one on either side of the needle, moves the cloth more evenly, and arranging them so as to draw the cloth through and from the needle, obviates the liability to wrinkling incident to those feeds which push the work toward and beyond the needle.

The presser-foot not rising and falling at each thrust of the needle as in those machines where the feed rises and falls alternately, the noise resulting from such motion is prevented. The construction and arrangement of the spool-case and holder so as to have but one bearing for both, and that a rigid one on the driving-shaft, prevent the noise from rattling of parts and the increased friction unavoidable in those machines in which the device forming the loop has a bearing distinct from that of the bobbin carrying the thread. This machine begins and completes one and the same stitch at each revolution of the case.

I am well aware that a vertically-rotating hook has been heretofore used for the purpose of forming a loop in the upper thread, and that a single roughened wheel has been used to feed the cloth, and that there is no novelty in the use of a partially-revolving cloth-plate; but I do not claim such devices as my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The spool-case R, formed in two parts, having a hook on its periphery, and containing within it a device for holding an ordinary wooden spool, and giving tension to its thread; the spool remaining still while the case revolves, and having united with such case a loose disk, T, and plate S having an arm, Z,

and pinion V, in combination with a vertical eye-pointed needle carrying the thread of an another ordinary spool, and a rotary take-up, H, all arranged in combination with suitable operating mechanism to make stitches, substantially as hereinbefore shown and described.

2. A spool-case, constructed to contain within it an ordinary spool and a device for giving tension to its thread, and provided with a loose disk and fixed plate, such that the case will, when moved by suitable mechanism, operate in connection with a vertically-vibrating eye-pointed needle carrying a thread, to seize such thread, form it into a loop, gradually spread such loop until the case and its inclosed spool has passed completely through the same, in combination with a suitable take-up device to draw such loop tight as the case leaves it, thus completing the stitch, the various parts being constructed and combined for united action, substantially as shown and specified.

3. The spool-case R, consisting of two parts, *d d'*, one of which has a hook on its periphery, a loose disk, T, and plate S, the several parts being constructed and combined substantially as and for the purpose shown and specified.

4. The combination of the spool-case R with a loosely-swinging spool-holder, composed of four arms, *p p' p'' p'''*, one of which is provided with a hooked tension-spring, *z*, and eyelet *h*, the case being connected rigidly with a horizontal shaft and suitable operating mechanism, so as to rotate in a vertical or nearly vertical plane with reference to the bed-plate of the machine, and while so rotating, seizing, spreading, and passing completely through a loop of a thread brought down by a vertically-vibrating needle, such upper thread being acted upon by a suitable take-up to draw the loop tight immediately upon its passing from the spool-case, the various parts being arranged and combined for joint action, substantially as shown and specified.

5. The cloth-feeding mechanism, substantially as hereinbefore described, consisting of two small wheels, revolving intermittently, and having roughened or serrated surfaces, the

shaft to which they are attached having fixed bearings, and being so arranged in relation to the cloth-plate that the needle shall pass between the wheels, which, in combination with a downward-yielding pressing surface, operate by and during their rotary motion to draw the cloth through and from the clamping surfaces, the various parts being constructed and operating substantially as set forth.

6. The combination, with the bed-plate of a sewing-machine, of a revolving plate supporting a rotary feed device, consisting of two small wheels with roughened or serrated surfaces, and a wheel-plate communicating motion to said feed-wheels by gearing on the upper surface of said wheel-plate, engaging with a pinion on the arbor of said feed-wheels, the various parts being combined, constructed, and operating substantially as and for the purpose shown and specified.

7. The combination of the gear 21, ring 22, dogs 23 and 26, and their springs 25 and 20, with the vibrating-lever 13, spring 15, and cam 14, arranged on a revolving-shaft, substantially as set forth.

8. The combination of the gear 21, ring 22, dogs 23 and 26, and their springs 25 and 20, vibrating-lever 13, spring 15, cam 14, and revolving-shaft P with the plate 34, the latter communicating its intermittent motion to the feed-wheels 31 and 32 through the pinion 33, substantially as described.

9. A rotary take-up, composed of the wheel H, adjustable arm 7, eccentric 2, ring 6, arm 3, and semicircular projection 4, all combined, constructed, and operating substantially as described and shown.

10. A needle-holder for a sewing-machine, consisting of a cylinder, 38, piston 41, double spring 47, and cam-lever 49, all constructed and arranged substantially as and for the purpose set forth.

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Witnesses:

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