No. 705,328. Patented July 22, 1902.

P. DIEHL.

TAKE-UP DEVICE FOR SEWING MACHINES.

(Application filed June 26, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 3.

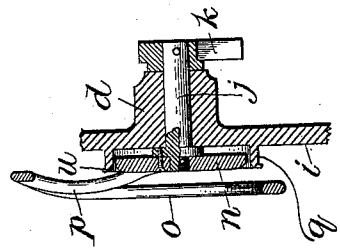


Fig. 2.

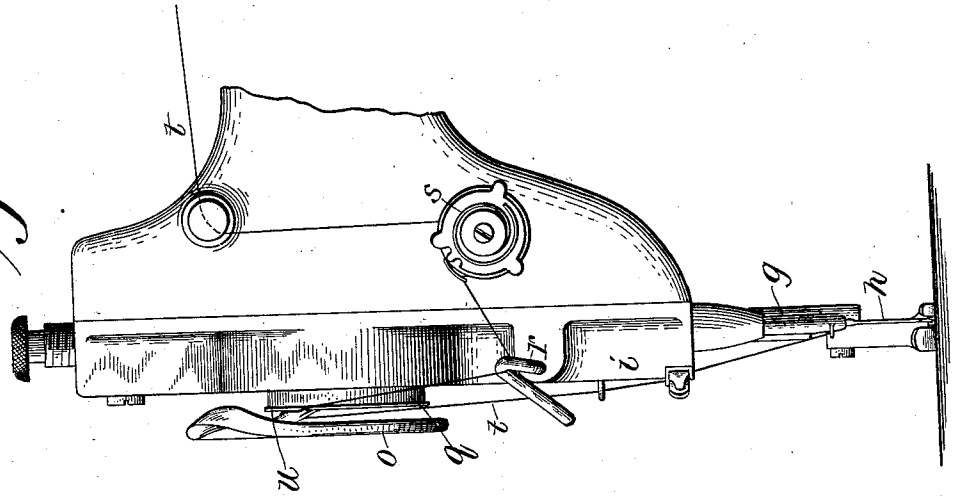
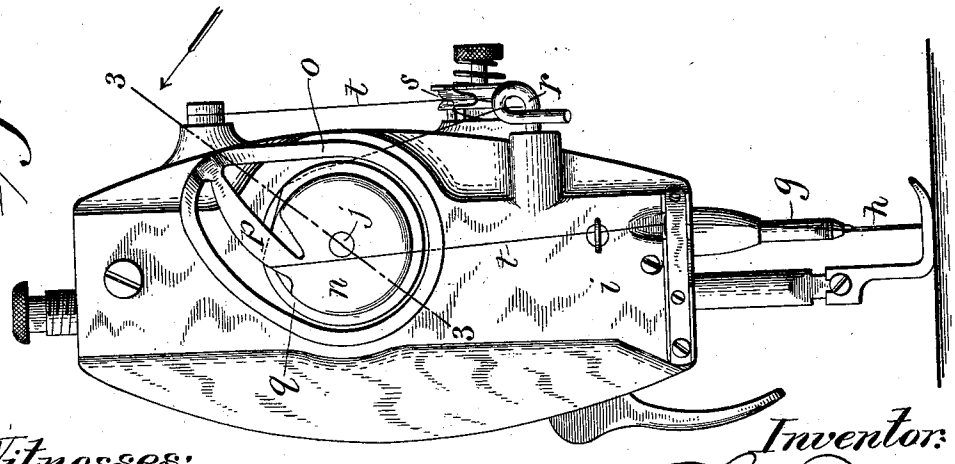


Fig. 1.



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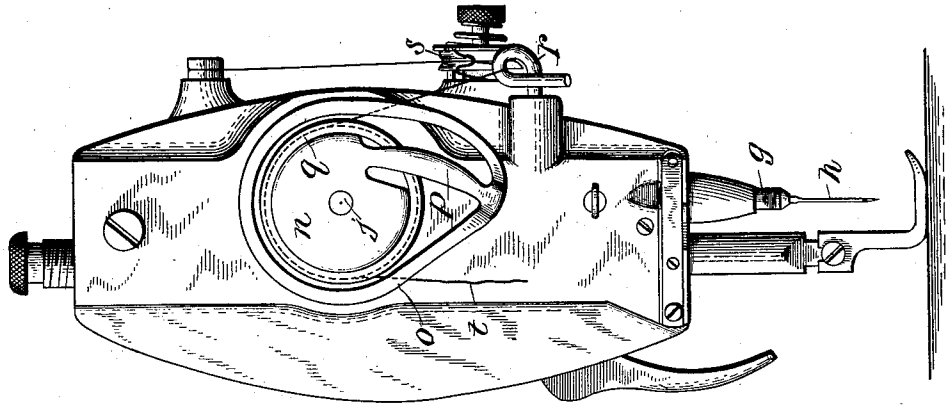


Fig. 3.

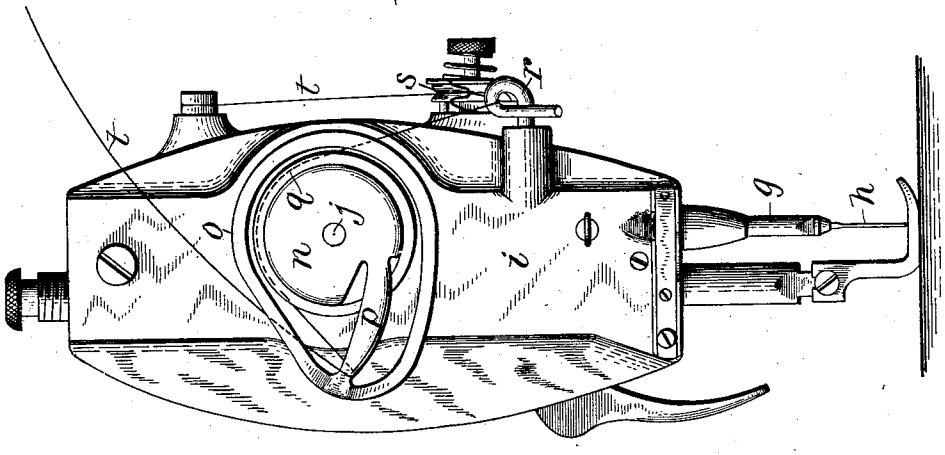


Fig. 4.

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TAKE-UP DEVICE FOR SEWING MACHINES.

(Application filed June 26, 1901.)

(No Model.) 3 Sheets—Sheet 3.

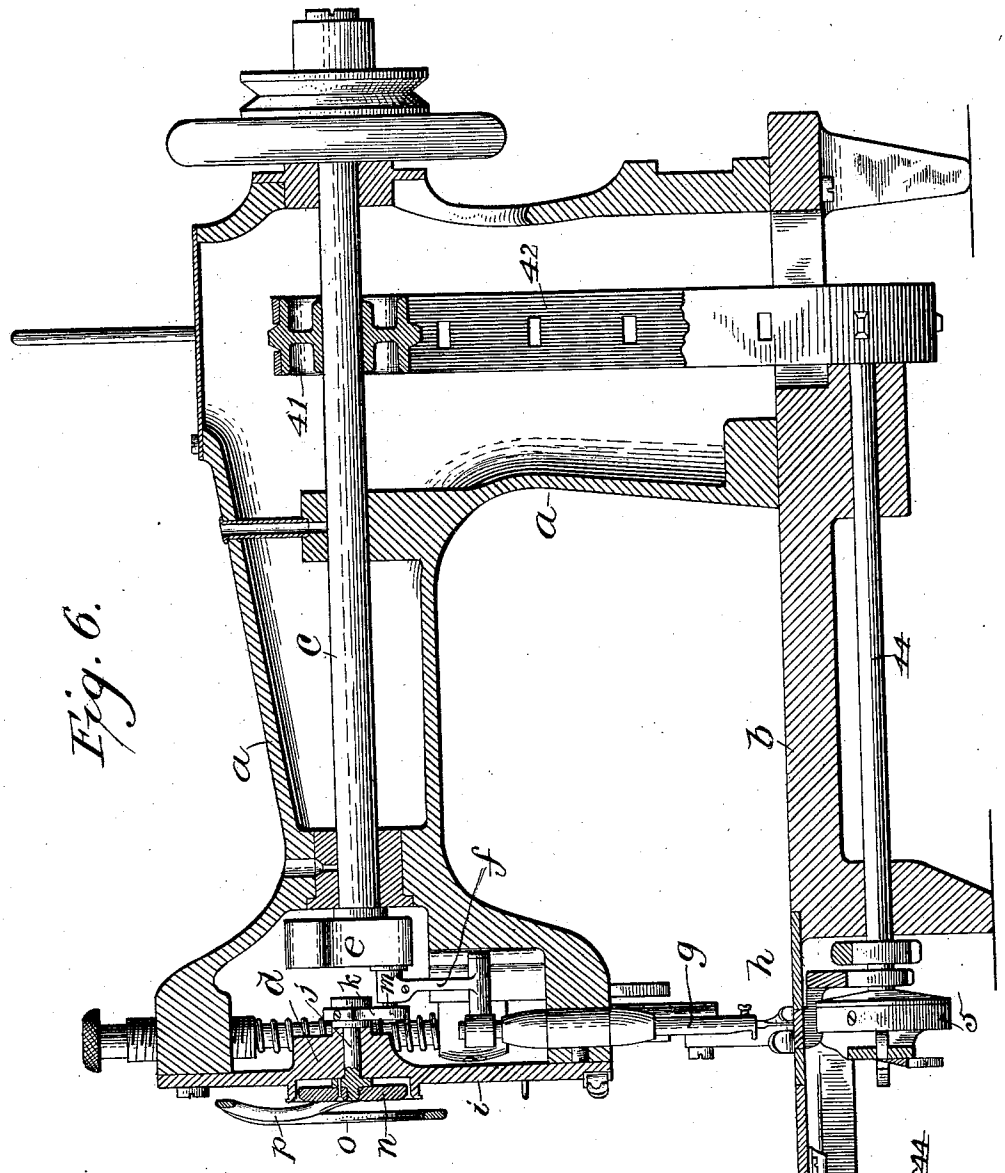


Fig. 6.

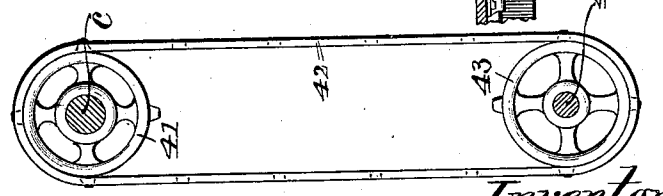


Fig. 7.

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UNITED STATES PATENT OFFICE.

PHILIP DIEHL, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

TAKE-UP DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 705,328, dated July 22, 1902.

Application filed June 26, 1901. Serial No. 66,063. (No model.)

To all whom it may concern:

Be it known that I, PHILIP DIEHL, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Take-Up Devices for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

In the use of rotary take-ups for sewing-machines more or less trouble has arisen by reason of the fact that when the thread is accidentally broken at or near the needle the end of the thread is sometimes caught by the rotary take-up and wound up thereon as the take-up continues to revolve before the machine is stopped. This results in a very considerable waste of thread and also causes annoyance and loss of time in removing the wound-up or entangled thread from the take-up. It has heretofore been proposed to obviate this difficulty by providing stationary thread-cutters, against which the thread would be carried by the rotary take-ups, so as to sever the thread between the spools or thread supplies and the take-ups, and thereby avoid wastage of thread; but even with these thread-cutters the ends or portions of thread extending from the thread-cutters toward the needles were frequently wound up on or entangled with the take-ups, resulting in loss of time in removing the same, and such entanglement of the ends of thread with the rotary take-ups necessarily occurred when the cutters were arranged to sever the thread in advance of the take-ups or between the latter and the tension devices, as the thread would not be severed until one portion thereof became caught fast on the take-up and was thus carried against the thread-cutter.

This invention has for its object to fully obviate the difficulties referred to by providing thread-guarding means for preventing the entanglement of the needle-thread with the rotary take-up when such thread is accidentally broken between the take-up and the work or at or near the needle. To this end I provide a stationary thread-guard or thread-shield which is arranged adjacent to the rotary take-up and which is so located with reference to the latter and to a suitable thread-guide that when the thread accidentally breaks between the take-up and the work the loose thread end will be wrapped around said thread-guard by the rotary take-up, said thread-guard being preferably of such size that only one or two turns of thread will be necessary to wind up all the loose thread, and when the machine is stopped this wound-up thread is drawn off the thread guard or shield without offering any resistance, so that no trouble or loss of time in disentangling or removing fast-caught ends of thread occurs.

In the accompanying drawings, Figure 1 is a front end view of the head or upper part of a sewing-machine embodying the present invention. Fig. 2 is a front side view of the same. Fig. 3 is a detail sectional view on line 3 3, Fig. 1, looking in the direction of the arrows adjacent to said line. Figs. 4 and 5 are views similar to Fig. 1, but with the take-up in different positions to illustrate the operation of the thread-guard. Fig. 6 is a central sectional view of a sewing-machine embodying the invention, and Fig. 7 is a detail view showing the belt-gearing connecting the driving and the driven shafts.

Referring to the drawings, *a* denotes the arm of the machine, *b* the work-plate thereof, and *c* the driving-shaft, journaled in the upper part of the arm and having at its forward end the crank *e*, connected by the pitman *f* with the needle-bar *g*, carrying the usual eye-pointed needle *h*. The driving-shaft *c* is herein shown as being provided near its rear end with a sprocket-wheel 41, connected by a flexible non-metallic belt 42 with a similar sprocket-wheel 43 at the rear end of the lower rotating shaft 44, carrying at its forward end the rotary hook 5, coöperating with the needle *h*, as fully set forth in my United States Patent No. 663,808, dated December 11, 1900. This belt-gearing contains features of novelty, but is not herein claimed broadly, being embraced by my application No. 66,062, filed simultaneously herewith.

Journaled in the bearing portion *d* of the face-plate *i* is a shaft *j*, provided at its inner end with a slotted crank *k*, engaged by the needle-bar-operating crank-pin *m*, said shaft carrying at its outer end a hub or disk *n*, offset from which is a ring or guard *o*, of irregu-

lar oval or pear-shaped form, and which ring or guard *o* is connected with said disk by a tangential take-up arm *p*, which is preferably integral with both said disk and ring and which is also preferably curved outward slightly, as shown. The general operation of this rotary take-up is fully set forth in the joint application of myself and Martin Hemleb, filed May 7, 1901, No. 59,119, and not being my sole invention its operation need not be herein further described.

The face-plate *i* is provided with a hub or ring *q*, preferably formed integral with said face-plate and which surrounds the rotating hub or disk *n* of the take-up, and adjacent to which hub or ring the guard-ring *o* and take-up arm *p* rotate. The hub or ring *q* serves as a guard for preventing the needle-thread *t* from becoming entangled with the rotary take-up should the thread break at or near the needle, as will now be explained. To this end said thread-guard hub *q* is so arranged relative to the rotating take-up and to the thread-guide *r* that the thread running from the tension device *s* to said thread-guide and thence to the rotary take-up will in the rotation of said take-up draw at times across a part of said thread-guard hub or ring, the latter being preferably provided with a small peripheral lip or flange *u*. In the usual operation of the machine the needle-thread is at each rotation of the take-up temporarily detained in contact with the guard ring or hub *q* just after the take-up has tightened the stitch, (see Figs. 1 and 2;) but as the take-up continues its rotation after the stitch-tightening operation the outwardly-curved take-up arm *p*, down which the thread slides after the take-up operation has been completed, carries the thread away and clears it from said guard ring or hub. By arranging the guard ring or hub *q* in such relation to the rotary take-up that the latter will at times carry the thread into contact with said guard ring or hub it results that should the thread break at or near the needle while the machine is in operation the centrifugal action incidental to the rotation of the take-up will force the thread toward the outer end of the take-up arm *p* and outside of or beyond the guard ring or hub *q*, the outer part of the said take-up arm extending beyond or outside of the periphery of said ring or hub, so that the rotating take-up will carry the free end of the thread around said guard ring or hub, which is preferably of such size that one or two turns of the thread around it will wind up the loose thread. In so doing said guard will serve to withdraw or unthread the thread from the take-up, and thus prevent it from becoming entangled therewith. This operation is illustrated by Figs. 4 and 5. Fig. 4 represents the take-up as having performed a partial revolution after the thread has broken and as commencing to wind the thread around the guard-hub *q*. Fig. 5 shows the take-up as having performed about one and a quarter rotations from the position indicated by Fig. 4, so as to have wrapped the thread *t* about once and a half times around the hub *q*, thereby winding up nearly all the loose end of thread and in so doing withdrawing or unthreading the thus-shortened end of the thread from the take-up. This wound-up thread of less than two turns is loose upon the guard-hub and is thus easily removed therefrom by a slight pull on the thread when the attendant wishes to rethread the needle. Thus my improved thread-guard prevents any part of the loose or broken end of the thread from becoming wound upon the take-up without requiring the use of a cutter to sever the thread between the tension or thread-supply and the needle or work.

The thread-guard hub *q* serves when the thread is in contact therewith, as shown in Fig. 1, as a stationary slack-thread controller to take up or control a part of the slack thread resulting from the downward and inward sliding movement of the bight of thread engaged with the tangential take-up arm *p*, on which the needle-thread has an inward and outward sliding movement, due to the fact that the inner limb of the bight of thread engaged with the said hub is considerably bent or deflected from a straight line, as shown. This is advantageous owing to the fact that a proper control of the slack thread at this time or during the early part of the thread-slackening operation prevents the thread from getting in the way of the point of the then descending needle, and thus danger of breakage of the thread by being caught by the point of the needle is avoided. As the thread is not carried into contact with the guard-hub until about or at the time when the stitch is fully tightened and the cast-off or thread-slackening action of the take-up is to commence, the said guard-hub while serving a good purpose of a slack-thread controller does not in any manner interfere with the take-up operation.

I do not wish to be understood as limiting my invention to the details herein shown and described, as these may be varied widely without departing from the spirit of the invention. For example, the thread-guard need not necessarily be made in the form of a continuous ring or hub or need not be of the particular relative size herein represented, and also the invention may be applicable for use in connection with rotary take-ups of somewhat different construction, from that herein shown and described. Also the positions of the thread-guide *r* and the take-up arm *p* relative to the guard ring or hub *q* might be such that in the normal operation of the machine the thread would not come in contact with the said guard ring or hub, but when carried to the extreme outer end of the rotating take-up arm by centrifugal force the thread would be in such position as to be wound about said ring or hub. This might be effected by locating the thread-guide *r* a

little farther outward or to the left, Fig. 2, and by inclining the outer end of the take-up arm *p* a little farther inward or to the right, Fig. 2. Also as the gist of the invention consists in means for controlling without severing the loose end of the accidentally-broken needle-thread in such a manner that it cannot become entangled with the take-up it will be obvious that any device capable of performing this function will be within the scope of the invention.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a sewing-machine, the combination with a rotary take-up, of a stationary device arranged and operating out of the normal path of movement of the thread and adapted to catch, without severing, the loose end of the needle-thread as it is carried around by the take-up after accidental breakage between the tension and the work, thereby preventing the entangling of the thread with the take-up, and means for guiding the thread to said stationary device and take-up.

2. In a sewing-machine, the combination with a rotary take-up, of a thread-guard device for withdrawing or unthreading the needle-thread from the said take-up when the said thread accidentally breaks between the take-up and the work, and means for guiding the thread to said thread-guard device and take-up.

3. In a sewing-machine, the combination with a rotary take-up, of a stationary thread-guard located adjacent to said take-up and a thread-guide so arranged relative to said thread-guard and take-up that when the needle-thread accidentally breaks the loose end thereof will be wound up on said thread-guard.

4. In a sewing-machine, the combination with a rotary take-up comprising a take-up arm on which the thread can slide out and in for the take-up and thread-slackening operations, of a stationary thread-controller serving to take up or control a part of the slack thread given up by the said take-up arm during the early part of the thread-slackening operation and during the time the needle is descending to enter the work.

5. In a sewing-machine, the combination with a rotary take-up, of a thread-guard ring or hub located adjacent to said take-up and outside or beyond the periphery of which said take-up extends, and thread-guiding means for directing the thread to the take-up and guard ring or hub, so that a loose end of needle-thread will be wrapped about said guard ring or hub and thus be withdrawn from said take-up to prevent its entanglement therewith.

6. In a sewing-machine, the combination with a rotary take-up comprising the ring or guard *o* and take-up arm *p*, of a thread-guard ring or hub *q* adjacent to said rotary take-up and outside or beyond the periphery of which a portion of said take-up arm extends.

7. In a sewing-machine, the combination with a rotary take-up comprising a take-up arm on which the thread can slide out and in for the take-up or stitch-tightening and the thread-slackening operations, of a stationary thread-guard hub adjacent to the path of movement of said take-up arm and which is arranged so as to control slack thread given up by or released from said take-up arm at the thread-slackening operation.

In testimony whereof I affix my signature in presence of two witnesses.

PHILIP DIEHL.

Witnesses:
HENRY J. MILLER,
HENRY A. KORNEMANN.