No. 705,221. Patented July 22, 1902.

P. DIEHL & M. HEMLEB.

ROTARY TAKE-UP DEVICE FOR SEWING MACHINES.

(Application filed Dec. 30, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

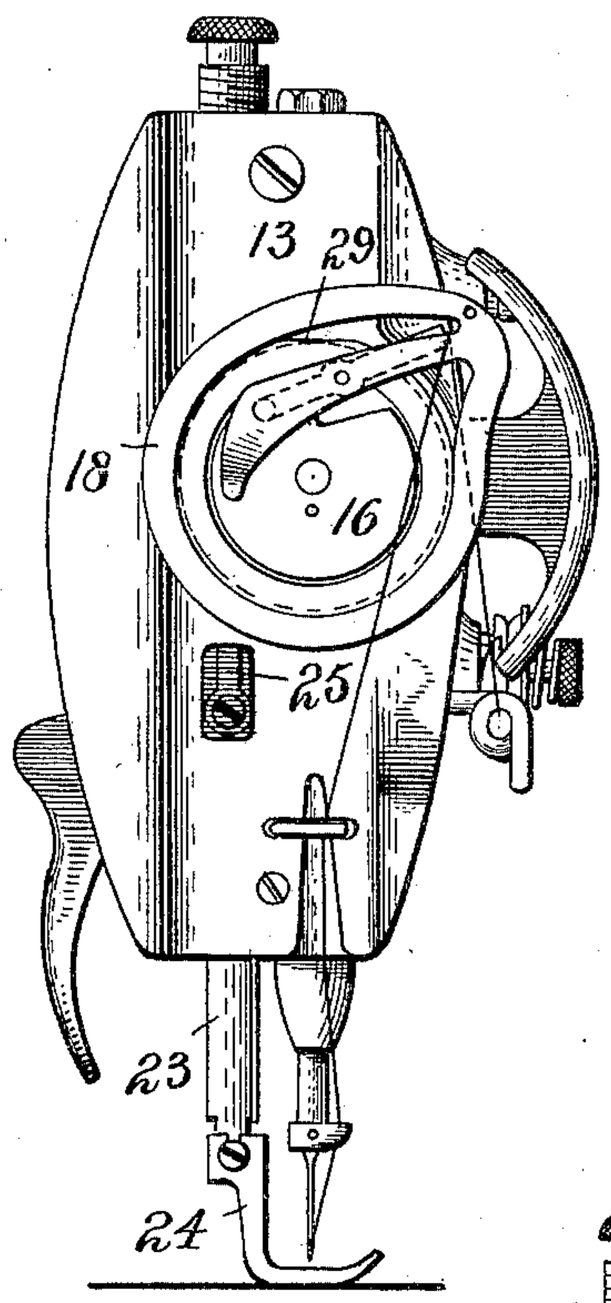


Fig. 4.

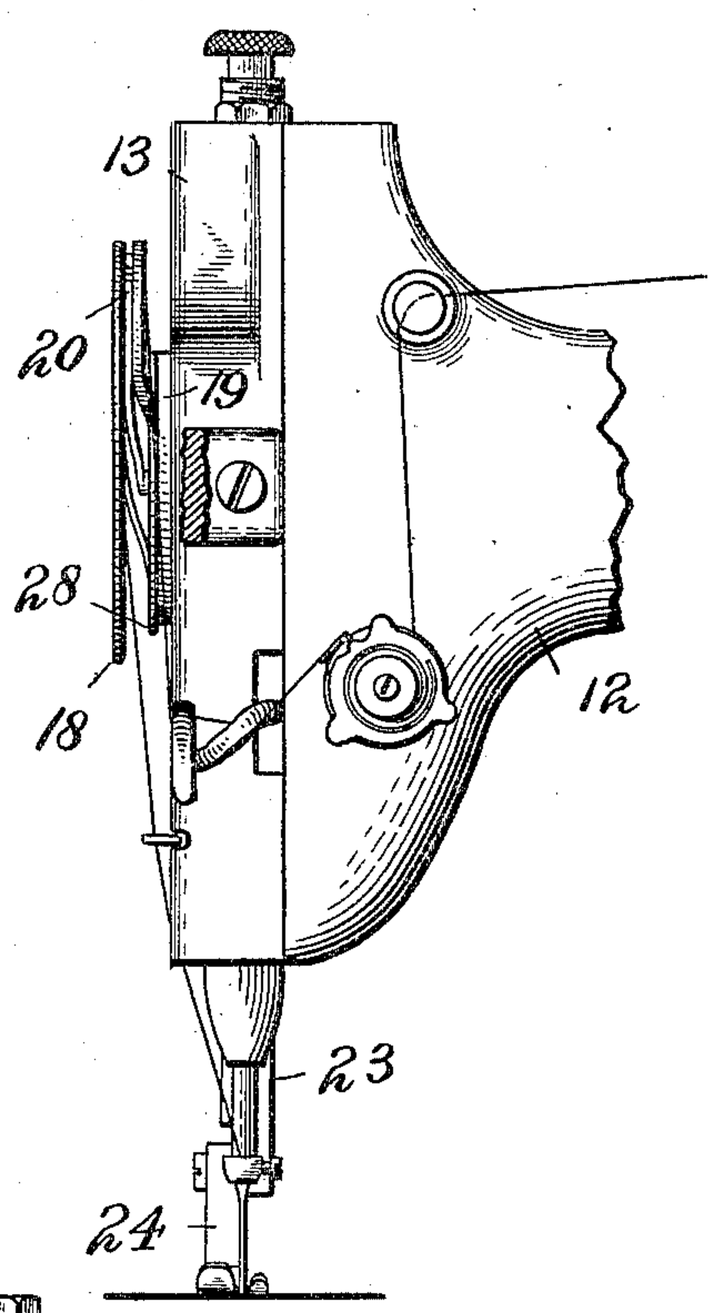


Fig. 3.

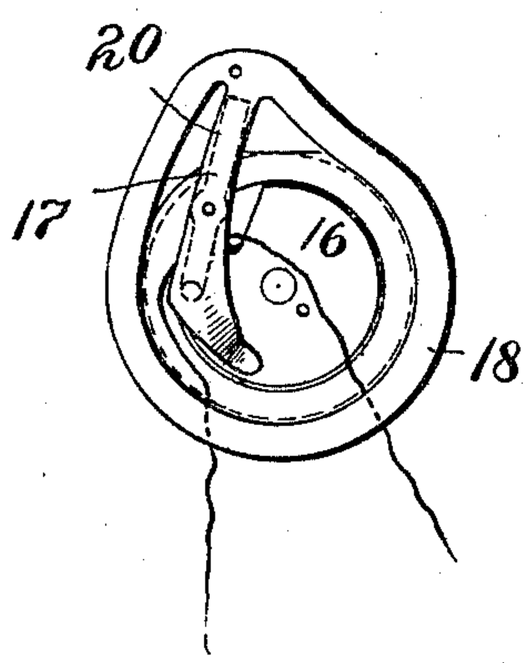
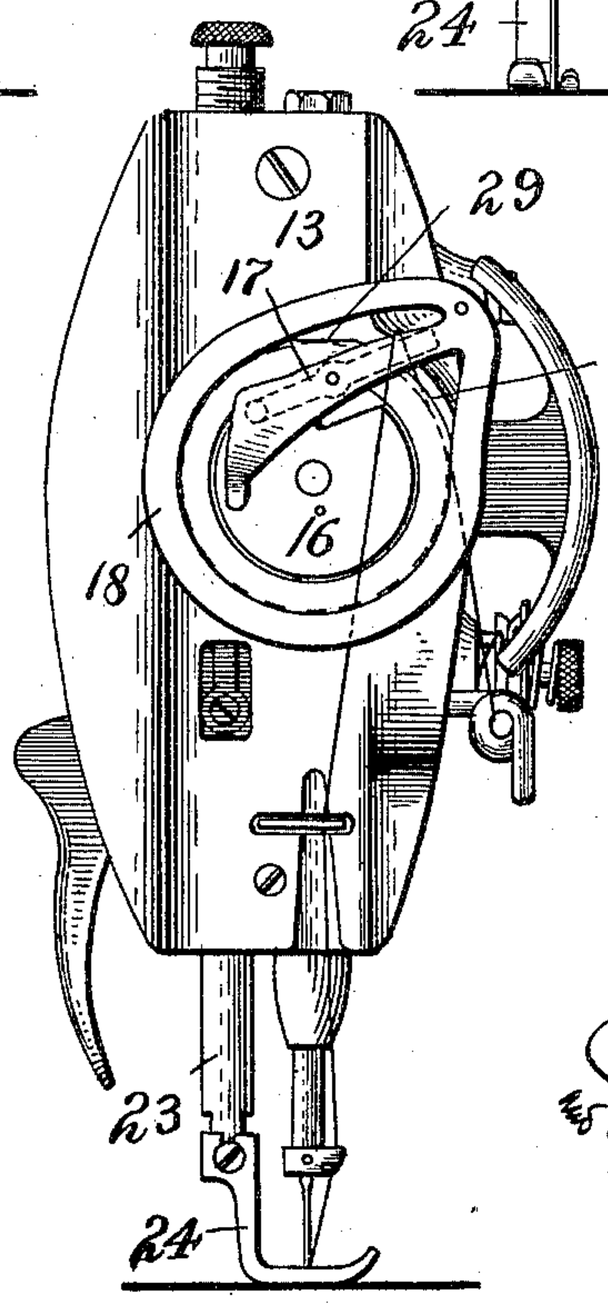


Fig. 2.



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ROTARY TAKE-UP DEVICE FOR SEWING MACHINES.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 5.

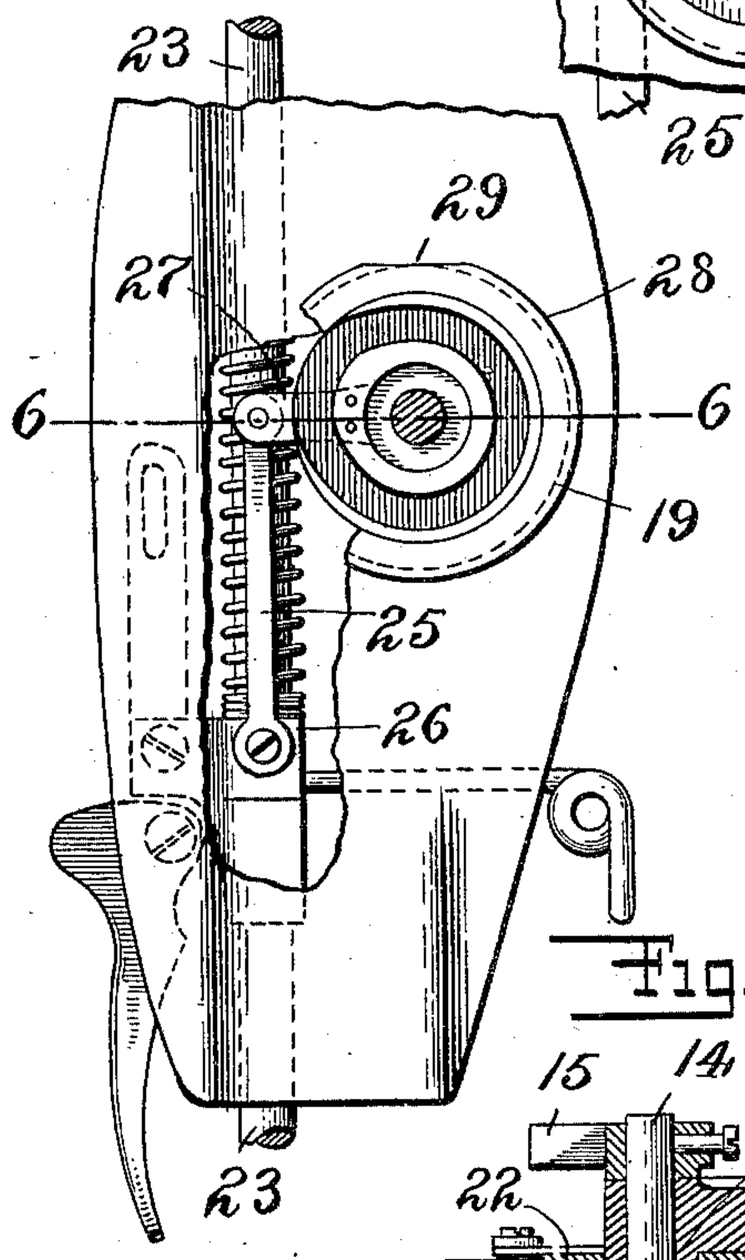


Fig. 9.

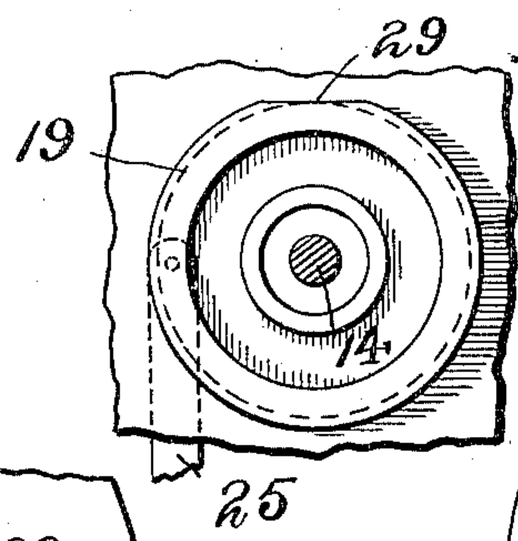


Fig. 7.

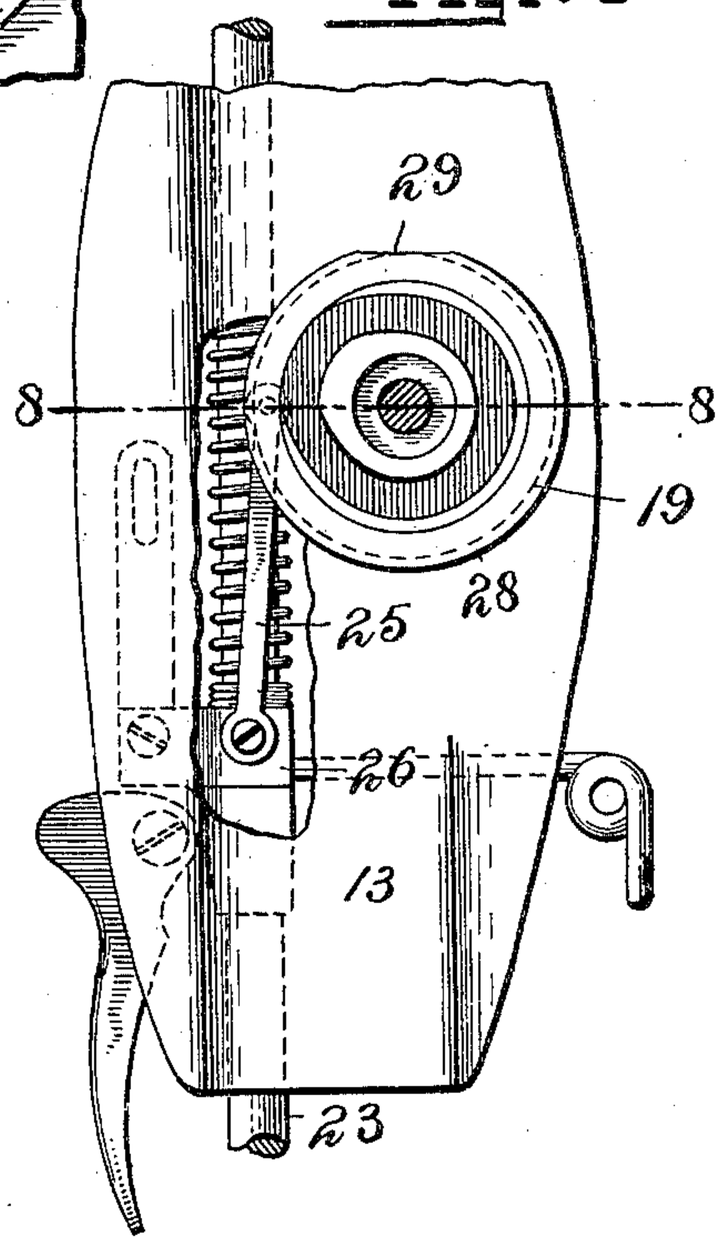


Fig. 11.

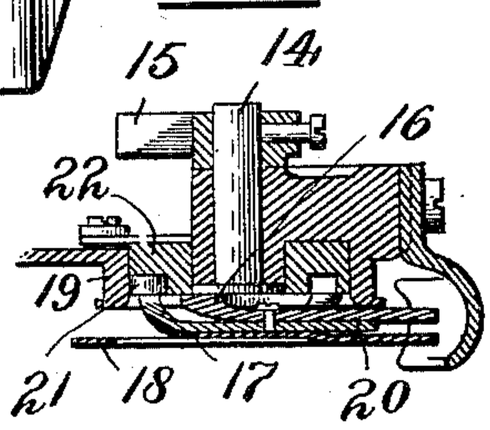


Fig. 6.

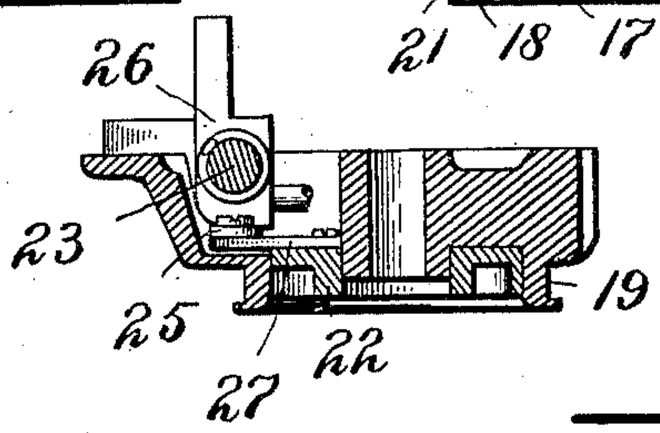


Fig. 8.

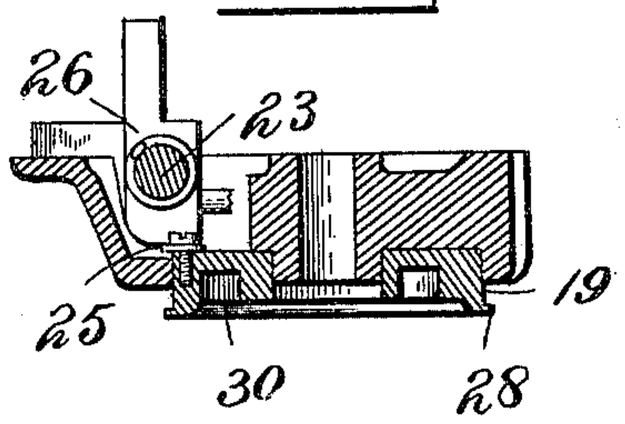
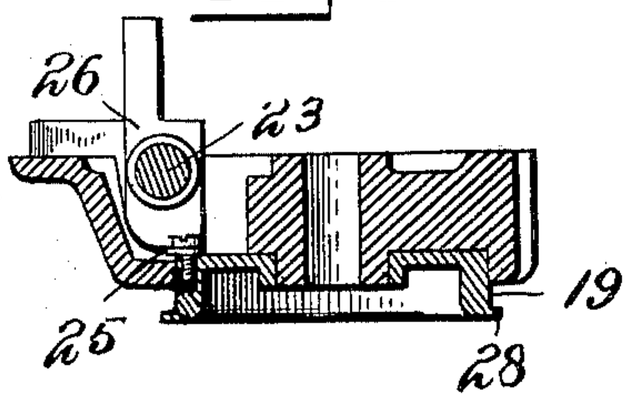


Fig. 10.



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UNITED STATES PATENT OFFICE.

PHILIP DIEHL AND MARTIN HEMLEB, OF ELIZABETH, NEW JERSEY, ASSIGNORS TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

ROTARY TAKE-UP DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 705,221, dated July 22, 1902.

Application filed December 30, 1901. Serial No. 87,780. (No model.)

To all whom it may concern:

Be it known that we, PHILIP DIEHL and MARTIN HEMLEB, citizens 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 Rotary Take-Up Devices for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to rotary take-ups for sewing-machines, and has for its object to provide certain accessories coöperating with a rotary take-up whereby a uniform take-up or stitch-tightening action will be secured in the use of different kinds of needle-threads and in sewing different kinds and different thicknesses of materials, so that the needle-thread will be properly controlled under all conditions of operation.

To this end the invention provides a thread-detaining and cast-off-controlling device to coöperate with a rotary take-up arm on which a bight of needle-thread may have a sliding in-and-out movement, so that the bight of needle-thread will be reliably held at the outer part of said arm until the take-up or stitch-tightening operation is effected and will then be released or cast off from take-up position, so that it will slide inward for the thread-slackening operation to give up a proper amount of loose thread for the next succeeding stitch. The detaining device is preferably mounted on, and thus movable with, the rotary take-up, and the operating-cam therefor is preferably so connected with the presser-foot of the machine that it will be automatically adjusted according to the thickness of work beneath the said presser-foot, so that the cast-off or thread-releasing action will occur a little earlier in the rotation of the take-up when the work is thicker and a little later when the work is thinner, thereby resulting in uniformly-tightened stitches under all conditions, as stated.

Referring to the drawings, Figures 1 and 2 are front end views of the upper part of a sewing-machine embodying the invention, Fig. 1 showing the parts in the position they assume just as the final take-up or stitch-forming operation is being effected, and Fig. 2 showing the positions assumed by the parts just as the thread-slackening operation has commenced. Fig. 3 illustrates the parts in fully thread-slackened positions. Fig. 4 is a partial front side view of the construction shown in Figs. 1 and 2. Fig. 5 is a detail view to illustrate the connection of the operating-cam for the thread-detainer with the presser-bar of the machine; and Fig. 6 is a cross-section on line 6 6, Fig. 5, through the cam and face-plate. Figs. 7 and 8 are views similar to Figs. 5 and 6, showing a modified or preferred form of the invention; and Figs. 9 and 10 are detail views illustrative of still another form of the invention. Fig. 11 is a horizontal sectional view showing the operating devices of the rotary take-up and thread-detainer.

In the drawings, 12 denotes a portion of the bracket-arm of a sewing-machine, and 13 the face-plate, removably secured to the head of the arm in the usual manner. Journaled in a thickened bearing portion of the face-plate is a small rotary take-up shaft 14, provided at its inner end with a slotted crank 15 to be operated by the machine needle-bar crank-pin, said shaft having at its outer end a fixed hub or disk 16, provided with an outwardly-extending and preferably tangentially-disposed take-up arm 17, carrying at its outer end an encircling thread-guard 18.

The parts thus far described are or may be essentially the same as the corresponding parts shown and described in our United States application, No. 59,119, filed May 7, 1901, and the general construction of the sewing-machine and the means by which the rotary take-up shaft is operated are or may be essentially the same as in said application.

In the present instance the face-plate is preferably provided with a stationary hub or thread-guard 19, encircling the take-up hub or disk 16, as in our application No. 66,063, and serving, as described in our said application, to prevent entanglement of a loose end of the thread with the rotary take-up should the thread be accidentally broken between

the take-up and the needle, said thread-guard also serving, as will hereinafter appear, as a controller for the slack thread.

The take-up arm 17 consists, preferably, of two separated parts or plates, between which is pivotally mounted a thread-detaining and cast-off-controlling lever 20, provided with a pin or roller-stud 21, engaging a normally stationary cam 22, mounted in the face-plate 13 and preferably connected with the presser-bar 23, provided with the presser-foot 24, by means of a link 25, attached at its lower end to a collar 26 on said presser-bar and jointed at its upper end to an arm or projection 27, with which said cam is or may be provided.

In the operation of the rotary take-up the bight of needle-thread engaged by the take-up arm 17 slides or moves in and out on the said arm, being at the outer part thereof when the take-up or stitch-tightening action occurs and moving inward on said arm after a stitch has been tightened and when the thread-slackening action takes place, as fully set forth in our applications hereinbefore referred to. In order to positively prevent inward or thread-slackening movement of a bight of needle-thread on the take-up arm during the take-up operation, the lever 20 is so operated by its cam 22 as to cause said lever to present at its outer end, by the projection of said outer end slightly above the upper surface or surfaces of the said take-up arm, a thread-detaining shoulder, as shown in Fig. 1, and which shoulder will positively hold the thread at the outer or take-up part of said arm until the stitch-tightening action has been effected, when the said lever will be operated by its cam to move the thread-detaining shoulder down flush to or slightly below the upper surface or surfaces of the take-up arm, (see Fig. 2,) thus releasing the thread and permitting it to slide downward and inward on said take-up arm for the thread-slackening operation. As the thickness of the material being sewed increases and more needle-thread for a given length of stitch is therefore absorbed by the work less thread is required to be drawn up by the take-up in tightening the stitches, so that under such circumstances the cast-off or thread-slackening action of the take-up should occur earlier in the rotation of the take-up. This is automatically provided for by the connection hereinbefore described of the cam 22 with the presser-bar and presser-foot, so that as the latter is lifted to a higher position by the increased thickness of the work passing beneath it the said cam will be correspondingly shifted, so as to operate the lever 20 earlier, and thus cause its thread-retaining end or shoulder to release the bight of thread sooner in the rotation of the take-up than when thinner material is being sewed, this automatic variation or adjustment being reversed when the work is thinner, as will be understood.

The thread-guard hub 19 is provided with a small peripheral flange 28, which serves, by deflecting one limb of the bight of thread held by the take-up from a straight line, as a slack-thread controller, and the said thread-guard hub and thread-controller are preferably used in coöperation with the thread-detainer or lever 20, moving with the rotary take-up, but may be used independently thereof, if desired. In the use of the thread-guard hub as a thread-controller the flange of said hub is preferably cut away slightly, as at 29, at one portion of its upper edge to afford a cast-off part to facilitate the cast-off or thread-releasing operation. Thus when in the rotation of the take-up the take-up arm assumes a nearly vertical position after a stitch has been tightened and when the thread-slackening operation due to the sliding inward and downward movement of the bight of needle-thread on said arm has commenced the limb of needle-thread which has momentarily been detained by said flange will be cast off from the guard-hub, (see Fig. 3,) and this cast-off action will be assisted by the cut-away or flattened portion of said flange. As the portion of the needle-thread momentarily retained on the guard-hub after the thread-slackening action has commenced will be bent or deflected from a straight line, a considerable amount of slack will thus be taken up by the said guard-hub, which thereby performs the additional function of a thread-controller in assisting to handle the slack thread.

To provide for an automatic adjustment of the cast-off portion of the guard-hub thread-controlling flange according to varying thicknesses of work and preferably simultaneously with the automatic adjustment of the cam for operating the thread-detaining lever 20, the said guard-hub may be formed integral with the cam referred to and separate from the face-plate, as shown in Figs. 7 and 8, in which 19 denotes the movably-mounted guard-hub in which is formed the cam-groove 30 for operating the thread-detaining lever 20, said hub being connected by the link 25 with the collar 26 on the presser-bar.

In utilizing the guard-hub 19, with or without its cast-off cut-away portion 29, as a thread-controller independently of the thread-detaining lever and its operating-cam said hub may also be connected by a link 25 with the presser-bar, as indicated by Figs. 9 and 10, which show a guard-hub without a cam movably mounted in the face-plate.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. In a sewing-machine, the combination with a rotary take-up comprising an arm on which the needle-thread can slide out and in from and toward the center of movement of said take-up, of an automatically-operated thread-detaining device mounted on said arm and serving to control the take-up and the cast-off or thread-slackening operations.

2. In a sewing-machine, the combination with a rotary take-up, of a cast-off-controlling

device, a presser-foot, and connections between the said presser-foot and cast-off-controlling device; whereby the timing of the operation of the said cast-off-controlling device will be varied with the varying thickness of the work beneath the presser-foot.

3. In a sewing-machine, the combination with a rotary take-up comprising an arm extending outward from the center of movement of the take-up, and on which the needle-thread can slide in and out, of a lever providing a thread-detaining shoulder on said arm, and a normally stationary cam for operating said lever.

4. In a sewing-machine, the combination with a rotary take-up comprising an arm extending outward from the center of movement of the take-up, and on which the needle-thread can slide in and out, of a lever providing a thread-detaining shoulder on said arm, a normally stationary cam for operating said lever, a presser-foot, and connections between said presser-foot and said cam whereby the position of the latter will be varied to change its timing for different thicknesses of work.

5. In a sewing-machine, the combination with a rotary take-up, of a normally stationary thread-controller having a cast-off part, a presser-bar, and connections between said presser-bar and said normally stationary thread-controller; whereby when the presser-foot is raised or lowered the position of the cast-off part of said normally stationary thread-controller will be correspondingly varied.

6. In a sewing-machine, the combination with a rotary take-up, of a thread-detaining and cast-off-controlling device movable and coöperating with said rotary take-up, and a normally stationary thread-controlling device adjacent to and also coöperating with said rotary take-up, and serving to control the slack thread first given up by said take-up after a stitch has been tightened.

7. In a sewing-machine, the combination with a presser-foot and a rotary take-up having an arm on which the thread can slide in and out, of a thread-detaining lever on said arm, a normally stationary cam for operating said lever, a normally stationary coöperating thread-controlling device having a cast-off part, and connections between said cam and said normally stationary thread-controlling device whereby the position of the latter and of the said cam will be automatically varied, to change the timing, with variations of the thickness of work.

8. In a sewing-machine, the combination with a rotary take-up comprising a take-up arm on which the thread can slide outward for take-up position and inward for thread-slackening position, and which arm consists of two separated parts or plates, of a thread-detaining and cast-off-controlling lever mounted between said separated parts of said arm, and a normally stationary cam for operating said lever.

9. In a sewing-machine, the combination with a rotary take-up comprising a take-up arm on which the thread can slide outward for take-up position and inward for thread-slackening position, and which arm consists of two separated parts or plates, of a thread-detaining and cast-off-controlling lever mounted between said separated parts of said arm, a normally stationary cam for operating said lever, and a coöperating normally stationary thread-controlling device.

10. In a sewing-machine, the combination with a rotary take-up comprising a take-up arm on which the thread can slide outward for take-up position and inward for thread-slackening position, and which arm consists of two separated parts or plates, of a thread-detaining and cast-off-controlling lever mounted between said separated parts of said arm, a normally stationary cam for operating said lever, a coöperating normally stationary thread-controlling device having a cast-off part, a presser-bar, and connections between said presser-bar and said cam and thread-controlling device; whereby the timing of the operation of said lever and thread-controller will be automatically varied for different thicknesses of work beneath the presser-foot.

In testimony whereof we affix our signatures in presence of two witnesses.

PHILIP DIEHL.
MARTIN HEMLEB.

Witnesses:
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HENRY A. KORNEMANN.