Oct. 9, 1945. C. R. BACKLIN 2,386,678

THREAD CONTROL DEVICE FOR SEWING MACHINES

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Fig. 1

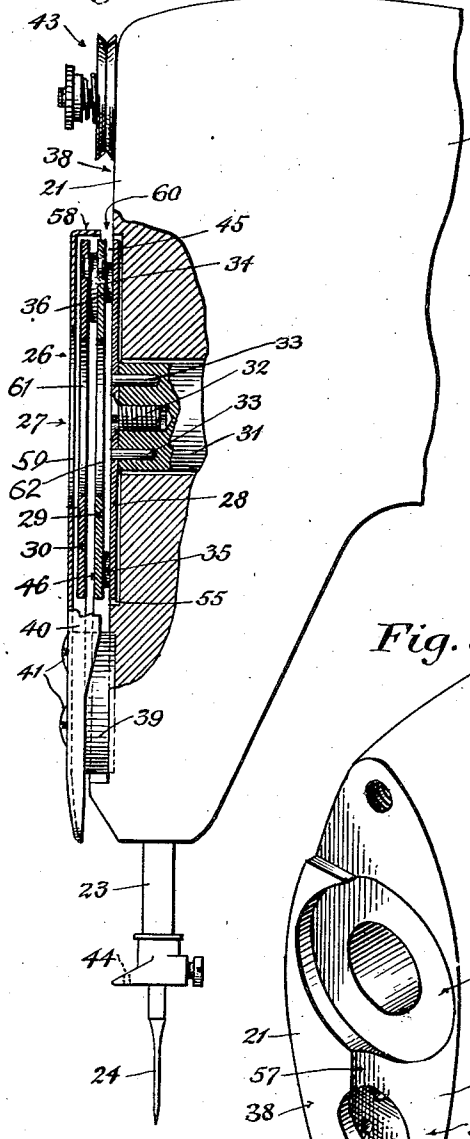


Fig. 2

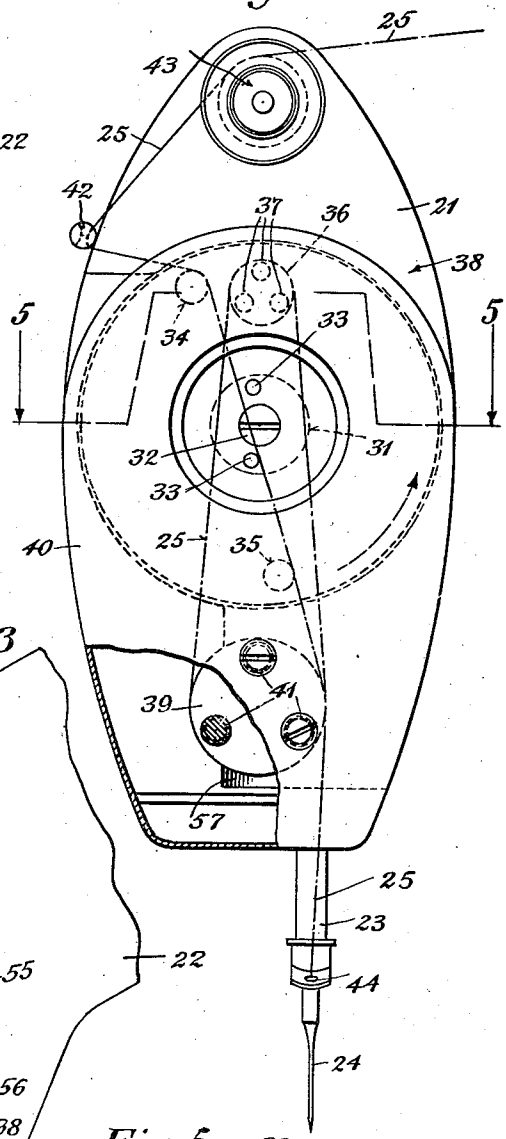


Fig. 3

Fig. 4

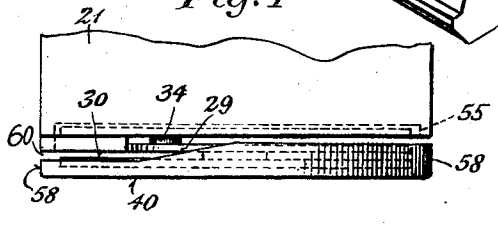
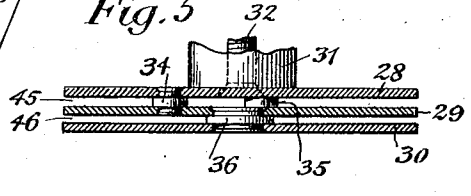


Fig. 5



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Fig.8

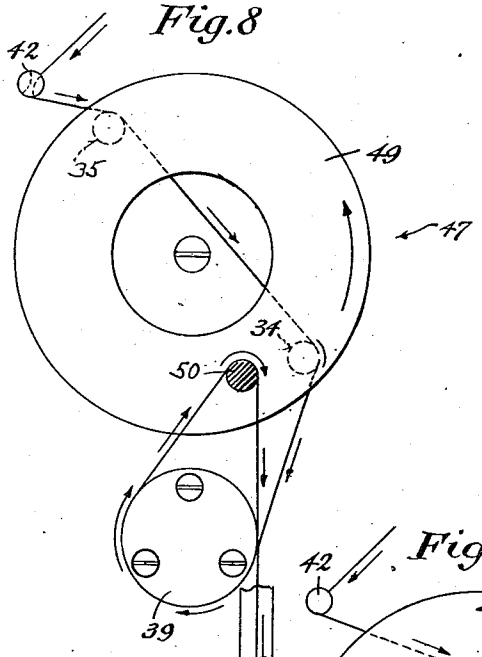


Fig.9

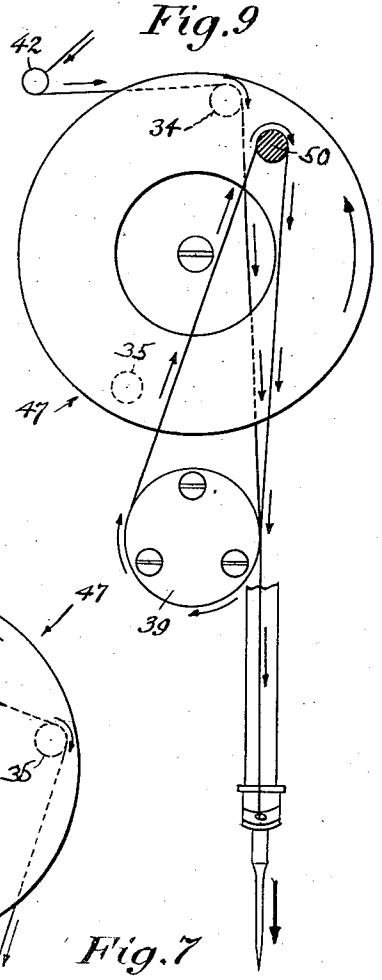


Fig.10

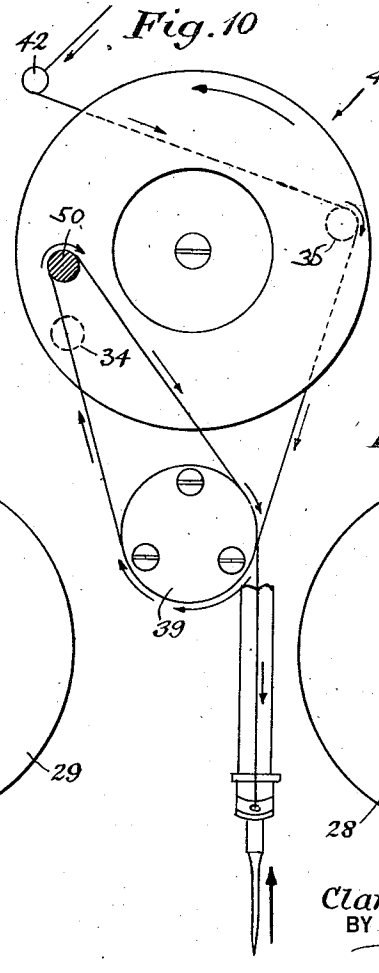


Fig.6

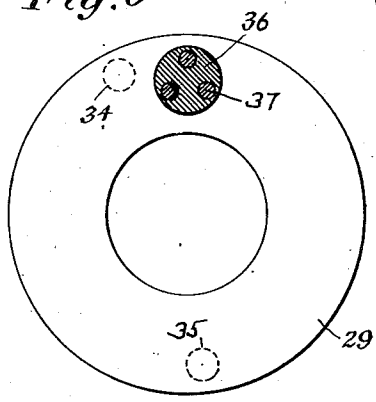
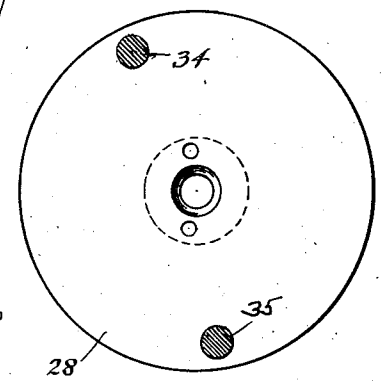


Fig.7

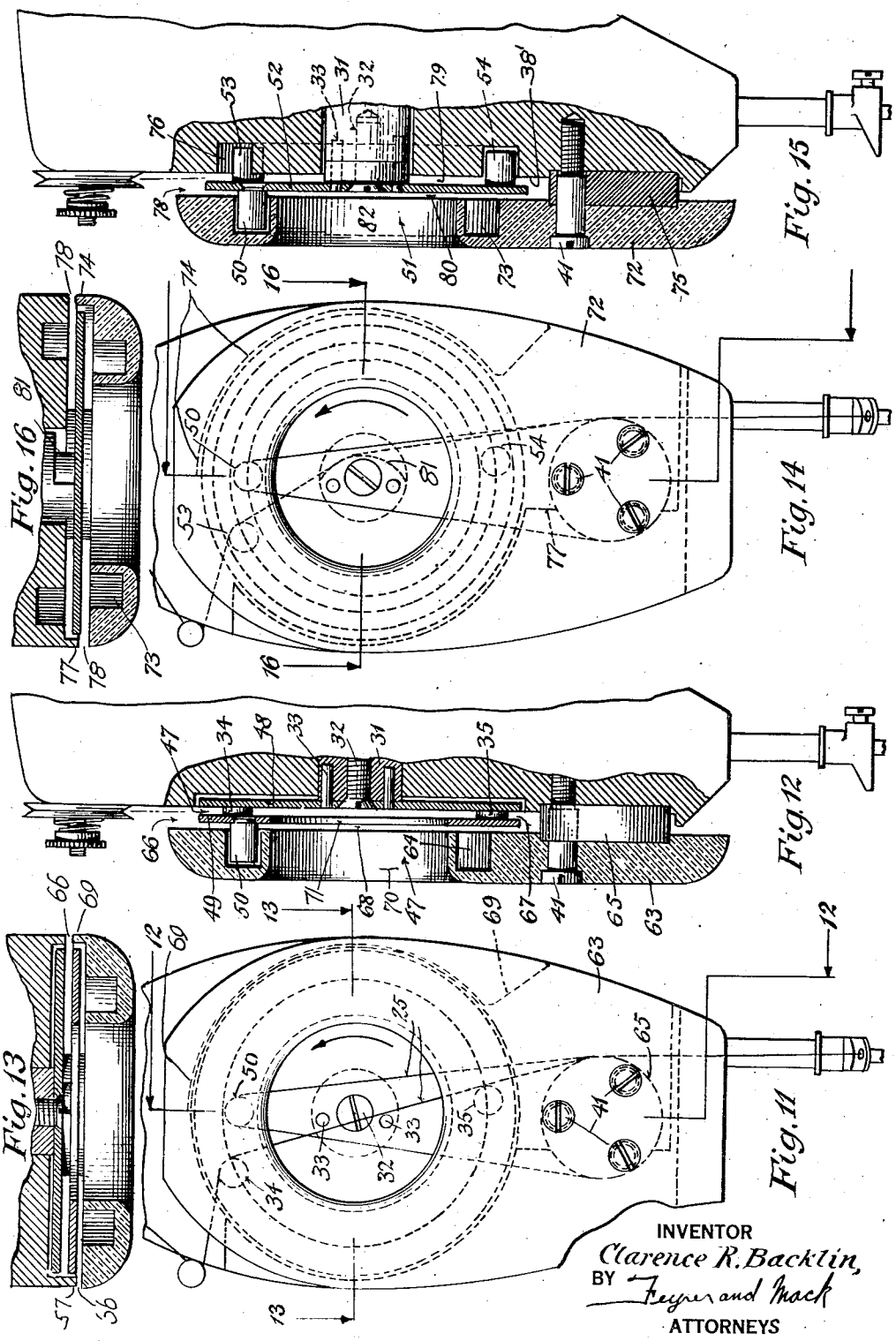


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THREAD CONTROL DEVICE FOR SEWING MACHINES

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Fig. 17

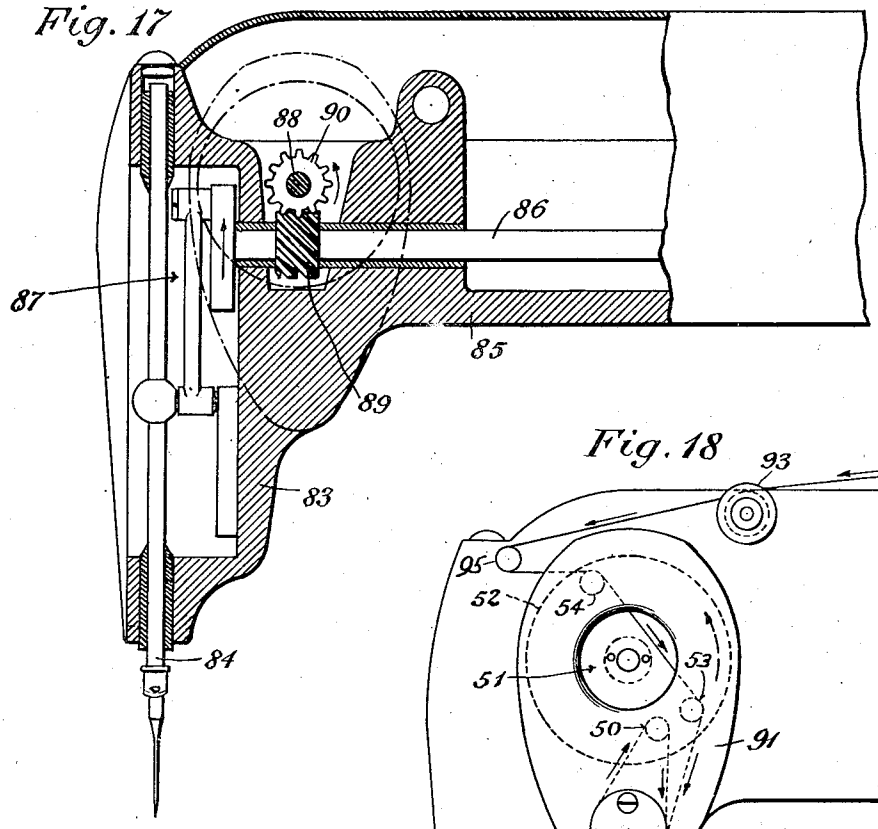
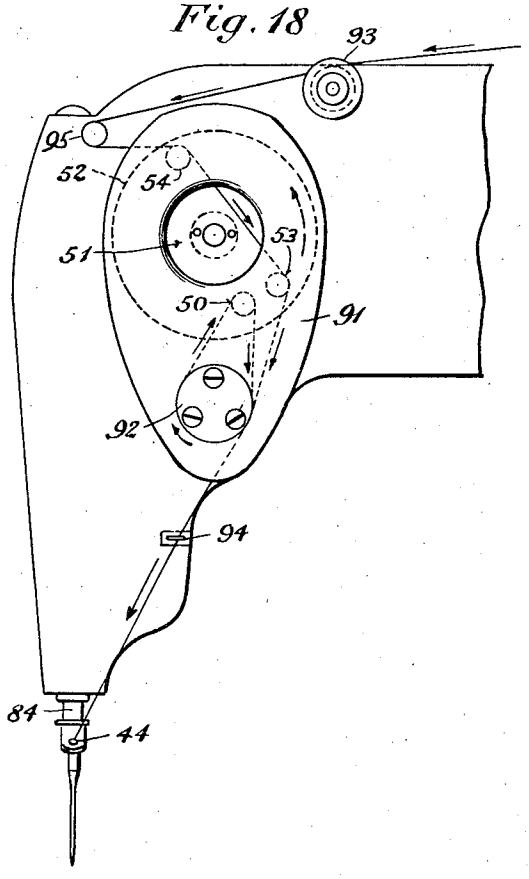


Fig. 18



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UNITED STATES PATENT OFFICE

2,386,678

THREAD CONTROL DEVICE FOR SEWING MACHINES

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Application May 28, 1942, Serial No. 444,827

19 Claims. (Cl. 112—248)

This invention relates to sewing machines; and particularly to improved thread-control means therefor.

One of the important desideratums of a thread take-up, especially one to be used on a high speed sewing machine, is that it have an easy action on thread. A rotary type of take-up, which does have an easy action on thread, thus has been found to be particularly desirable on high speed sewing machines. However, despite the above-explained advantage of rotary take-ups, in general the rotary take-ups heretofore employed have had the failings of allowing slack thread to be uncontrolled during a part of the revolution thereof, or of requiring the employment of complicated mechanisms including auxiliary shafts and/or other special auxiliary devices to provide a secondary control of the thread.

In the common form of rotary take-up, such as used with sewing machines of the lock stitch type, a pronounced difficulty has been encountered in that, in order to provide a sufficiently fast acting take-up, it has been necessary to increase the size or orbit of the take-up, thus increasing the amount of uncontrolled thread.

It is, therefore, an object of the present invention to provide a take-up of simple form, having only one moving unit, small in size, which will take up thread with ample speed and at the same time will control excess or slack thread to practically any degree desired.

It is a further object of the invention to provide a take-up which not only will take up thread with ample speed and at the same time will control excess or slack thread very effectively but also may be very rapidly, easily and accurately threaded.

A feature of the invention, therefore, resides in the provision of a relatively small take-up which includes a main take-up element extending from one face of a rotatable take-up plate, and an auxiliary take-up element and a slack thread control element extending from the opposite face of the take-up plate, all of these elements being adapted to act on the same thread and being so disposed relative to each other that while the desired fast action of an oversize take-up is obtained, excess or slack thread is controlled in a very satisfactory manner.

Another feature of the invention resides in the provision in a take-up and thread control device including thread-engaging elements extending from opposite faces of a rotatable take-up plate and including thread guide means relative to which said thread-engaging elements move, of means which accurately directs the same thread, in the threading of the device, in a predetermined manner relative to said thread guides and consecutively to opposite faces of said take-up plate.

Other objects and features will appear hereinafter.

In the drawings:

Figure 1 is a front side view, partly broken away, of the head portion of a sewing machine embodying the present invention.

Fig. 2 is an end view of the sewing machine as shown in Fig. 1, a portion of the same being broken away to more clearly illustrate certain elements of the invention.

Fig. 3 is a perspective view illustrating the head portion of the sewing machine as illustrated in Figs. 1 and 2.

Fig. 4 is a top view of the head end of the machine shown in Figs. 1 and 2, certain of the parts being omitted for clarity of illustration.

Fig. 5 is a sectional detailed view illustrating the rotating take-up unit embodied in the thread control illustrated with the sewing machine shown in Figs. 1–4.

Fig. 6 is a sectional view illustrating the intermediate take-up plate embodied in the rotating take-up unit shown in Fig. 1.

Fig. 7 is a view similar to Fig. 6, but illustrating the inner take-up plate.

Figs. 8, 9 and 10 are views illustrating successive stages in the operation of the take-up on the thread.

Fig. 11 is a view similar to Fig. 2, but illustrating another form of the invention.

Fig. 12 is a view similar to Fig. 1, but illustrating that form of the invention shown in Fig. 11.

Fig. 13 is a sectional view taken on the line 13—13 of Fig. 11.

Fig. 14 is a view similar to Fig. 11, but illustrating another form of the invention.

Fig. 15 is a view similar to Fig. 12, but illustrating that form of the invention shown in Fig. 14.

Fig. 16 is a sectional view taken on the line 16—16 of Fig. 14.

Fig. 17 is a section of a fragmentary portion of a sewing machine illustrating the manner of associating the thread take-up and control mechanism at the front side of the sewing machine.

Fig. 18 is a front view of the sewing machine as illustrated in Fig. 17.

Before describing the present improvements and mode of operation thereof in detail it should be understood that the invention is not limited to the details of construction and arrangement of

parts shown in the accompanying drawings, which are merely illustrative of the present preferred embodiments, since the invention is capable of other embodiments, and the phraseology employed is for the purpose of description and not of limitation.

Referring more particularly to the drawings, and first to Figs. 1 through 7, there is shown for the purpose of illustrating one embodiment of the invention, a head end portion 21 of a sewing machine frame 22 having associated therewith a needle bar 23 carrying a needle 24 and reciprocable in a well-known manner to cooperate with a loop-taking mechanism, not shown, in the formation of a line of stitches as the work is advanced in the usual way. The needle drive mechanism, likewise not shown, may be such as is used in the well-known Willcox & Gibbs lock stitch sewing machine, for example type 10, commercially used for many years.

For controlling a needle thread 25 during the stitching operations a rotary take-up device 26 is utilized. The use of take-ups of the rotary type is not new, particularly in connection with the control of thread in sewing machines of the lock stitch type. However, a thread-control device embodying the present invention is especially advantageous in employing a single rotating unit 27 adapted not only to provide a desired fast acting take-up but also to very satisfactorily control slack or excess thread.

As shown in Figs. 1–7, this rotating unit 27 includes axially spaced inner, intermediate and outer take-up plates 28, 29 and 30, and is secured to the end of a usual rotating top shaft 31 in the sewing machine frame. A screw 32 inset in the inner take-up plate and threaded into the end of the shaft 31 serves to secure the inner take-up plate to the latter, and, to insure rotation of the inner take-up plate therewith, pins 33 advantageously may be provided. Extending from the inner face of the intermediate take-up plate to the outer face of the inner take-up plate and suitably secured to both of these take up plates is a pair of thread control buttons 34 and 35 which serve not only to secure these plates together for coaxial rotation together but also respectively constitute, as will be explained more fully hereinafter, auxiliary take-up and slack thread control elements which act on the needle thread.

Extending from the outer face of the intermediate take-up plate to the inner face of the outer take-up plate is another thread control button 36 which serves to connect, as by pins 37, the outer and intermediate take-up plates for conjoint and coaxial rotation together and which also serves as the main take-up element for the needle thread. Thus, it will be readily appreciated that all of the plates 28, 29 and 30 of the rotating unit, rotate coaxially with each other, with the shaft 31 as the axis of rotation, and that the respective thread control buttons 34, 35 and 36, which are offset radially relative to the axis of rotation, move in a rotary path or orbit.

Spaced radially from the rotating unit 27 and extending outwardly from the end wall 38 of the sewing machine frame to underlie the respective take-up plates 28, 29 and 30 is a spool-like thread guide 39, which advantageously serves to space a guard plate 40 outwardly relative to the end wall 38 and to the rotating unit. A plurality of screws 41 may be utilized as a common means for maintaining the guard plate 40 and guide 39 in proper position relative to the end wall and to the rotating unit. Another thread guide 42, which, as shown, may be of conventional construction, is suitably secured to the frame and from this guide, to which the needle thread 25 passes from a source of supply, not shown, and a suitable tension device 43, the needle thread is passed into association with the rotating unit 27, including the control buttons 34, 35 and 36, and the spool-like guide 39, prior to passing through a guide eye 44 on the needle bar on its way to the needle 24.

In associating the thread with the rotating unit, it is first passed over the control buttons 34 and 35 in the thread compartment 45 defined between the inner and intermediate take-up plates; then passed under the spool-like guide 39 up into the thread compartment 46 defined between the intermediate and outer take-up plates and over the control button 36; and then down through the thread compartment 46, past the spool-like guide 39 and to the needle.

With the construction and arrangement above described, and shown, including the rotating unit 27 having the main take-up element or button 36 projecting from one face of the take-up plate 29 and having the auxiliary take-up element or button 34 and the slack thread control element or button 35 projecting from the opposite face of the same take-up plate 29, it is possible to achieve the desired fast take-up action of a relatively large or oversize rotary take-up in a take-up of relatively small size and at the same time control excess thread in a highly satisfactory manner.

While, as illustrated in Figs. 1–7, the rotating unit 27, including the three thread control buttons, may include three take-up plates as there shown, the same advantageous results of fast take-up action with a relatively small size take-up and highly satisfactory control of slack or excess thread may be achieved through the employment of rotating units employing other than three take-up plates.

Thus, in Figs. 11–13 a modified form of the invention is shown utilizing a rotating unit 47 employing only two take-up plates 48 and 49 with a modified main take-up button 50, corresponding to the button 36 of Figs. 1–7, projecting from the outer face of the outermost take-up plate 49, corresponding to the intermediate take-up plate 29 of Figs. 1–7, and with the auxiliary take up and slack thread control buttons 34 and 35 projecting inwardly from the inner face of the outermost plate and connected to the innermost plate 48, corresponding to the inner plate 28 of Figs. 1–7.

And, in Figs. 14–16 another modified form of the invention is shown utilizing a rotating unit 51 employing only one take-up plate 52 with a main take-up button 50, similar to the main take-up button of Figs. 11–13 projecting from the outer face thereof, and with modified auxiliary take-up and slack thread control buttons 53 and 54 projecting inwardly from the inner face thereof.

Other differences between the modifications of Figs. 11–13 and Figs. 14–16, and the form shown in Figs. 1–7 will hereinafter be pointed out in detail. However, in each of these forms, and as hereinabove explained, the same advantageous take-up action and thread control is achieved.

Thus, in each of the above forms, and as best shown in Figs. 8–10, where the two plate form of rotating unit 47 is illustrated, the desired amount of thread is taken up in about 112° of rotary movement, and the slack or excess thread

which might be adversely uncontrolled from this point on and create a difficult problem, is maintained under highly effective control.

Illustrating the foregoing action, and first by reference to Fig. 8, it is seen that the main take-up botton **50** and auxiliary take-up button **34** are beginning to move upward, see direction indicating arrow on take-up plate **49**, and are thus starting to draw up thread around the spool-like guide **39**. Due to the location of the thread contacting points the thread is drawn up very rapidly. Referring next to Fig. 9 it is seen that the main and auxiliary take-up buttons have completed or substantially completed their take-up action and are about at the point where they will begin to release tension on the thread, the auxiliary take-up button having already given thread and hence counteracting the excessive take-up action of the main take-up button. At this phase of the action it is seen that the slack thread control button **35** is approaching the point where it will contact the thread and thus control the excess thread that the take-up action would normally produce. Referring next to Fig. 10 it is seen that the excess thread which would otherwise be uncontrolled is controlled by the slack thread control button **35** which now is contacting the thread. It will be readily appreciated that by varying the positions of the three control buttons **34**, **35** and **50**, practically any desired degree of control of the thread may be obtained and also the rapidity of take-up action may be varied as required for divers hook ratios, as for a 2 to 1 or a 3 to 1 ratio. Arrows adjacent the needle in Figs. 8, 9 and 10 indicate the direction of needle movement.

In addition to providing a most effective means for taking up and controlling the thread during the actual stitching operations of the sewing machine, the present invention also includes effective means by which the thread may initially be properly associated with the rotating units of the several above-described forms of the invention. In all of these forms of the invention this thread-associating means provides specially defined directing means so designed that it is possible to completely and properly located the thread consecutively in association with the oppositely projecting auxiliary take-up and slack thread control buttons on the one hand and the main take-up button on the other hand, by drawing thread through the guide **42** and then by following the directing means merely loop the thread in between the guard plate and end wall formation, down around under the spool-like guide **39**, up and down between the guard plate and end wall once more, and then through the needle bar guide eye **44** and to the needle **24**. The entire operation of threading the device is thus seen to be very simple and easily accomplished and in an insured accurate manner. Also, this means enabling such a ready and accurate threading of the device, serves as a means for further confining the thread peripherally of the rotating unit and maintaining the same in proper association with the device in the course of the stitching operations.

Thus, as shown in Figs. 1–7, the end wall **38** is formed with a recess **55** therein for receiving the inner take-up plate so that the main outer face **56** of the end wall is flush or substantially flush with the outer face of the inner take-up plate. And, of particular importance, the end wall is further formed with an outwardly projecting camlike portion **57** at one lateral side thereof extending from its lower part adjacent the left side of the spool-like guide, as viewed in Figs. 2 and 3, up to a point nearly level with the upper extremity of the recess **55**. As best shown in Figs. 2, 3 and 4 the portion of the projecting portion adjacent the rotating unit **27** and recess **55** is shaped to conform with the rotating unit and to form an outward continuation of the lateral wall of the recess. And, as shown best in Fig. 4, the outward extent of the projecting portion is such that the outer face thereof is substantially flush or aligned with the outer face of the intermediate take-up plate **29** from which the main take-up button **36** projects.

Cooperating with the end wall formations above described in facilitating a proper threading of the device is the guard plate **40**, which as shown most clearly in Figs. 1, 2 and 4, is formed with an inwardly extending peripheral rib or flange **58**. At the left, as viewed in Figs. 2 and 4, and at the upper left portion thereof, the inward extent of this flange is such that the inner edge thereof is substantially flush or aligned with the inner face of the outer take-up plate **30**. However, at the right, as viewed in Figs. 2 and 4, down to the level of the spool-like guide **39** and at the upper right portion thereof, the inward extent of the flange is such that the inner edge thereof is substantially flush or aligned with the inner face of the intermediate take-up plate **29**. And, as shown most clearly in Fig. 4, the upper portions of the flange of different inward extent are joined by a merging portion, while, as shown most clearly in Fig. 1, the portion of the flange at the right opposite the spool-like guide **39** diminishes in inward extent and merges with that portion of the flange having its inner edge substantially flush or aligned with the inner face of the outer take-up plate.

With the foregoing construction, it can be readily seen, particularly by viewing Figs. 1, 3 and 4, that the wider portion of the flange and the opposed main face **56** of the end wall define a thread-receiving passage **60** which is aligned with the thread compartment **45** defined between the inner and intermediate take-up plates, and that a following portion, in a clockwise direction, of the same passage, defined by the narrower portion of the flange and the opposed outer face of the projecting portion **57** of the end wall, is aligned with the thread compartment **46** defined between the intermediate and outer take-up plates **29** and **30**.

Thus, when a thread is drawn through the guide **42** and over the top of the flange **58** in a clockwise direction, it slips through the thread passage **60** to the thread compartment **45** and into association with the auxiliary take-up and slack thread control buttons **34** and **35**. Then as the thread is looped under the spool-like guide **39** it is automatically forced forwardly by the camlike projecting portion **57** so that when it is drawn up on the left it slips through the thread passage to the thread compartment **46** and into association with the main take-up button **36**. Continuing the up and then over and down looping of the thread it automatically slides and is drawn into the thread compartment **46** and thence to the right of the spool-like guide to the needle. The direction of threading is indicated in Figs. 8–10 by the arrows adjacent the thread.

Should the thread become broken and tangled either during the threading and/or during the take up action of the device, access may readily

be had thereto through suitable central openings 59, 61 and 62 in the guard plate 40, outer take-up plate 30 and intermediate take-up plate 29 respectively. Moreover, it will be appreciated that the flange 58 and projecting portion 57 provide means for confining the thread peripherally relative to the rotating unit 27.

In the two plate rotating unit 47, shown in Figs. 11–13, the innermost take-up plate 48, like the inner take-up plate 28 shown in Figs. 1–7, may be suitably secured by a screw 32 and pins 33 to the end of a usual rotating top shaft 31 in the sewing machine frame. However, in this form a modified guard plate 63 having a raceway or groove 64 formed therein for receiving the free end of the main take-up button as the latter moves in its rotary path, is utilized. Similarly to the form shown in Figs. 1–7, screws 41 may advantageously be provided as a common means for securing the guard plate 63 and spool-like guide 65 relative to the end wall of the sewing machine frame, which end wall 38 may have exactly the same formation as embodied in the form shown in Figs. 1–7, as most clearly illustrated in Fig. 3, and including the camlike projecting portion 57 having its outer face substantially flush or aligned with the outer face of the outermost take-up plate 49.

Also, similarly to the guard plate 40 embodied in the form shown in Figs. 1–7, the modified guard plate 63 is so formed that it cooperates with the end wall formation in defining a thread-receiving passage 66 adapted to consecutively direct thread to a thread compartment 67 defined between the take-up plates 48 and 49 and into association with the auxiliary take-up and slack thread control buttons 34 and 35, and to a thread compartment 68 defined between the take-up plate 49 and the guard plate 63 and into association with the main take-up button 50.

Thus, as shown most clearly in Figs. 11 and 13, the guard plate 63 is formed with an inwardly projecting peripheral rib 69, the inner edge of which is substantially flush or aligned with the inner face of the outermost take-up plate 49 and which extends from a point adjacent the upper right-hand portion overlying the rotating unit 47 down the right lateral side of the guard plate to a point substantially level with the spool-like guide 65.

With this construction, it will be readily appreciated, a thread may be drawn from the thread guide 42 and looped around the device in the same manner as above described in connection with Figs. 1–7, to automatically and properly associate the thread where it may be acted upon by the respective thread control buttons 34, 35 and 50.

Also, similarly to the form shown in Figs. 1–7, the guard plate 63 and the outermost take-up plate 49 may be provided with central openings 70 and 71 respectively, to facilitate access to the thread should it become broken and tangled during the initial threading or during the operation of the device in controlling the thread in the course of the stitching operations.

In the one plate rotating unit 51, shown in Figs. 14–16, the one take-up plate 52, like the take-up plates 28 and 48 of the forms shown in Figs. 1–7 and Figs. 11–13, respectively, may be secured to the end of the rotating shaft 31 by a screw 32 and pins 33. The guard plate 72 employed with this form may be and as shown is exactly the same as the one employed with the form shown in Figs. 11–13, having a raceway or groove 73 formed therein for receiving the free end of the main take-up button 50 as the latter moves in its rotary path and having an inwardly projecting peripheral rib 74, the inner edge of which is substantially flush or aligned with the inner face of the take-up plate from which the thread control buttons project in opposite directions. Also, as in the forms shown in Figs. 1–7 and Figs. 11–13, a plurality of screws 41 provide a common means for securing the guard plate and a spool-like guide 75 relative to the end wall 38' of the sewing machine frame.

However, with this form of the invention it is to be noted that the end wall while having a formation embodying substantially the same features as the formation of the end wall as shown in Fig. 3, except that it does not include a take-up plate receiving recess such as the recess 55, includes as an additional feature a raceway or groove 76, formed therein for receiving the free ends of the modified auxiliary take-up and slack thread control buttons 53 and 54 respectively. The camlike projecting portion 77 at the left of the rotating unit corresponds to and extends in the same manner as the camlike projecting portion 57 shown in Fig. 3.

Also, with this form of the invention and as shown best in Figs. 14 and 16, it is to be noted that the end portion of the shaft 31 is laterally incut at 81 on one side thereof to minimize the out of line distorting effect of the shaft 31 on the thread.

Thus, with this form of the invention, similarly to the form of the invention shown in Figs. 11–13, the formation and disposition of the guard plate 72 and end wall are such that a thread-receiving passage 78 is provided adapted to consecutively direct thread into a thread compartment 79 defined between the take-up plate 52 and the main face of the end wall and into association with the auxiliary take-up and slack thread control buttons 53 and 54, and to a thread compartmenty 80 defined between the take-up plate 52 and the guard plate 72 and into association with the main take-up button 50. Hence, with all of the forms of the invention a thread may be drawn from the thread guide 42 and merely looped around the device to automatically and properly associate the thread where it may be acted upon by the respective thread control buttons.

Likewise, similarly to the form of the invention shown in Figs. 11–13, the guard plate may advantageously be provided to a central opening 82 to facilitate access to the thread should the latter become broken or tangled.

While in each of the forms hereinabove considered, the rotating unit has been described as being associated with the end wall of the sewing machine frame, the rotating unit as shown in Figs. 17–18 may be associated with the front side of the sewing machine frame.

For the purpose of illustrating this modification of the invention there is shown in Figs. 17–18 a fragmentary portion of a sewing machine including, as is conventional, a head portion 83 in which a needle bar 84 is mounted for reciprocating movement, and an upper arm portion 85 in which a main rotating top shaft 86 is suitably mounted and, as shown, is connected through suitable driving connections 87 to the needle bar. Positioned to extend transversely of the upper arm portion and suitably supported by opposite side walls thereof is an auxiliary shaft 88 having a gear 90 suitably fixed thereto adapted to mesh

with a mating gear 89 fixed on the rotating shaft 86. With this construction, it will be readily appreciated, when the main shaft 86 is rotated the auxiliary shaft 88 will be rotated thereby.

Secured to the front end of the auxiliary shaft for rotation therewith is the rotating unit 51, which in the form illustrated is the same as the rotating unit illustrated in that form of the invention shown in Figs. 14–16, including a single take-up plate 52 from the inner face of which project auxiliary take-up and slack thread control buttons 53 and 54 and from the outer face of which projects a main take-up button 50. The outer face of the front side wall of the sewing machine frame adjacent the rotating unit, it will be appreciated, may be of the same formation as that of the end wall shown in Figs. 14–16, while the guard plate 91 may also be of the same general formation as the guard plate 72 shown in the latter named figures, and spaced from the front wall of the sewing machine frame by a spool-like guide 92 similar to the spool-like guide shown in Figs. 14–16.

The threading of the device of Figs. 17 and 18 is similar to that of the device of Figs. 14–16 and is accomplished by drawing a thread from a supply, not shown, through a suitable tension device 93, over a thread guide 95, then inwardly of the take-up plate over the auxiliary take-up and slack thread control buttons 53 and 54, then under the spool-like guide 92 and outwardly of the take-up plate 52, and then up and over the main take-up button 50, down through a suitable guide 94 and to the needle bar guide eye 44 and the needle. The action of the respective thread control buttons on the thread is exactly the same as described above in connection with the forms in Figs. 1–16.

It will be readily appreciated that instead of a one plate type rotating unit, two or three plate rotating units may be associated with the front side of the sewing machine frame.

Likewise, it is to be borne in mind that the spool-like guide illustrated with all forms of the invention may, if desired, be provided with a plurality of rollers about the periphery thereof or may itself be rotatably mounted instead of non-rotatably mounted as shown.

Other variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is claimed as new is:

1. In a sewing machine, the combination of a frame; at least one rotatable take-up plate mounted on said frame, having a center of rotation; thread-engaging elements extending from opposite sides of said take-up plate, rotatable with and disposed eccentrically relative to the center of rotation of said take-up plate; a guard plate; first and second thread-guide means, relative to which said take-up plate rotates; and cooperating means on said frame and said guard plate, defining a thread-receiving passage disposed radially outward from said take-up plate and extending from a location at one side of said take-up plate to a location at the opposite side of said take-up plate, whereby in threading, a thread may be readily directed from said first guide to one side of said take-up plate and to said second guide, and then from said second guide to the other side of said take-up plate.

2. In a sewing machine, the combination of at least one movable take-up plate; take-up elements on opposite sides of said plate and movable therewith, for operating on a thread; first and second thread guides spaced radially of the take-up plate and relative to which said take-up plate and elements move; and threading-facilitating means, including camlike means providing thread-engaging portions for directing a thread first from said first thread guide to one side of said take-up plate and to said second thread guide and then from said second thread guide to the opposite side of said take-up plate.

3. In a sewing machine, the combination of a frame having an end wall; at least one take-up plate having inner and outer faces, rotatably mounted relative to said frame, and disposed with said inner face opposed to and spaced outwardly from said end wall; thread-engaging elements rotatable with said take-up plate and respectively projecting from said inner and outer faces; a guard plate spaced outwardly from said end wall and said outer face; a first thread guide; a second thread guide, spaced radially relatively to said take-up plate and located intermediate said guard plate and said end wall; and threading means on said guard plate and said end wall, spaced radially from said take-up plate, having thread-engaging projections respectively extending toward said inner and outer faces, for directing a thread first from said first thread guide to one of said take-up plate faces and to said second thread guide and then from said second thread guide to the other one of said take-up plate faces.

4. In a sewing machine, the combination of a frame; a plurality of rotatable take-up plates, axially spaced relative to each other, having a common axis of rotation; thread-engaging elements respectively extending from opposite sides of at least one of said take-up plates; a guard plate; and cooperating means on said guard plate and on said frame, defining a thread-receiving passage disposed radially outward from said one of said take-up plates and extending from a location at one side of said one of said take-up plates to a location at the opposite side thereof, for directing a thread into association with said respective thread-engaging elements.

5. In a sewing machine, the combination of a frame; an inner and an outer take-up plate, spaced axially relative to each other to define a first thread compartment therebetween, and mounted for rotation together about an axis of rotation; a pair of thread-engaging elements disposed between and rotatable with said inner and outer take-up plates; a thread-engaging element extending outwardly from the outer side of said outer take-up plate; a guard plate opposed to said outer take-up plate and defining a second thread compartment therewith; and rib means on said guard plate and on said frame, respectively cooperating to define a thread-receiving passage extending from a location aligned with said first thread compartment to a location aligned with said second thread compartment.

6. In a sewing machine, the combination of a frame having a wall; a guard plate spaced outwardly relative to said wall and carried by said frame; at least one rotatable take-up plate, rotatably mounted relative to said frame and disposed between and axially spaced relative to said guard plate and wall; a thread guide extending between said wall and guard plate; thread-controlling elements carried by, rotatable in a rotary path of movement with and extending from opposite faces of said take-up plate, to act on a thread

passing relative to said thread guide; and inwardly and outwardly projecting means on said guard plate and said wall respectively, disposed peripherally of said take-up plate, engageable with said thread to locate the latter consecutively in association with said thread-controlling elements at opposite faces of said take-up plate as the thread is passed to and from said thread guide.

7. In a sewing machine, the combination of a frame having a wall formation; a rotatable take-up plate having an inner and an outer face, spaced axially from said wall formation and defining therewith a first thread compartment; a pair of thread-engaging elements extending from and spaced circumferentially of said inner face, said wall formation having a raceway for receiving said pair of thread-engaging elements; a thread-engaging element extending from said outer face; a guard plate opposed to and spaced axially from said outer face and defining therewith a second thread compartment, said guard plate having a raceway for receiving said last-named thread-engaging element; and means on said guard plate and said wall formation, disposed radially outward relative to said take-up plate and defining a thread-receiving passage extending from a location aligned with said first thread compartment to a location aligned with said second thread compartment.

8. In a sewing machine, the combination of a frame having a wall formation; inner, outer and intermediate take-up plates, spaced axially relative to each other and rotatably mounted on said frame, said inner and intermediate plates defining a first thread compartment therebetween and said intermediate and outer plates defining a second thread compartment therebetween; a pair of thread-engaging elements extending between and spaced circumferentially of said inner and intermediate plates; a thread-engaging element extending between said intermediate and outer plates; a guard plate; and means on said guard plate and said wall formation, disposed radially outward relative to said plates and defining a thread-receiving passage extending from a location aligned with said first thread compartment to a location aligned with said second thread compartment.

9. In a sewing machine, the combination of a frame having a wall formation; inner and outer take-up plates, spaced axially relative to each other to define therebetween a first thread compartment, and mounted for rotation together on said frame; a pair of thread-engaging elements extending between and spaced circumferentially of said inner and outer plates; a thread-engaging element extending outwardly from said outer plate; a guard plate opposed to and spaced outwardly from said outer plate to define with the latter a second thread compartment, said guard plate having a raceway therein for receiving said last-named thread-engaging element; and means on said guard plate and said wall formation, disposed radially outward relative to said take-up plates and defining a thread-receiving passage extending from a location aligned with said first thread compartment to a location aligned with said second thread compartment.

10. In a sewing machine, the combination of a main frame having an elongated arm, said arm having a wall extending parallel to the longitudinal axis of the arm and facing the normal position for the operator; first and second guide means mounted on said wall; rotary take-up means including at least one plate provided with thread-engaging elements disposed between said first and second guide means and rotated in timed relation with the operation of said machine; a guard member mounted on said wall and overlying said take-up plate, the guard member, plate and wall forming a thread-receiving compartment at each side of the plate; and guide means for engaging and directing the thread from the first guide means into one compartment, to the second guide means and to the other compartment as the thread is wrapped around the assembly with a continuous circular motion, whereby the threading of the take-up may be readily accomplished by the operator from the normal operating position with either hand.

11. In a sewing machine, the combination of a frame; at least one rotatable take-up plate mounted on the frame; a pair of thread-engaging elements extending from one side of said take-up plate; a thread-engaging element extending from the other side of said take-up plate; first and second thread guides mounted on the frame, relative to which said take-up plate and associated thread-engaging elements rotate; and a cover plate overlying the take-up plate and together with the frame forming guiding surfaces to guide the thread to one side of the take-up plate, around one of the thread guides and to the other side of the take-up plate to contact all of the thread-engaging elements carried thereby, said cover plate having a raceway receiving an adjacent thread-engaging element on the take-up plate.

12. In a sewing machine, the combination of at least one rotatable take-up plate; a main take-up element extending from one side of said take-up plate; an auxiliary take-up element and a slack thread control element, spaced from each other circumferentially of said take-up plate and extending from the side of the latter opposite to that from which said main take-up element extends; a first thread guide, from which a thread passes to one side of said take-up plate and into association with said auxiliary take-up and slack thread control elements; a second thread guide from which the same thread passes to the opposite side of said take-up plate and into association with said main take-up element; and guide means engageable by the thread for directing the same thread successively to opposite sides of said take-up plate as the thread is wound thereabout.

13. In a sewing machine, the combination of coaxially rotatable inner and outer take-up plates, spaced axially relative to each other; a guard plate spaced axially from and opposed to said outer take-up plate; a main take-up element extending outwardly from said outer take-up plate and toward said guard plate, said guard plate having a raceway for receiving said main take-up element; and auxiliary take-up and slack thread control elements, extending between and spaced from each other circumferentially of said outer and inner take-up plates.

14. In a sewing machine, the combination of a frame having a wall formation with a raceway therein; a rotatable take-up plate, mounted for rotation relative to said frame and spaced axially from said wall formation to define with the latter an inner thread compartment, said wall formation having the raceway therein facing said inner thread compartment; a guard plate spaced axially outward from said take-up plate to define therewith an outer thread compartment, said guard plate having a raceway therein facing said outer thread compartment; a main take-up ele-

ment having a free end, carried by said take-up plate and disposed in one of said thread compartments with its free end received in the raceway facing said one of said compartments; and auxiliary take-up and thread slack control elements, having free ends, carried by said take-up plate and disposed in the other of said thread compartments with their free ends received in the raceway facing said other of said thread compartments.

15. In a sewing machine, the combination of coaxially rotatable inner, outer and intermediate take-up plates, spaced axially relative to each other, said inner and intermediate take-up plates and said intermediate and outer take-up plates respectively defining inner and outer thread compartments therebetween; a first thread control element, rotatable with said take-up plates and disposed in one of said thread compartments; second and third thread control elements rotatable with and spaced from each other circumferentially of said take-up plates, and disposed in the other of said thread compartments; a pair of thread guides adjacent the plates and relative to which said take-up plates rotate; and means for guiding the thread into said compartments and around one of said guides by wrapping the thread around the assembly.

16. In a sewing machine, the combination of a frame having a wall; a guard plate spaced outwardly from said wall; at least one rotatable take-up plate intermediate said guard plate and said wall, rotatable relative to said frame; a first thread control element movable in a rotary path with and extending away from one face of said take-up plate; second and third thread control elements movable in a rotary path with and extending away from the opposite face of said take-up plate; and a spool-like thread guide extending between said guard plate and wall, underlying said take-up plate, adapted to have passed thereunder a thread passing on one side into association with the thread control elements at one face and on the other side into association with the thread control element at the other face of said take-up plate.

17. In a sewing machine, the combination of a frame having a wall formation; a guard plate spaced outwardly from said wall formation; at least one rotatable take-up plate disposed intermediate said guard plate and said wall formation; a first thread control element rotatable with said take-up plate and extending away from one side of the latter towards said guard plate; second and third thread control elements rotatable with and spaced from each other circumferentially of said take-up plate and extending away from the other side of the latter towards said wall formation; a first normally stationary thread guide; a second normally stationary thread guide spaced radially relatively to said take-up plate and extending between said wall formation and said guard plate; riblike means on said guard plate and projecting toward said wall formation to define with the latter a first portion of a thread-receiving passage overlying said first control element at one side of said take-up plate and extending to adjacent one lateral side of said second thread guide; and a projection on said wall formation projecting towards said guard plate to define with the latter a continuing portion of the same thread-receiving passage overlying said second and third control elements at the other side of said take-up plate and extending from adjacent an opposite lateral side of said second thread guide, said riblike means and said projection serving to direct thread in a predetermined manner into initial consecutive association with said control elements at opposite sides of said take-up plate and to provide means for confining the thread after said thread is initially associated with said control elements.

18. A rotary take-up device for sewing machines having first and second fixed guide means; means interposed between said first and second fixed guide means forming a plurality of thread compartments; rotary take-up means in the compartments acting on the thread to take-up and let out a quantity of thread in coordination with the operation of the machine; and guide means engageable by the thread and associated with the rotary take-up means for directing the thread from the first guide means into one compartment, to the second guide means and to the other compartment as the thread is wrapped around the device with a continuous circular motion.

19. A rotary take-up device for sewing machines comprising a fixed introductory thread guide; means forming a plurality of thread compartments; rotary means in the compartments acting on the thread to take up and let out a quantity of thread in coordination with the operation of the machine; and guide means engageable by the thread for automatically directing a bight of the thread from said fixed guide into one compartment, and then into another compartment, as said bight of thread is wrapped by hand with a rotary motion about the rotary take-up device.

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