W. M. AMMERMAN.

THREAD CONTROLLING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED MAY 19, 1905.

912,522.

Patented Feb. 16, 1909.

2 SHEETS—SHEET 1.

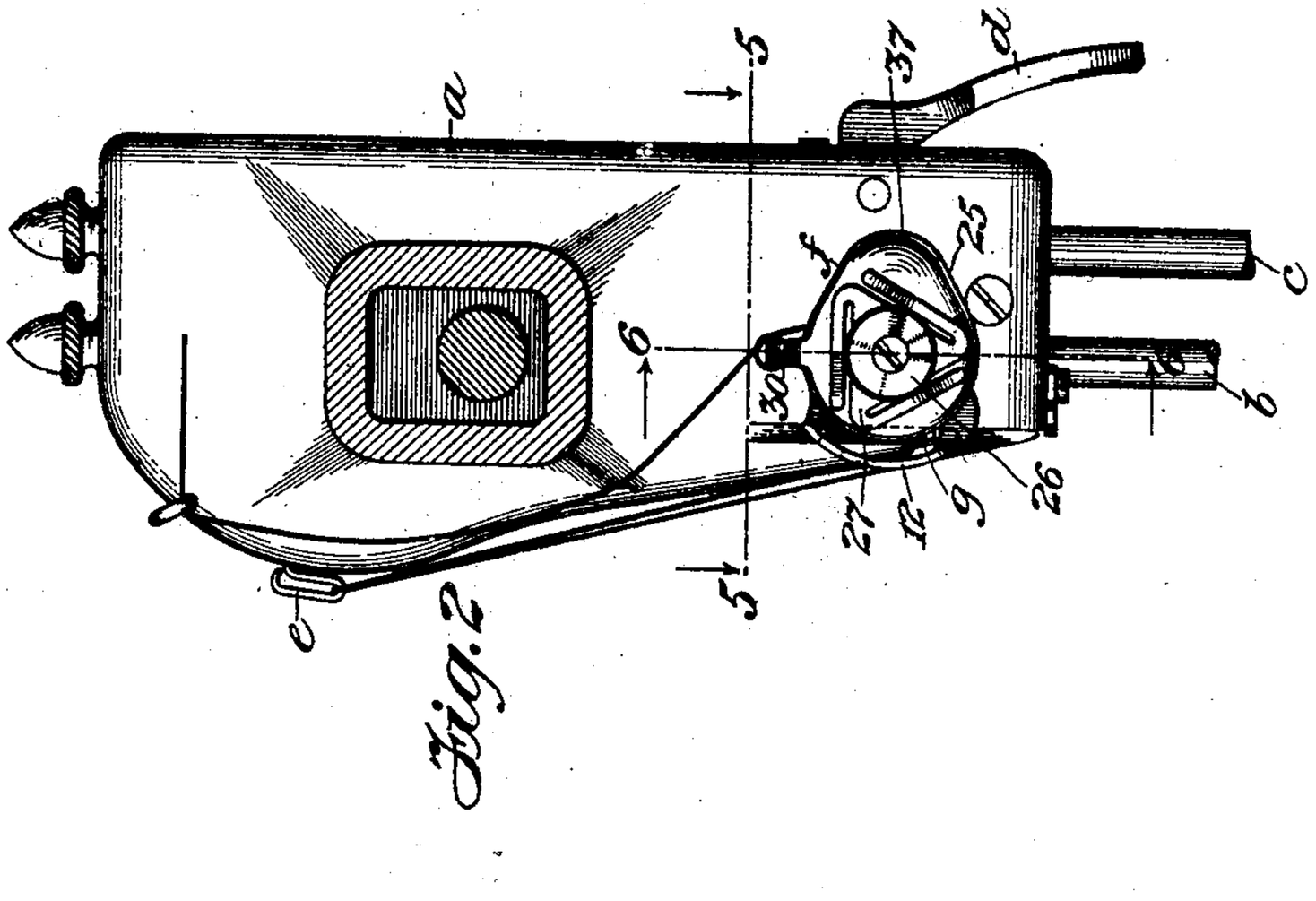

Fig. 2.

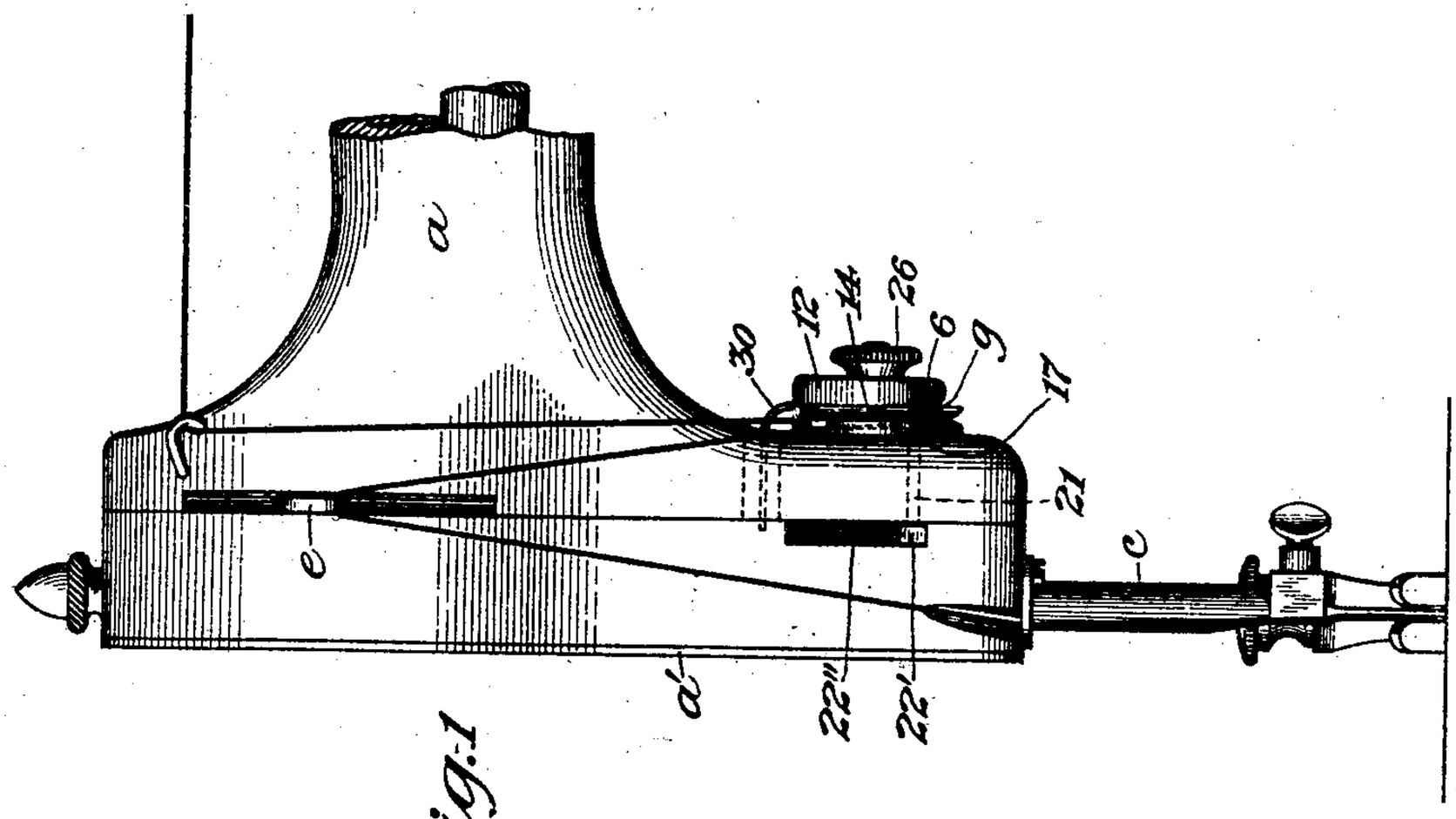

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 4

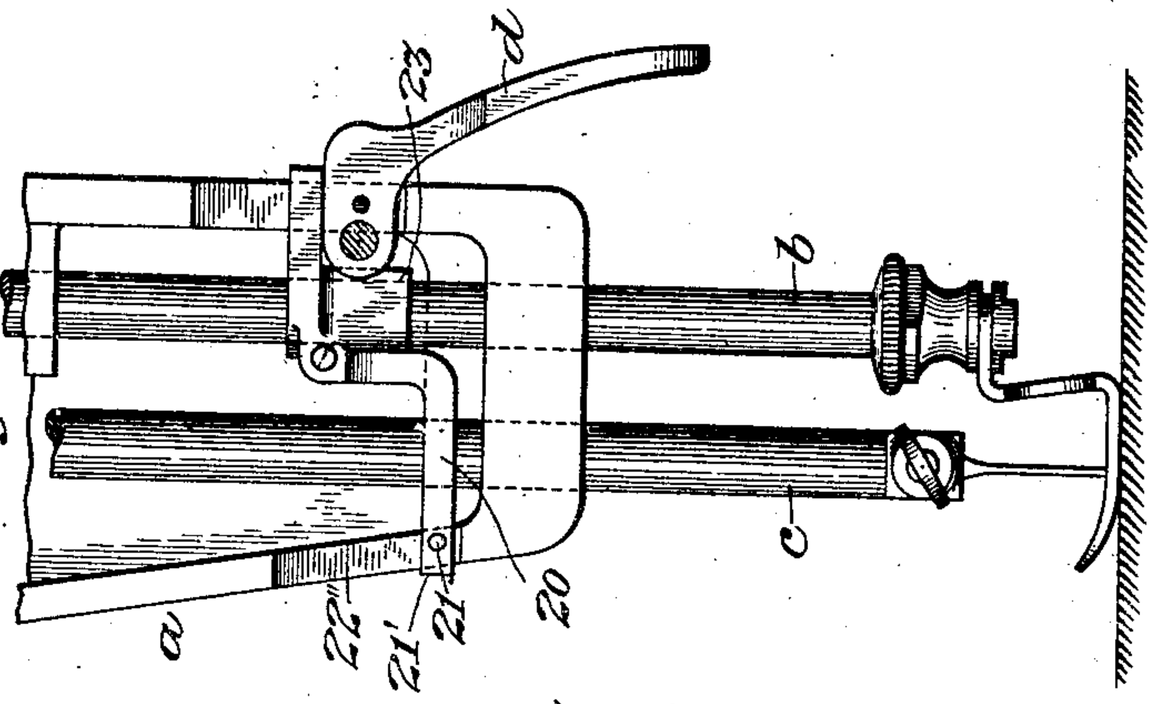


Fig. 5

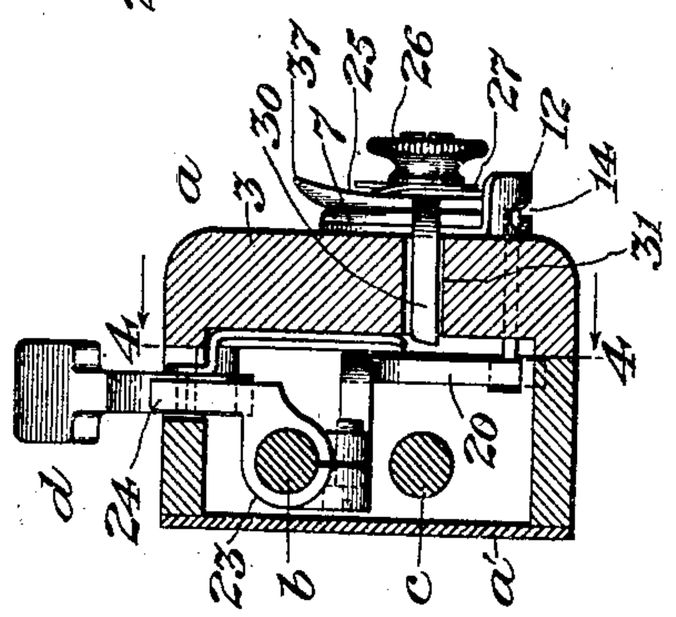


Fig. 9

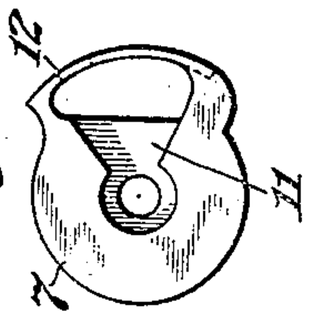


Fig. 10

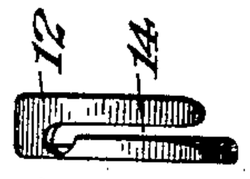


Fig. 3

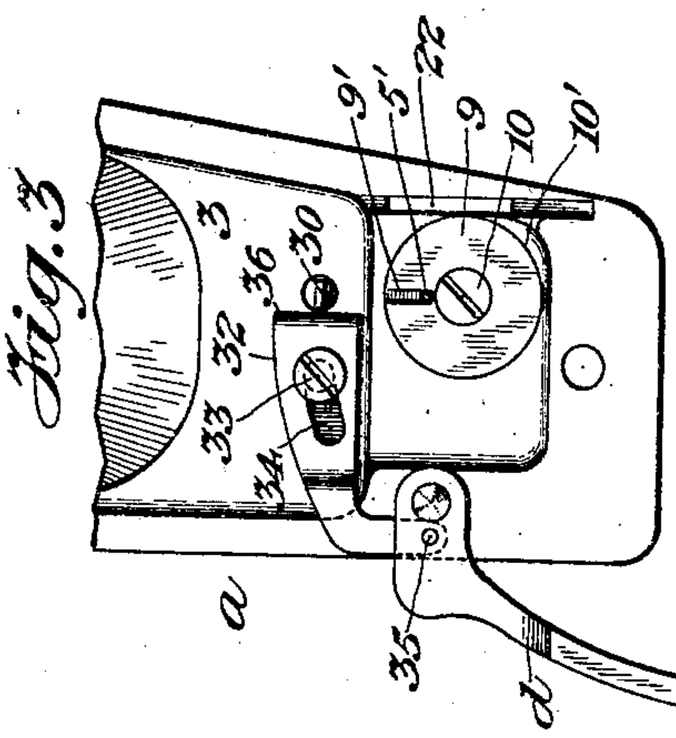


Fig. 6

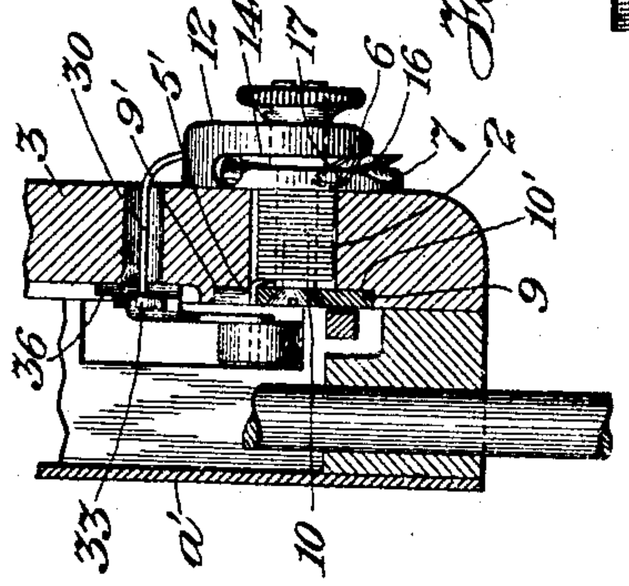


Fig. 7

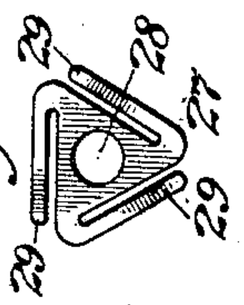
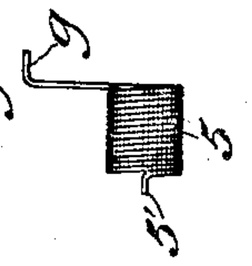


Fig. 8

Fig. 12

Fig. 11



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UNITED STATES PATENT OFFICE.

WILLIAM M. AMMERMAN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ANNIE ELIZABETH AVERY, ADMINISTRATRIX OF EDWIN J. TOOF, DECEASED.

THREAD-CONTROLLING MECHANISM FOR SEWING-MACHINES.

No. 912,522. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed May 19, 1905. Serial No. 261,175.

To all whom it may concern:

Be it known that I, WILLIAM M. AMMERMAN, a citizen of the United States, and resident of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Thread-Controlling Mechanism for Sewing-Machines, of which the following is a specification.

This invention has particular reference to the thread-controlling mechanism of sewing machines as embodied in the tension and slack thread take-up devices, and has for its principal object to improve such mechanism both in construction and operation.

To this end, the invention consists in the novel features of construction, and in the novel arrangement and combinations of parts, as hereinafter set forth in detail and pointed out in the claims.

Referring to the accompanying drawings forming part of this specification, Figure 1 is a front view of the forward end of a sewing machine arm embodying my invention. Fig. 2 is an inner side view of the same looking from the right in Fig. 1. Fig. 3 is a detail view of a portion of the arm with the face-plate removed. Fig. 4 is a vertical section through line 4—4 of Fig. 5. Fig. 5 is a horizontal section through line 5—5 of Fig. 2. Fig. 6 is a horizontal section through line 6—6 of Fig. 2. Figs. 7 and 8 are side and edge views, respectively, of a tension spring. Figs. 9 and 10 are side and edge views, respectively, of a tension disk or plate, and Figs. 11 and 12 are detail views to be hereinafter referred to.

In said drawings, *a* indicates the sewing machine arm; *a'* the removable face-plate at the forward end of said arm; *b* and *c* the presser and needle bars, respectively, supported in suitable bearings in said arm; *d* the pivoted presser-bar lifter lever; *e* the main take-up supported and operative in a position at the front side of the arm; and *f* and *g* the tension and auxiliary take-up devices, respectively, both located and operative at the inner side of the arm in a position opposite the said removable face-plate thereof. With this particular arrangement of the tension and take-up devices in a position at the rear of the face-plate, a smooth and unobstructed surface of the latter is provided; also, the line of draft on the thread between the take-up and the needle is made substantially parallel with the path of movement of the latter whereby undue lateral strain on the needle, with the attendant liability to prevent perfect stitching is avoided.

Before proceeding with a detailed description of the auxiliary take-up device and its associated parts in the particular embodiment of my present invention, I will first briefly describe the purpose of said take-up, as follows: In certain classes of sewing machines as usually constructed, provision is made whereby a certain determined amount of thread is drawn from the spool or other thread supply by the main take-up which is sufficient for the proper formation of a stitch in very thick work, and, in the event of thinner work being operated upon, the slack produced by the difference between the amount drawn from the spool and the amount required for the stitch is taken up and controlled by an auxiliary take-up, in the form of a light spring, operating between the tension and the main take-up. The throw of this auxiliary take-up is ordinarily regulated so as to take up and control the slack thread produced when very thin work is operated upon, and, as thicker work is operated upon, such auxiliary take-up being in the form of a light spring will readily yield and give off the required amount of thread necessary for the stitch in the increased thickness of work. It is desirable, however, that the tension or elasticity of such spring take-up should be capable of adjustment whereby the same may be caused to act more or less rapidly according to the speed of the machine, and also for the purpose of acting with greater or less strain or tension upon the thread according to the character of the work, as it will be understood that according to the tension with which the take-up acts on the thread, the stitch will be made more or less tight. A further and desirable adjustment to the spring take-up is one regulating its throw or extent of movement, as, if thick work is being operated upon, but very little throw of the take-up may be necessary and by regulating the extent of such throw according to the thickness of the work being operated upon all unnecessary strain upon the thread is avoided. These adjustments of the auxiliary spring take-up are provided for by

the construction and arrangement of parts embodying my present invention to be hereinafter described.

The machine arm *a* is provided with an opening 2 extending through its rear wall 3 in a position opposite the face-plate *a'* in which is located a spindle 4 having loosely mounted thereon a coiled spring 5, one end of which spring is extended radially therefrom in a position at the outer side of the wall 3 to provide a spring-arm which constitutes the auxiliary take-up, the said arm being provided at its outer end with a thread-receiving eye 6. As a means for detachably holding the spindle 4 with the supported take-up spring in connection with the machine arm, a plate or disk 7 is mounted on the said spindle at the outer side of the wall 3 and engages at its face side with a shoulder 8 on the spindle to hold the latter against longitudinal movement in one direction, while a second plate or disk 9 is located at the inner side of the wall 3 and is connected with the inner end of the spindle by a screw 10, the said screw operating through the spindle 4 to firmly clamp the disks 7 and 9 against the opposite sides of the wall 3 and thereby hold the said several parts in stationary adjusted position with respect to the machine arm. In order that the spindle 4 as thus supported may be held centrally within the opening 2 in the arm, a countersink 10' is formed at the inner end of said opening to closely receive the disk 9 and thereby position the connected spindle.

As before referred to, it is desirable that the tension of the spring take-up in its action on the thread should be capable of adjustment and I provide for this in my present construction by connecting the inner end 5' of said take-up spring with the disk 9 at the inner end of the spindle 4, which said disk is rotatably adjustable within its countersink seat 10. In effecting such adjustment of the take-up spring through the medium of the said disk 9, the face-plate is first removed so as to expose said disk, as shown in Fig. 3, and the clamping screw 10 then loosened, after which the disk may be turned in a direction to either wind or unwind the spring 5 about the spindle 4 and so cause the take-up arm *g* to act with greater or less tension upon the thread. After the desired adjustment to the take-up has been made, the disk 9 will then be secured in stationary adjusted position by again tightening the clamping screw 10. The connection between the take-up spring and the disk 9 may be effected in any desirable manner. the said connection being effected in the present case by entering the inner end 5' of the spring into a radial slit or notch 9' in the disk 9, as clearly shown in Figs. 5 and 6, and which said slit or notch also provides a means for engaging the disk at its face side by means of a screw-driver or other suitable instrument for the purpose of adjusting the same.

The plate or disk 7 mounted on the spindle 4 at the outer side of the wall 3 is formed with a cut-out portion 11 (see Fig. 9) on that side adjacent to said wall to receive the spring take-up arm and spring operating pin, and is also provided with a laterally projecting flange or extension 12 in a position opposite the path of movement of the end of said take-up arm to serve as a guard therefor. This guard flange 12 of the disk 7 is formed with an open-ended slot 14 into which the thread is entered for threading engagement with the take-up, which latter is bent at its end to form a thread-receiving eyelet 6 having its lower edge or wall 16 extending diagonally across the slot 14 of the guard-flange 12 and terminating at the opening 17 into which the thread is entered into the eyelet in a position behind the guard-flange, as clearly shown in Fig. 6. With this construction and arrangement of the take-up and its said guard, a thread entered into the slot 14 of the guard will engage with the diagonal wall 16 of the take-up and be guided thereby into the eyelet, and the entering opening 17 of the latter being behind the guard at one side of the slot 14 will avoid liability of the thread from becoming accidentally disconnected from the eyelet.

The tension device shown and described will be claimed in a separate application.

As a means for controlling the extent of throw or movement of the auxiliary take-up in accordance with the thickness of work being operated upon, as hereinbefore referred to, I have provided the presser-bar with an arm 20 fixedly attached thereto and having an extension 21 extending through a vertically arranged slot 22 in the wall 3 to a position in engagement with the auxiliary take-up at the under side thereof, as clearly shown in Figs. 1, 2 and 5. With this connection between the presser-bar and the auxiliary take-up, the vertical movement of the presser-bar as controlled by the different thicknesses of work thereunder will accordingly automatically regulate the movement of the take-up. For instance, if thin work is being operated upon the presser-bar will be near its lowermost position and the auxiliary take-up will have substantially its maximum extent of movement to control the slack thread, but as thicker work is passed under the presser the latter with its arm 21 will be correspondingly raised and so operate to correspondingly limit the extent of the operative or downward throw of the take-up. In this manner the throw or movement of the auxiliary take-up will be automatically regulated from the presser-bar to accord with the amount of slack thread to be controlled. The arm 21 may be connected with

the presser-bar in any suitable or desired manner, the same in the present case being made as a part of the collar 23 which carries the arm 24 for coöperation with the presser-bar lifter lever *d*. This arm 21 is also arranged with one end 22′ extending into a vertical slot 22″ in the machine arm *a* to serve as a means to prevent turning of the presser-bar.

The spindle 4 in accordance with my present invention is extended somewhat beyond the outer side of the wall 3 to afford a support for a tension disk 25 which coöperates with the face of the disk 7 to impinge and tension the thread passed therebetween, the said plates being held in coöperative engagement by means of an adjusting-nut 26 threaded on the outer end of the spindle, and a suitable spring, such as 27, interposed between the said nut and the outer disk 25. This said tension spring 27, which constitutes a feature of my present invention, comprises a thin metallic plate having a central aperture 28 to receive the spindle 4 and also having a plurality of spring arms 29 struck up therefrom at its outer edge, as most clearly shown in Fig. 8. A desirable feature of this form of spring, in addition to the features of cheapness and simplicity, is the fact that it occupies but little space between the tension disk and the adjusting-nut and therefore avoids the necessity of a long spindle projecting from the side of the machine arm as is usual.

The outer tension disk 25 is provided with an arm 30 extending therefrom at its upper side through an opening 31 in the wall 3 to a position to be engaged by a tension-releaser at the inner side of the said wall, the said tension-releaser in the present instance shown being in the form of a plate 32 which is slidably mounted upon the inner side of the wall 3 by means of a headed pin or screw 33 engaging the same through an elongated slot 34 therein, and which is also operatively connected at one end with the presser-bar lifter lever by means of a pin 35 thereon entering a corresponding pivot opening in said lever. With this construction, a raising of the lever *d* to elevate the presser for the purpose of releasing the work will also operate the plate 32 to cause its forward outwardly-turned end 36 to engage the end of the arm 30 and force the tension disk 25 outwardly from its coöperating disk and thereby release the tension on the interposed thread.

In threading the tension device, the thread is entered between the tension disks at a point in the rear of the tension-disk arm 30 as most clearly shown in Fig. 2, and I have therefore found it desirable to provide the outer disk with an outwardly-flaring thread-guiding extension, such as 37, adjacent to the point of entry of the thread between the disks in order to better facilitate the entry of the thread.

What I claim is:

1. In a sewing machine, the combination with the arm of the machine having an opening in its rear wall in a position opposite the removable face-plate of the arm, of a rotatably adjustable disk supported adjacent to said opening at the inner or that side of the wall adjacent to said face-plate and having means for adjusting the same, a coiled spring located in said opening with one end connected with said adjustable disk and its opposite end being radially extended relative to its coil in a position at the outer side of the wall to provide a spring take-up, and means for holding said disk in adjusted position.

2. In a sewing machine, the combination with a spring take-up having an open thread-receiving eye, and a guard for said take-up located in the plane of the length of the take-up opposite its path of movement and having an open-ended thread-guide slot, the said take-up having a thread-engaging and guiding wall extending diagonally across the slot of the guard and terminating behind the latter at the opening of the take-up eye, for the purpose set forth.

3. In a sewing machine, the combination with the arm of the machine, of a spindle supported by said arm, a coiled spring mounted on said spindle and having a radially extended end forming a spring take-up, and a plate mounted on said spindle having a cut-out portion to receive the take-up, and also having a lateral extension radially beyond the path of movement of the end of said take-up and constituting a guard for the latter.

4. In a sewing machine, the combination with the arm of the machine, of a spindle supported by said arm, a coiled spring mounted on said spindle and having a radially extended end forming a spring take-up, and a rotatably adjustable plate mounted on said spindle and having a cut-out portion to receive the take-up, and also having a lateral extension radially beyond the path of movement of the end of said take-up and constituting a guard for the latter, and means for holding the said adjustable plate in stationary adjusted position.

5. In a sewing machine, the combination with the arm of the machine having an opening in one wall thereof, of a rotatably adjustable disk supported adjacent to said opening at one side of the wall, a shouldered spindle extending through said opening, a coiled spring mounted on said spindle with one end connected with the said adjustable disk and its opposite end extended radially relative to its coil to provide a spring take-up, a plate supported on said spindle at that

side of the wall opposite the said disk and having a lateral extension radially beyond the path of movement of the end of the take-up and constituting a guard for the latter, the said plate being engaged at its face side by the shoulder of the said spindle, and a screw detachably and adjustably connecting the said adjustable disk with one end of the said spindle, for the purpose set forth.

6. In a sewing machine, the combination with the arm of the machine having an opening in one wall thereof, of a rotatably adjustable disk supported adjacent to said opening at the inner side of the wall, a shouldered spindle extending through said opening, a screw connecting one end of said spindle with the said adjustable disk, a coiled spring mounted on said spindle with one end connected with the said adjustable disk and its opposite end extended radially relative to its coil to provide a spring take-up, a tension plate supported on said spindle at that side of the wall opposite the said disk and being engaged at its face side by the shoulder of the said spindle, a second tension-plate mounted on the spindle and engaging with the said first mentioned tension plate, and means for holding said tension plates in operative engagement.

7. In a sewing machine, the combination with the arm of the machine having an opening in one wall thereof, of a rotatably adjustable disk supported adjacent to one end of said opening at the inner side of the wall, a shouldered spindle extending through said opening, a screw connecting the inner end of said spindle with the said adjustable disk, a coiled spring mounted on said spindle with one end connected with the said adjustable disk and its opposite end extended radially therefrom to provide a spring take-up, a tension plate supported on said spindle at the outer side of the wall and having a lateral extension radially beyond the path of movement of the end of the take-up and constituting a guard for the latter, the said plate being engaged at its face side by the shoulder of the said spindle, a second tension-plate mounted on the spindle and engaging with the said first mentioned tension plate, and means for holding said tension plates in operative engagement.

Signed at New York in the county of New York and State of New York this 13th day of May A. D. 1905.

WILLIAM M. AMMERMAN.

Witnesses:
CHAS. F. DANE,
E. M. FAITH.