

No. 745,580.

PATENTED DEC. 1, 1903.

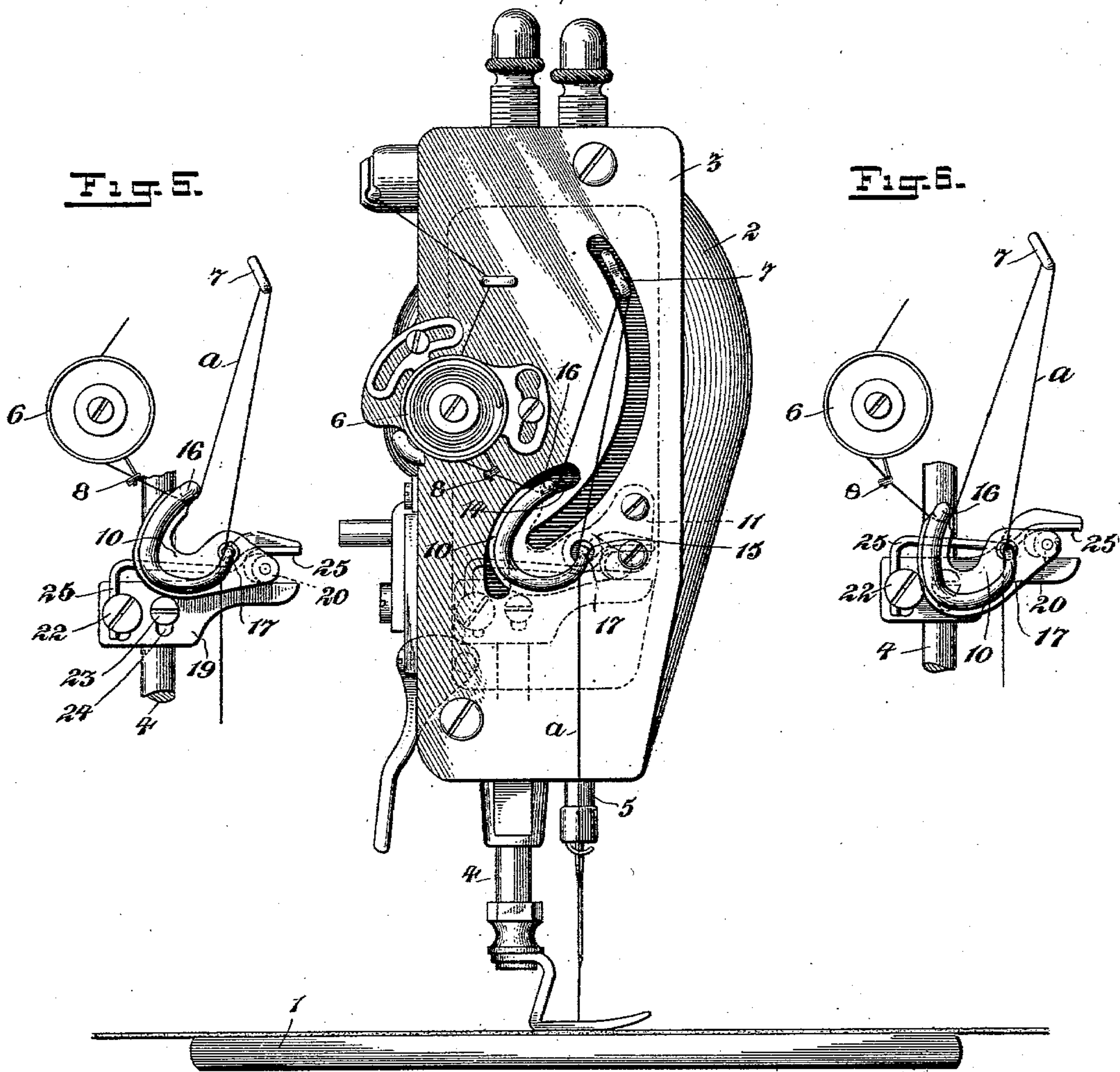
J. DIEHL.
THREAD CONTROLLER FOR SEWING MACHINES.

APPLICATION FILED JUNE 8, 1900.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Geo. W. Naylor
M. L. Torrey

Inventor
Jacob Diehl
By *Chas. F. Dane* Attorney

No. 745,580.

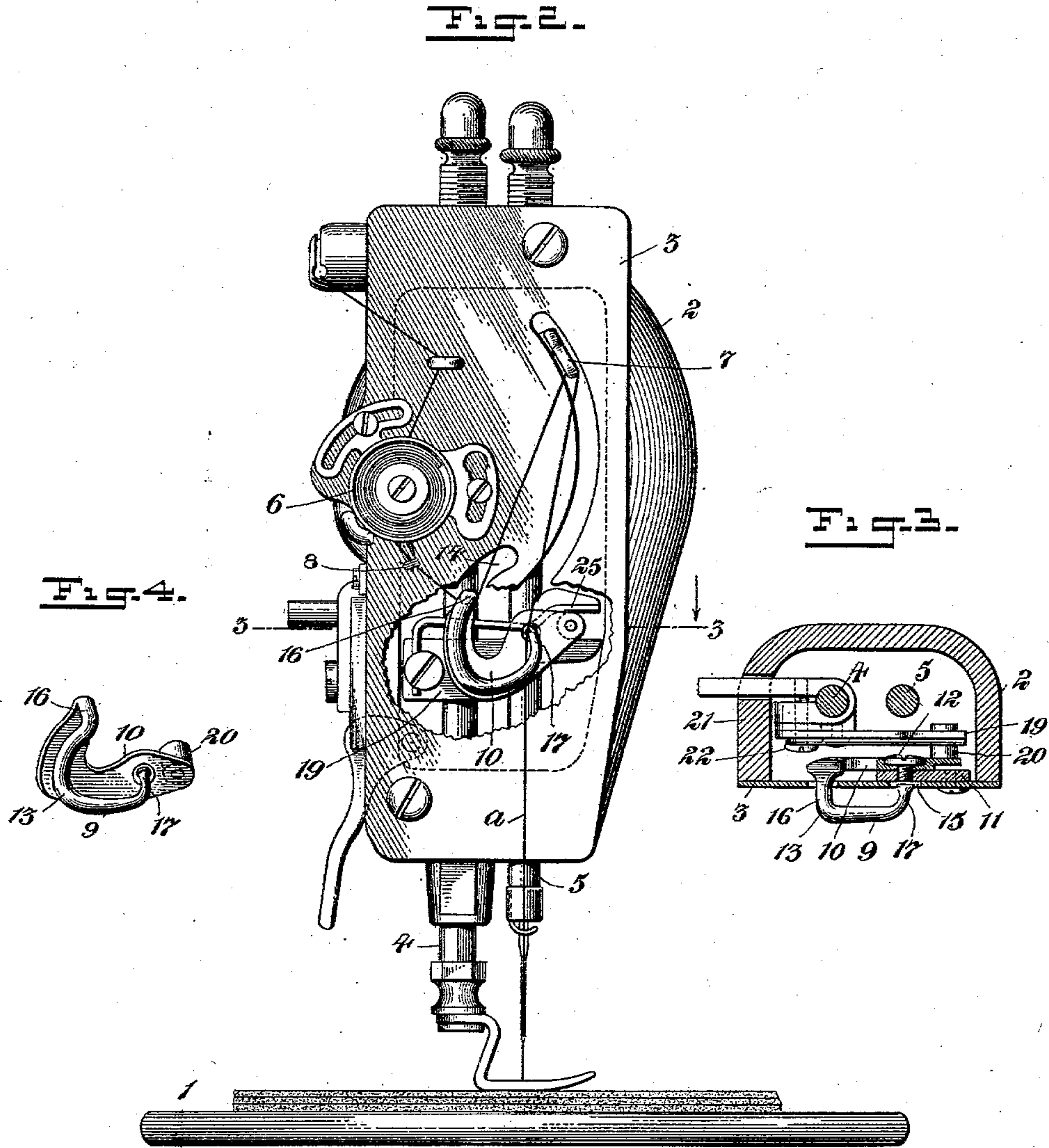
PATENTED DEC. 1, 1903.

J. DIEHL.
THREAD CONTROLLER FOR SEWING MACHINES.

APPLICATION FILED JUNE 8, 1900.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:
Geo. W. Maylor
M. L. Forrest.

Inventor
Jacob Diehl
By his Attorney
Chas. F. Damm

No. 745,580.

PATENTED DEC. 1, 1903.

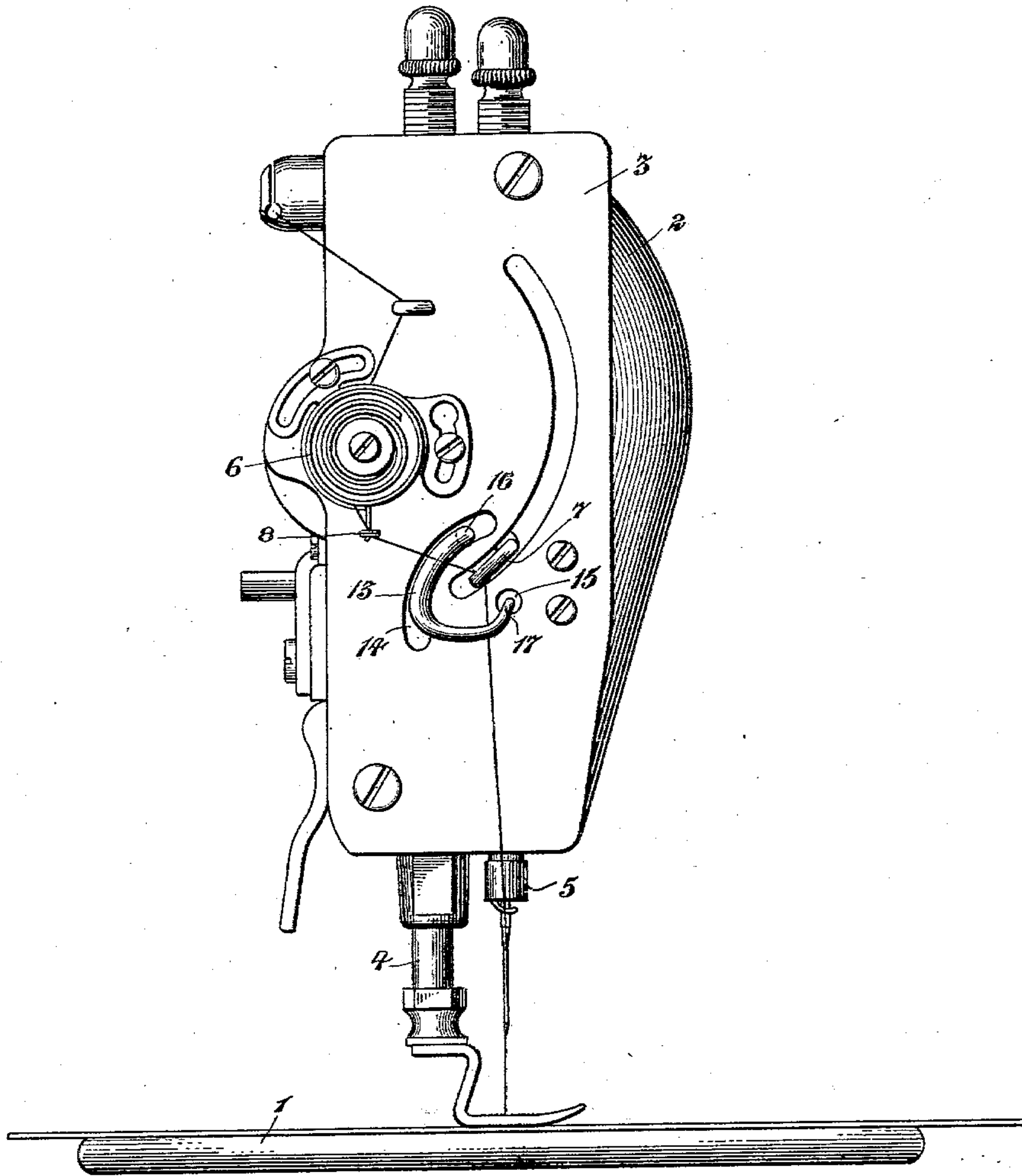
J. DIEHL.
THREAD CONTROLLER FOR SEWING MACHINES.

APPLICATION FILED JUNE 8, 1900.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 7.



Witnesses:
Geo. W. Naylor
M. L. Forrest.

Inventor
Jacob Diehl
By his Attorney *Chas. F. Dene*

UNITED STATES PATENT OFFICE.

JACOB DIEHL, OF CLEVELAND, OHIO, ASSIGNOR TO THE STANDARD SEWING MACHINE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

THREAD-CONTROLLER FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 745,580, dated December 1, 1903.

Application filed June 8, 1900. Serial No. 19,571. (No model.)

To all whom it may concern:

Be it known that I, JACOB DIEHL, a citizen of the United States, and a resident of Cleveland, Cuyahoga county, State of Ohio, have
 5 invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

10 This invention relates to sewing-machines, and particularly to a certain thread-controller device adapted to form a part of such machines for automatically regulating the amount of thread given off at each stitch, according to the thickness of the work being
 15 operated upon.

In the formation of the ordinary lock-stitch the upper or needle thread loop is carried around the bobbin containing the under-
 20 thread supply, so as to interlock with the under or bobbin thread, and should then in order to produce a desirable stitch be drawn up by the take-up until the lock between the upper and under threads is at the center of
 25 the goods or work being sewed. Therefore it will be obvious that the amount of thread given down for each stitch should vary more or less according to the thickness of the work. In the ordinary sewing-machine as
 30 usually constructed provision is made whereby a certain determined amount of thread is drawn from the spool or other thread-supply, which is sufficient for the proper formation of a stitch in very thick work, and in the
 35 event of thinner work being operated upon the difference or surplus between the amount drawn from the spool and the amount required for the stitch is taken up and controlled by the usual spring slack-thread controller or so-called "intermediate take-up"
 40 operating between the tension and the main take-up. The surplus thread thus produced is objectionable, however, for the reason that it forms an increased amount of slack thread
 45 to be controlled by the intermediate take-up, the inertia of the spring forming which is too great to vibrate at the required rate to properly control the thread when the machine is operated at a very high rate of speed.

50 Having such facts in mind it has been the

object of this invention to provide a simple and effective controller device for automatically regulating the amount of thread taken from the spool at each stitch, according to the thickness of the work being operated upon, 55 and thereby avoiding the necessity of providing a surplus amount of slack thread to be controlled. Such object I secure by means of my improved construction, as hereinafter set forth in detail and pointed out in the 60 claims.

Referring to the accompanying drawings, Figures 1 and 2 are end elevations of a sewing-machine (excepting the mechanism below the cloth-plate) embodying my invention, 65 showing the changed positions assumed by the controller when work of different thicknesses is being operated upon, the take-up and needle remaining in the same position with the take-up at its highest point. In Fig. 70 2 a portion of the face-plate is broken away to more clearly show the parts at the rear of the same. Fig. 3 is a cross-section taken through line 3 3 of Fig. 2. Fig. 4 is a perspective view of the controller removed from 75 the machine. Figs. 5 and 6 are detail views showing the controller and certain coacting parts in the same positions relative to each other as that shown in Figs. 1 and 2, respectively. Fig. 7 is a view similar to that of 80 Fig. 1, showing the position of the parts with the take-up at its lowest point.

In said drawings the cloth-plate 1, the overhanging arm 2, having the detachable face-plate 3 at the forward end thereof, the presser- 85 bar 4, the needle-bar 5, the tension device 6, the take-up 7, and the intermediate spring take-up 8 are all of the same construction and arrangement as found in the "Standard high-speed machine," and do not, as to their par- 90 ticular construction, form a part of my present invention. The take-up 7, which has a vertical or up-and-down movement in the arc of a circle, forms, with its actuating mechanism, the subject-matter of another applica- 95 tion filed by me February 18, 1899, bearing Serial No. 706,053; but such take-up for the purposes of this invention may be actuated by any suitable mechanism.

At a point between the tension device 6 and

and take-up 7 the needle-thread *a* is engaged and acted upon by my improved controller (indicated at 9) in a manner as will be described. This controller 9 consists of a lever 10, which is pivotally supported at a point between its ends in connection with a plate 11 on the rear side of the face-plate 3 by means of a pivot pin or screw 12, as clearly shown in Fig. 3. At one end this lever 10 is provided with an arm or extension 13, which projects outward through an elongated slot 14 in the face-plate 3 and then extends backward in a direction substantially parallel with the part 10 to a position opposite the pivot-screw 12, at which point the end of said arm or extension extends into an opening 15, which is formed in the face-plate immediately opposite the end of the said pivot-screw, as shown. By such described construction and arrangement of the controller an elongated loop or eye is formed at the front side of the face-plate for the passage of the needle-thread therethrough, one end of which (indicated at 16) is capable of a swinging or vibrating movement in the path of an arc described from the axis of the controller, while the opposite end, (indicated at 17,) being coincident with said axis, remains stationary except as to a rocking movement in a fixed plane.

A plate or arm 19, which is rigidly connected at one end with the presser-bar, so as to be vertically movable therewith, and at its opposite end being forked and embracing a stud or roll 20, carried at the inner end of the controller, serves to form an operative connection between the presser-bar and said controller, whereby any vertical movement of the presser caused by different thicknesses of work passing thereunder will cause the controller to rock on its pivot and so raise or lower its movable end 16 relative to the take-up. The action on the thread produced by such movement of the controller will now be described.

In threading the machine the thread is passed from the spool or other thread-supply through suitable guides to the tension device 6, then through the eye of the intermediate take-up 8 to and through the loop or eye formed by the controller 9, from thence up to and through the eye of the take-up 7, and then down again through the controller 9 to the needle, all as clearly shown in the drawings. When the machine is thus threaded, that part of the needle-thread between the tension and the take-up passes under the movable end 16 of the controller, so as to be engaged thereby, while that portion between the take-up and needle is engaged by the opposite or stationary end 17 of the controller, which latter end is arranged in a position about central with the path of the needle and serves as a guide for the thread in passing to the latter.

In the operation of the machine when thin goods are being operated upon, as shown in Fig. 1, the presser-foot is close to the cloth-

plate and the movable or operating end 16 of the controller is near its highest point of movement, in which position it will cause only so much thread to be drawn from the spool by the take-up as is required to pass around the shuttle. In the event of thicker goods now being passed under the presser, as shown in Fig. 2, or a raised seam in the goods passing thereunder the presser-bar will be correspondingly raised and so caused to act upon the controller through the arm 19 to rock the same and lower its thread-engaging end 16, as shown. When the controller is thus lowered relatively to the take-up, it increases the distance in which the thread is drawn between the take-up at its highest point and the tension and so causes a greater amount of thread, sufficient for the increased thickness of the goods, to be drawn from the spool and given down for the stitch. The controller as thus operated automatically regulates the amount of thread necessary to produce a uniform stitch in goods of varying thicknesses, and consequently renders the use of the intermediate spring take-up 8 practically unnecessary, the action of the latter being very slight when the thread is controlled in the manner described and is only used as a safeguard to prevent possibility of what might occur in some very rare case—that is, the formation of sufficient slack thread to become twisted about the point of the needle.

In Fig. 7 are shown the relative positions of the parts with the take-up at its lowest point, at which time the take-up has moved below the highest point of the controller with the thread drawing from the tension to the needle entirely free from engagement with either side of the controller. As the take-up moves upward from such position that portion of the thread between the take-up and needle will be engaged by the stationary end of the controller to be guided thereby relatively to the needle, while that portion between the take-up and the tension will be engaged by the opposite end of the controller, whereby an automatically-predetermined amount of thread will be drawn from the spool for the next stitch, as hereinbefore described.

The controller-engaging arm 19, as herein shown, is pivotally connected at one end with a block 21 on the presser-bar by means of a screw 22 and is supported with its opposite or controller-engaging end in a vertically-adjustable position by means of a clamping or set screw 23, which connects with the block 21 through an elongated slot 24 in the said arm 19. This adjustment permits the forked or controller-engaging end of the arm 19 to be raised or lowered relatively to the presser-bar, whereby an increased range of adjustment to the controller may be had independent of that obtained by the vertical movement of the presser-bar, the purpose of which is as follows: In the event of very thin work being operated upon the forked end of the arm 19 should be set to its extreme lowest point, so as to raise

the upper end of the controller to its highest point, and thereby cause a minimum amount of thread, as is required for the formation of the stitch, to be taken from the spool. On the other hand, in the event of very heavy work being operated upon, the forked end of the controller is then set to its extreme highest point, so as to lower the movable end of the controller to its lowest point, and thereby cause the increased amount of thread required for such heavy work to be drawn from the spool. Any suitable means for securing such vertical adjustment of the controller-engaging end of the arm 19 other than that shown and described may be employed without departure from my invention.

A spring 25, clamped in position at one end between the arm 19 and the head of the screw 22 and at its free end bearing downward upon the roll 20, carried by the controller, serves to prevent undue vibration between said roll and the engaging fork of the controller, and so avoid any noise that might otherwise occur.

Having thus set forth my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a sewing-machine, the combination, with the presser-bar and a take-up device, of a controller provided with two surfaces for engaging with the thread in its passage to and from the take-up, one of said surfaces being movable relatively to the take-up and the other being substantially stationary, and means for operating said controller from the presser-bar.

2. In a sewing-machine, the combination, with the presser-bar and a take-up device, of a controller provided with two surfaces for engaging with the thread in its passage to

and from the take-up and being arranged to receive therebetween the take-up during a portion of its movement, and means for operating said controller from the presser-bar.

3. In a sewing-machine, the combination, with the presser-bar and a take-up device, of a thread-controller, comprising a pivotally-supported lever having an arm provided with two surfaces for engaging with the thread in its passage to and from the take-up, and means for operating said controller from the presser-bar to move one of its said thread-engaging surfaces relatively to the path of the take-up while the other surface remains substantially stationary.

4. In a sewing-machine, the combination, with the presser-bar and the take-up device, of a pivoted controller provided with an elongated loop or eye through which the thread is passed to and from the take-up, one end of said loop or eye being substantially coincident with the axis of the controller, and means forming an operative connection between said controller and the presser-bar, for the purpose set forth.

5. In a sewing-machine, the combination, with the presser-bar and a take-up device, of a controller provided with two surfaces for engaging with the thread in its passage to and from the take-up, one of said surfaces being movable relatively to the take-up and the other being substantially stationary, and adjustable means forming an operative connection between the said controller and the presser-bar, for the purpose set forth.

JACOB DIEHL.

Witnesses:

CHAS. C. EMMONS,
W. C. WALKER.