No. 676,973. Patented June 25, 1901.

D. G. BAKER.

WINDING, MEASURING, AND SEVERING MACHINERY.

(Application filed May 15, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

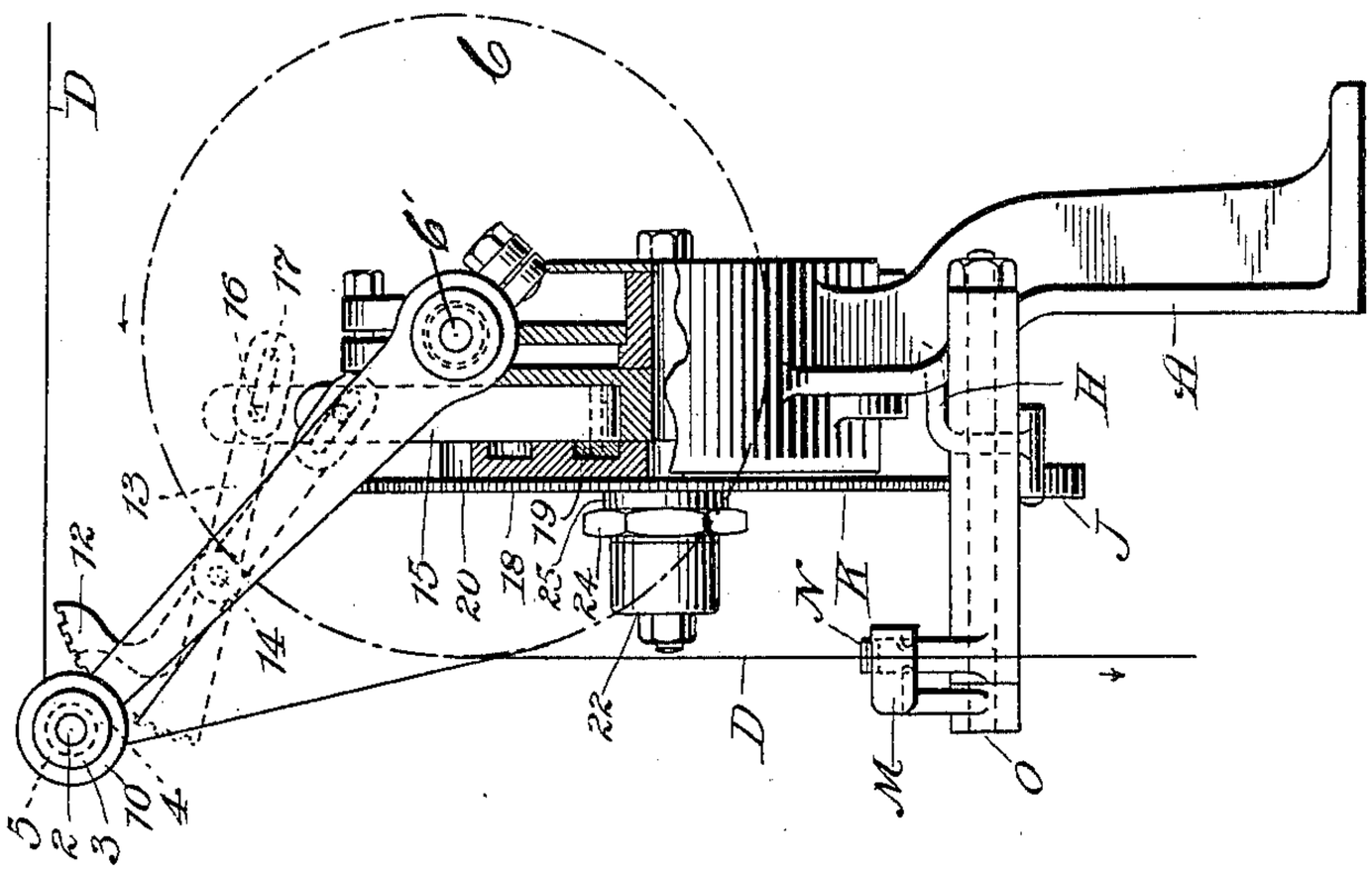

Fig. 1.

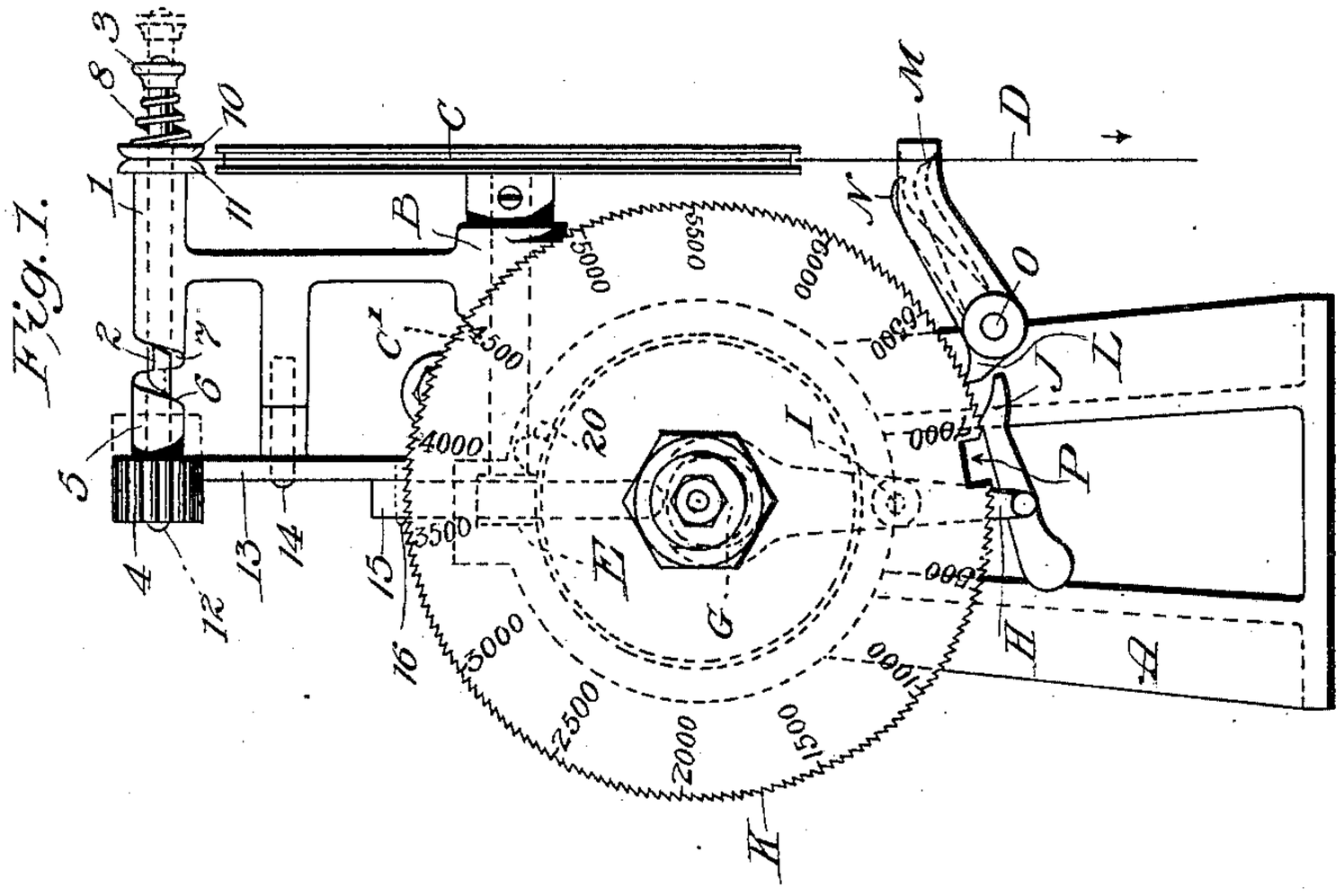

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Fig. 3.

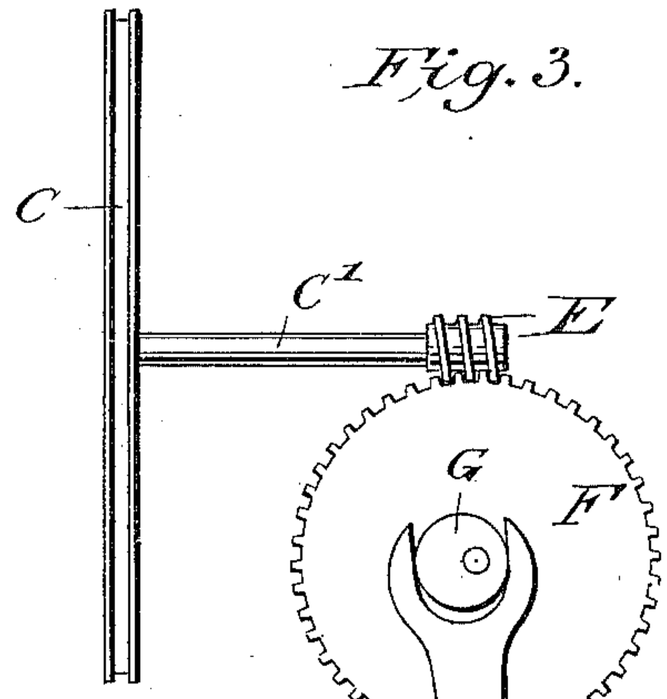


Fig. 5.

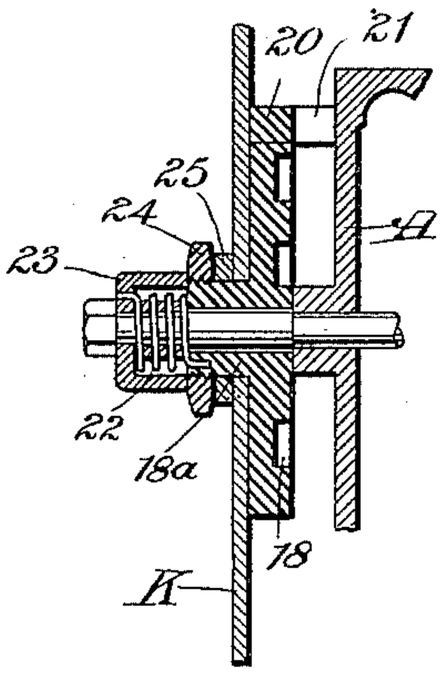
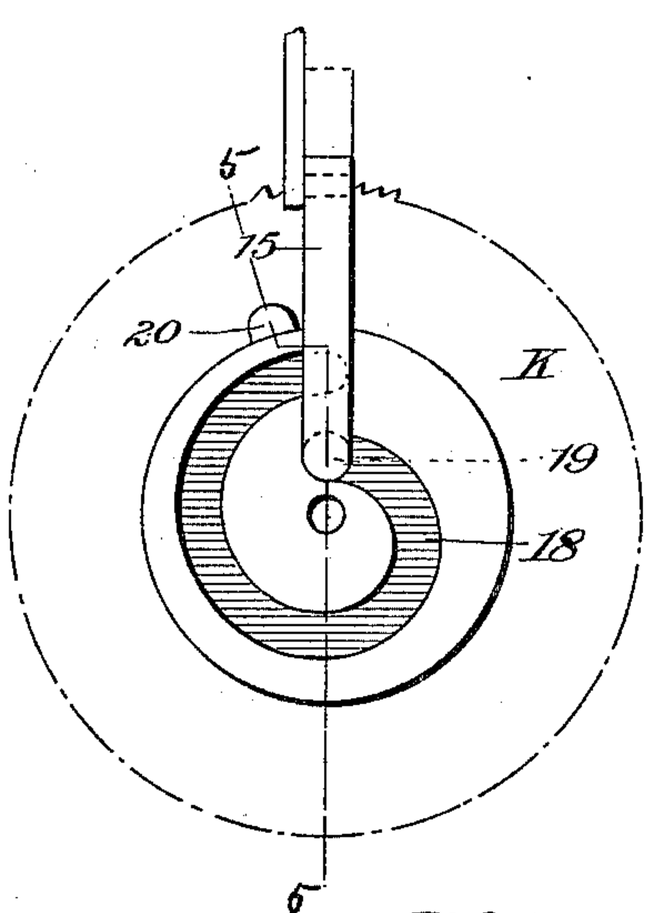


Fig. 4.



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WINDING, MEASURING, AND SEVERING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 676,973, dated June 25, 1901.

Original application filed February 9, 1900, Serial No. 4,582. Divided and this application filed May 15, 1900. Serial No. 16,736. (No model.)

To all whom it may concern:

Be it known that I, DICKERSON G. BAKER, a citizen of the United States, residing at Willimantic, county of Windham, State of Connecticut, have invented certain new and useful Improvements in Winding Machinery, of which the following is a full, clear, and exact description.

This is a divisional application from application Serial No. 4,582, filed by me on February 9, 1900.

My invention relates to winding-machines, and particularly to a measuring device which may be advantageously employed therewith, whereby the length of thread to be wound on the spool, bobbin, or the like may be accurately predetermined, so that when the desired length has been reached the said thread will be automatically severed.

This invention is useful in connection with any machine adapted to wind thread, cord, or the like.

The main object of my invention is to provide a simple and effective device, automatic in action, whereby after the desired length of thread has been wound it will be automatically cut off.

Inasmuch as the apparatus may be operated independently of any particular form of winding-machine and may be controlled entirely by the traveling thread, the device can readily be applied to any form of winding-machine. Consequently and inasmuch as the form of winding-machine is immaterial the latter has not been illustrated.

A further object consists in providing means whereby the measuring device will automatically return to the desired starting position, thereby saving a considerable portion of the operator's time, which would otherwise be required to manually reset the machine.

In the drawings, Figure 1 is a front elevation. Fig. 2 is a side elevation of the parts shown in Fig. 1. Fig. 3 is a detailed view of detached portions. Fig. 4 is a detailed view of other detached portions, and Fig. 5 is a longitudinal sectional view on the line 5 5 of Fig. 4.

The accompanying drawings correspond to the drawings in the original case, of which this is a division. A portion of the device illustrated is designed to control the tension of the thread, and because a full and detailed description of the construction and mode of operation of said tension device may be found in the original application, of which this is a division, the same will be only briefly described herein, particularly as the means for measuring the thread is the invention which is made the subject-matter of this application.

A is a suitable frame or standard having a bearing B for the shaft of a grooved wheel around which the thread to be measured is passed in its course to the winding-machine. (Not shown.) The grooved wheel C is rotated by the traveling thread and controls the mechanism by which the cutting off of the thread at the proper length is determined. The rotation of the said wheel C also drives the mechanism whereby the tension is controlled. For the purposes of this case, therefore, the wheel C will be called the "driving-wheel."

C' is the driving-wheel shaft, which in turn may carry a worm-gear E or other suitable device whereby a wheel F may be rotated. This wheel F may be mounted in a suitable bearing and may carry an eccentric G or its equivalent.

H is a rocking or oscillating lever pivoted at I at a point intermediate its length. This lever is rocked by the rotation of the wheel F.

J is a pawl carried at the free end of the lever H, which pawl may engage with the registering-wheel K of the measuring device, which wheel K may be loosely mounted so as to be rotated by the rocking of the lever H. In the form shown the wheel K is provided with teeth to be engaged by the pawl J, so that at each stroke of the rocking lever H the said wheel K will be advanced a slight distance.

L is a pawl mounted upon a stationary bearing O on the frame, which pawl may be caused to engage with the teeth on the wheel K and block the return of the wheel K so long as it bears freely against the toothed periphery of the latter.

M is a cutting-frame through or over which the thread D may pass.

N is a cutter extension carried by the pawl L, which is so controlled as to sever the thread D at the proper instant.

The pawl L may be held by gravity against the toothed periphery of the wheel K, in which event the weight of the cutter N may serve the purpose of a counterweight, although it is obvious that the substitution of a spring in place of the counterweight to cause the said pawl L to press against the toothed periphery of the wheel K would be the full mechanical equivalent, and such a mere variation is too obvious to require illustration.

P is a deep notch formed in the periphery of the wheel K, into which the pawl L may be freely dropped or projected to such an extent that the cutter N will engage with the thread—for example, as illustrated in dotted lines, Fig. 1—in which position the thread will be severed or broken.

The pawl L may act as an index-finger to point to graduations which may be arranged around the edge of the wheel K for the purpose hereinafter described.

The mechanism thus far described will act as a measuring device, as follows: Assume that the driving-wheel C is so geared to the intermediate wheel F and the registering-wheel K that one hundred revolutions of the wheel C will cause the registering-wheel K to advance one tooth, and assume that the circumference of the wheel C at the bottom of the groove is one-half yard. Under such circumstances the advance of the registering-wheel one notch indicates that the periphery of the driving-wheel has advanced fifty yards. Inasmuch as the thread may be wound once or more around the driving-wheel C, if desired, on its course to the winding-machine it will frictionally bind upon said wheel, so that it will not slip, and consequently it will cause the periphery of said wheel C to move at the same speed that the thread is traveling. This being so, the advance of the registering-wheel K one notch will indicate accurately that fifty yards of thread have been reeled off. Assume that the machine starts from the position indicated in Fig. 1, in which figure the pawl L, being the index-finger, points to the graduation upon the wheel K which indicates six thousand eight hundred and fifty yards. Before the wheel K can be rotated so as to bring the deep notch P adjacent the index-pawl the driving-wheel C must necessarily rotate thirteen thousand seven hundred times, and consequently six thousand eight hundred and fifty yards of thread will have to be reeled off, at which instant the index-pawl L will drop into the deep notch P and the cutter N will engage with and cut or break the thread D. The operator would then disengage the pawls L and J from the registering-wheel and reset the latter so that the desired graduation would be located adjacent the index-pawl L. This resetting of the registering-wheel may be effected manually; but where it is desired to reel off repeatedly a given number of corresponding lengths of thread it is advantageous to have an automatic resetting means, which means will be hereinafter described. When the registering-wheel K has been reset, the thread may be again connected to the winding-machine, which latter may be started until the number of yards of thread indicated by the graduation upon the registering-wheel has been reeled off, at which instant the pawl L drops into the deep notch P in the manner previously described and the thread is again severed.

From the foregoing it will be seen that any desired length of thread may be automatically cut off. For example, if it is desired to wind five thousand yards of thread and to then have the thread cut, the wheel K is set to bring the registration "5,000" adjacent the pawl L. In this manner any length of thread within the limit of the entire circumference of the wheel K may be reeled off and severed from a suitable supply source.

Obviously the unit of measurement is immaterial; but for convenience herein I have adopted the yard as the unit. The size of the wheel is also immaterial. While I have shown a registering-wheel that has only substantially the capacity of seven thousand yards, it is obvious that the proportions of the parts may be so varied as to vary this capacity to any reasonable extent.

As before indicated, the registering-wheel may be manually turned back from the zero-point to the starting-point; but I have devised a means whereby the said wheel K may be automatically returned to this point upon the mere freeing of the pawls L and J. The pawls are arranged, preferably, as shown in Fig. 1, so that an operator upon removing the pawl L from engagement with the wheel K will also remove the pawl J. This may be accomplished by so locating the pawls that the former will engage with the latter or an extension therefrom, so that the withdrawal will be simultaneous, or substantially so, the pawl L moving the said pawl J. On the rear of the wheel K is a plate having a cam-groove 18, which is a part of the tension-controlling mechanism, hereinafter described. 20 is an offset or shoulder upon said plate 18.

21 is a stationary stop located at a suitable point in the frame of the machine and in the path of movement of the shoulder 20. The shoulder 20 bears against the stop 21 when the registering-wheel is at the starting-point—for example, say "5,000"—indicating that five thousand yards of thread must be reeled off before said thread will be severed.

22 is a spring one end of which may be engaged with the hub of the cam-wheel 18 and the other end engaged with the stationary collar 23. This spring causes the shoulder 20 to yieldingly press against the stop 21. When the machine is started, the registering-wheel is turned step by step and the shoulder 20 is moved away from the stop 21 against the tension of the spring 22; but the pawl engagement will prevent the registering-wheel from being turned back. In other words, said pawl engagement will hold said wheel from rear-

ward movement as it is advanced step by step. When the deep notch P is reached, the thread will be severed in the manner described. The operator in rethreading the machine simply elevates the cutter N of the pawl L, thereby withdrawing said pawl from engagement with the wheel K and simultaneously freeing the pawl J from wheel K, at which instant the wheel K is returned to the predetermined starting-point under tension of the spring 22. As shown in the drawings, the starting-point is six thousand eight hundred and fifty yards. If it were desired to have the starting-point five thousand yards, it would be necessary to alter the position of the dial portion of the registering-wheel with respect to the stop 20 upon the cam 18. To that end, therefore, the cam 18 and the wheel K are adjustable with respect to each other.

24 is a set-nut borne by a hub 18ª of the cam-wheel. The dial portion of the registering-wheel may be clamped to the plate portion 18 thereof by means of said nut. This construction is clearly shown in sectional view, Fig. 5. Therefore when it is desired to readjust these parts the nut 24 is loosened and the dial portion of the registering-wheel is turned independently of the cam-wheel 18 so as to bring the desired graduation-mark adjacent the index-pawl L. If, for example, this desired graduation-mark were "5,000," the same would be brought adjacent the index-pawl L and the nut 24 then tightened, clamping the cam-wheel 18 tightly to the dial portion of the wheel K. In such event successive lengths of five thousand yards each of thread would be measured off and cut at each operation of the device.

The tension device is controlled partly by the cam 18 in the following manner: The cam 18 controls a rod 15, which in turn controls a rocking lever 13, which in turn coöperates with a tension device so constructed and arranged that as the thread is reeled off the tension thereon is gradually decreased. This means is best shown in Fig. 1, in which 1 is a bearing for the shaft 2, which carries at one end a thumb-nut 3 and at the other end a spur-gear 4, which has a laterally-projecting hub 5 and a volute cam-face 6. This cam-face 6 bears correspondingly-formed volute cam-face 7 at the adjacent end of the bearing 1. Between the opposite end of the bearing 1 and the thumb-nut 3 are located tension-disks 10 and 11 and a pressure-spring 8. Consequently when the parts are in the position shown in Fig. 1 (solid lines) any thread passed between the tension-disks 10 and 11 will be given a certain tension. Since the parts are shown in said Fig. 1 in the starting position, the advance of the machine from that point to the cutting-off point will cause the tension applied to the thread to be gradually lessened, because the rotation of the measuring-wheel K and its cam 18 will cause the spur-gear 4 to be gradually rotated, which rotation will cause the volute cam 6 to ride down on the volute cam 7, the spring 8 moving the thumb-nut 3 away from the bearing 1, which forms a stationary abutment for the tension-disk 11. This movement of the nut 3 will lessen the pressure of the disk 10 against the disk 11, and consequently reduce the tension.

A detailed description of the construction and mode of operation of the tension device will be found in my original application previously referred to.

Of course instead of making the registering-wheel a two-part device—*i. e.*, a device made up of the dial-face and the cam—for the purpose of varying the position of the dial-face with respect to the shoulder upon said cam said parts might be made integral, in which event the stop 20 should be adjustable. Such a modification is immaterial where the device is used merely as a measuring device; but where the measuring and the tension device are combined it is of course desirable that the stop 20 be stationary and that the relative position of the parts be changed by making the registering-wheel a two-part device.

The operation of the machine is as follows: The registering-wheel K is set so that the proper graduation corresponding with the number of yards to be measured is opposite the index-pawl J. The machine is started and the registering-wheel K and the cam 18 are moved as one part step by step until the deep notch P comes adjacent the pawl J. During this movement the thread-cutter N is locked from operation owing to the engagement of its pawl L against the periphery of the registering-wheel K; but when the deep notch P comes adjacent the pawl L the thread-cutter is allowed to operate, which operation is then automatically performed by gravity and the thread severed. When the pawls J and L are released, the spring 22 automatically returns the parts to the starting-point.

I am aware that a variety of changes may be made in the construction and arrangement of the parts, as well as the proportion thereof, and consequently I do not wish to have it understood that I intend to limit my claims thereto.

What I claim is—

1. In a device of the character described, a driving-wheel adapted to be rotated by the thread to be wound, a rotatable registering-wheel, means to rotate said registering-wheel said means being controlled by the driving-wheel, suitable graduations on said registering-wheel, a thread-cutter and controlling means for the same said controlling means moving through an arc of a circle, and means for limiting the rotation of said controlling means to arcs of different degrees.

2. In a device of the character described, a driving-wheel adapted to be rotated by the thread to be wound, a rotatable registering-wheel, means to rotate said registering-wheel

said means being controlled by the driving-wheel, suitable graduations on said registering-wheel, an automatically-operated thread-cutter, said registering-wheel having means for controlling the operation of said thread-cutter, and means for limiting the rotation of said registering-wheel to arcs of different degrees, thereby allowing any desired length of thread to be automatically measured off and cut.

3. In a device of the character described, a driving-wheel adapted to be rotated by the thread to be wound, a rotatable registering-wheel, means to rotate said wheel said means being controlled by said driving-wheel, a stop device carried by a pivotally-mounted plate adjacent the registering-wheel, and means for clamping said plate and registering-wheel together in different positions.

4. In a device of the character described, a driving-wheel adapted to be rotated by the thread to be wound, a rotatable registering-wheel, means to rotate said wheel said means being controlled by said driving-wheel, a stop device carried by a pivotally-mounted plate, means for clamping said plate in different positions on said registering-wheel, and means to automatically return said registering-wheel to the starting position.

5. In a device of the character described, a driving-wheel adapted to be rotated by the thread to be wound, a registering-wheel, means whereby the latter may be rotated step by step said means being controlled by the driving-wheel, a stop device carried by a pivotally-mounted plate, said plate being adjustable upon said registering-wheel, a thread-cutter, means to operate the same said means being controlled by said registering-wheel.

6. In a device of the character described, an adjustable measuring device comprising a driving-wheel adapted to be rotated by the thread to be wound, a registering-wheel rotated by said driving-wheel, a plate pivotally mounted concentrically with said driving-wheel and means for detachably securing said registering-wheel and said plate together, an offset or shoulder on said plate, a stationary stop in the path of movement of said shoulder, a spring engaging with said registering-wheel and rotating plate and adapted to move said shoulder toward said stop, means to positively move said registering-wheel in a direction opposite to the tendency of the spring, and means to detachably hold said registering-wheel as it advances.

7. In a device of the character described, a driving-wheel adapted to be rotated by the thread to be wound, a rotatable registering-wheel, means to rotate said registering-wheel said means being controlled by the driving-wheel, suitable graduations on said registering-wheel, a normally-locked thread-cutter, means to unlock said cutter when said registering-wheel is in but one certain position, means to operate said thread-cutter said means being controlled by said registering-wheel, and an automatic return device for said registering-wheel.

8. In a device of the character described, a driving-wheel adapted to be rotated by the thread to be wound, a registering-wheel, means whereby the latter may be rotated step by step said means being controlled by the driving-wheel, a stop device carried by and adjustable upon said registering-wheel, a thread-cutter, means to lock said thread-cutter during the rotation of said registering-wheel, means to unlock said thread-cutter at one point only in the revolution of said registering-wheel and means to operate said thread-cutter said means being controlled by said registering-wheel.

9. In a device of the character described, a driving-wheel adapted to be rotated by the thread to be wound, a rotatable registering-wheel, a pawl engaging said registering-wheel, a lever carrying said pawl, a cam for operating said lever, means intermediate of said cam and said driving-wheel for operating said cam, a stop device carried by an adjustable plate, said plate being adjustably secured to said registering-wheel, and means to automatically return said registering-wheel to the starting position.

Signed at Willimantic, Connecticut, this 8th day of May, 1900.

DICKERSON G. BAKER.

Witnesses:
WOODFORD ROYCE,
FRED L. FAY.