

(No Model.)

4 Sheets—Sheet 1.

C. J. WOODWARD.

THREAD SLACKENING DEVICE FOR SEWING MACHINES.

No. 411,702.

Patented Sept. 24, 1889.

FIG. I—

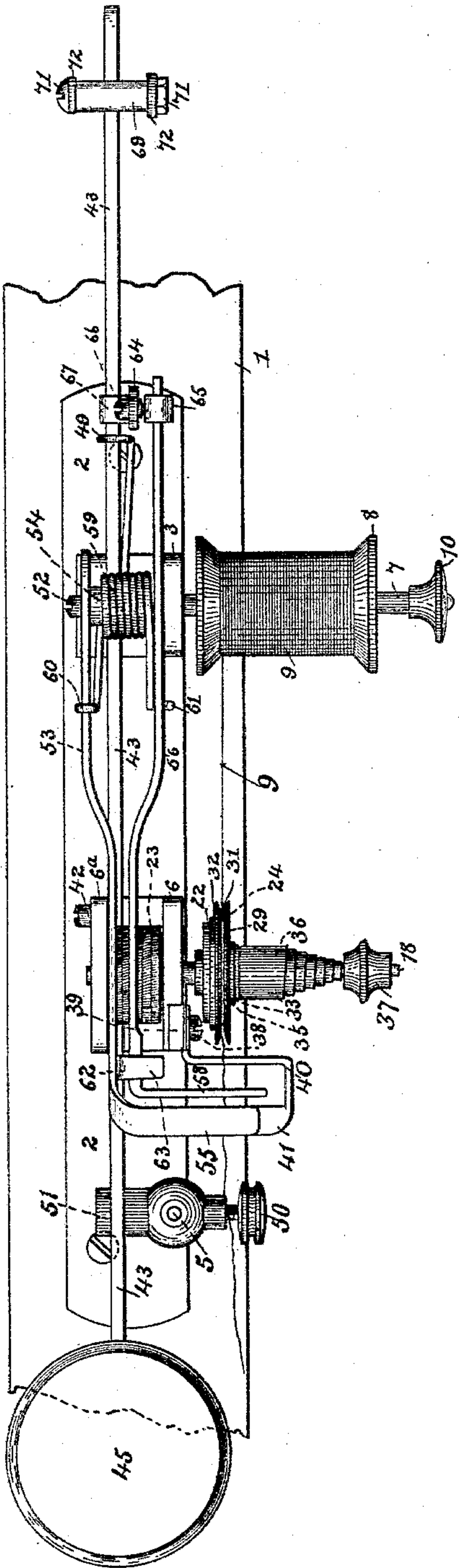
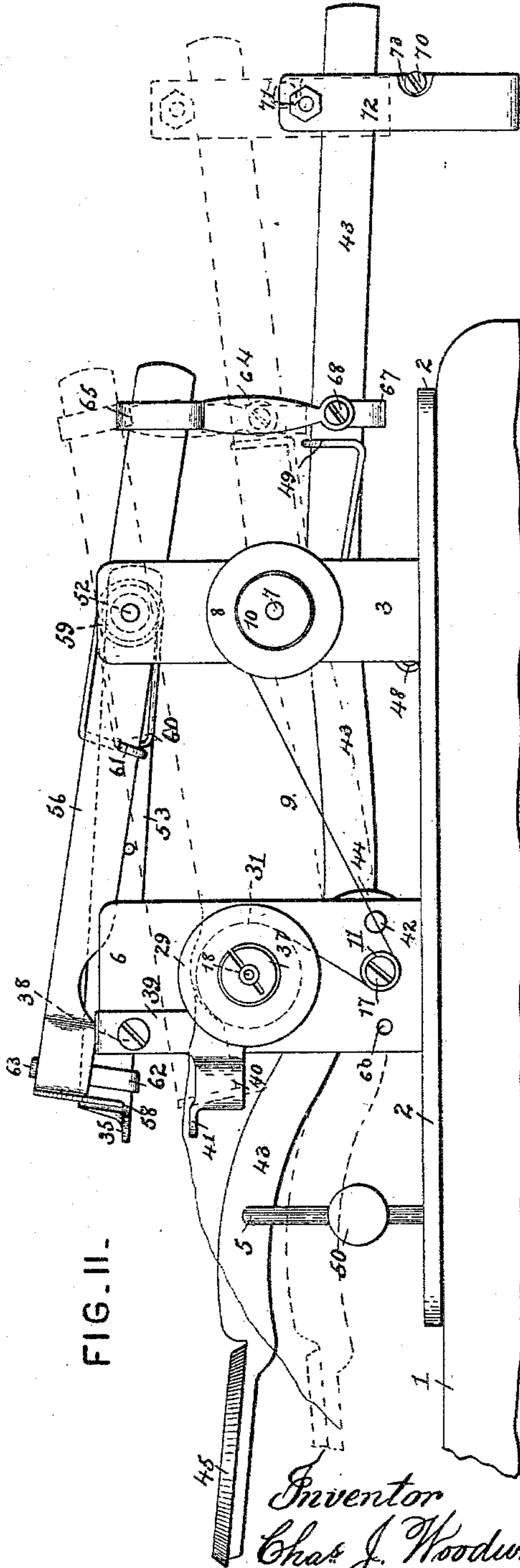


FIG. II—



Attest { Geo. T. Smallwood
Walter Allen

Inventor
Chas. J. Woodward
By Knight & Co.
attys

(No Model.)

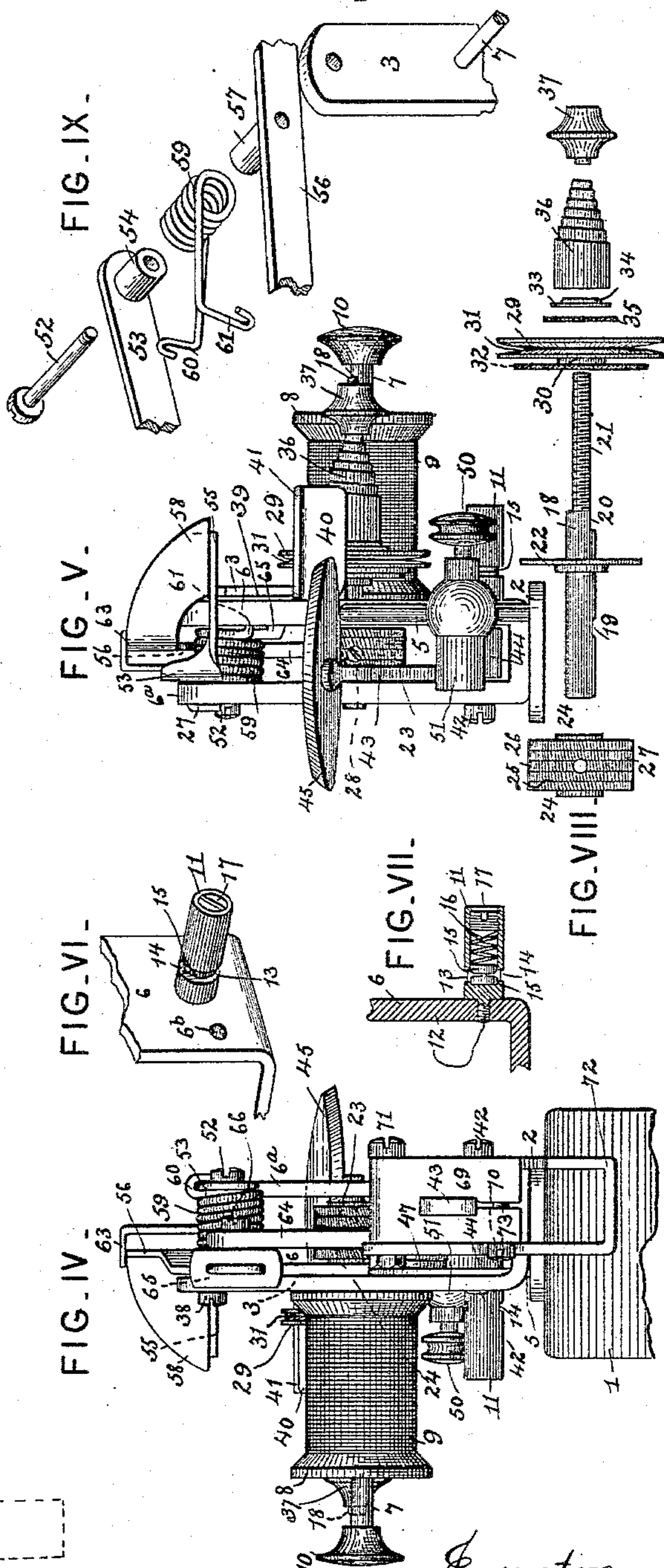
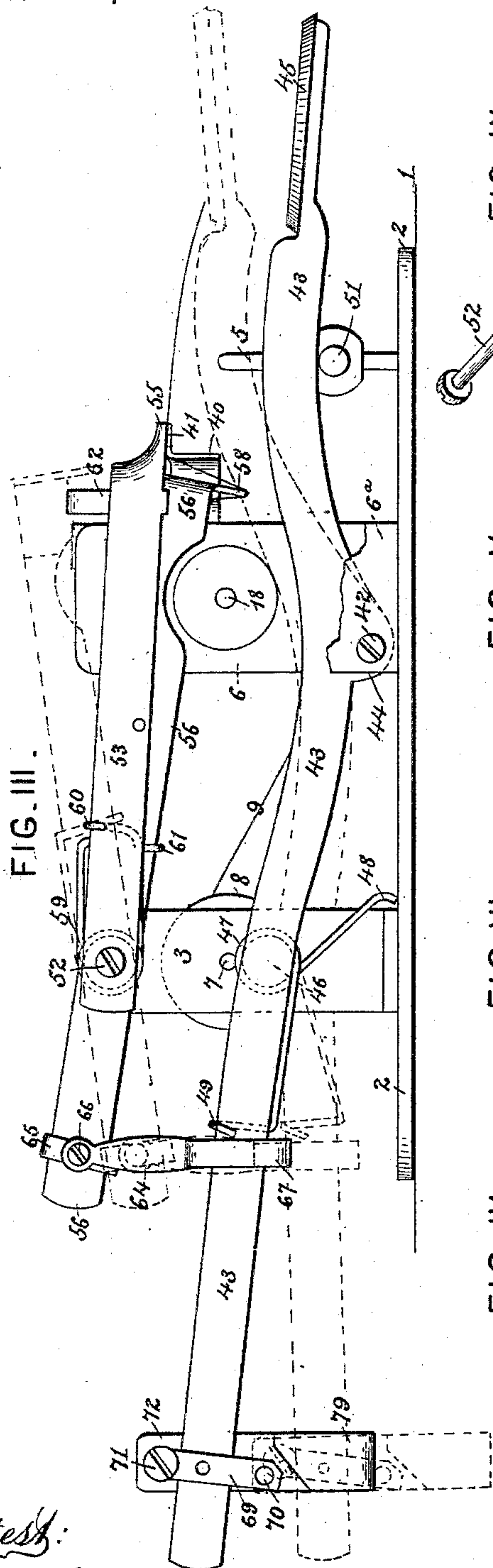
4 Sheets—Sheet 2.

C. J. WOODWARD.

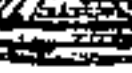
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Attest:
Geo. T. Smallwood.
Walter Allen

 Inventor
Chas. J. Woodward,
rights reserved
Attys

C. J. WOODWARD.

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FIG. XI -

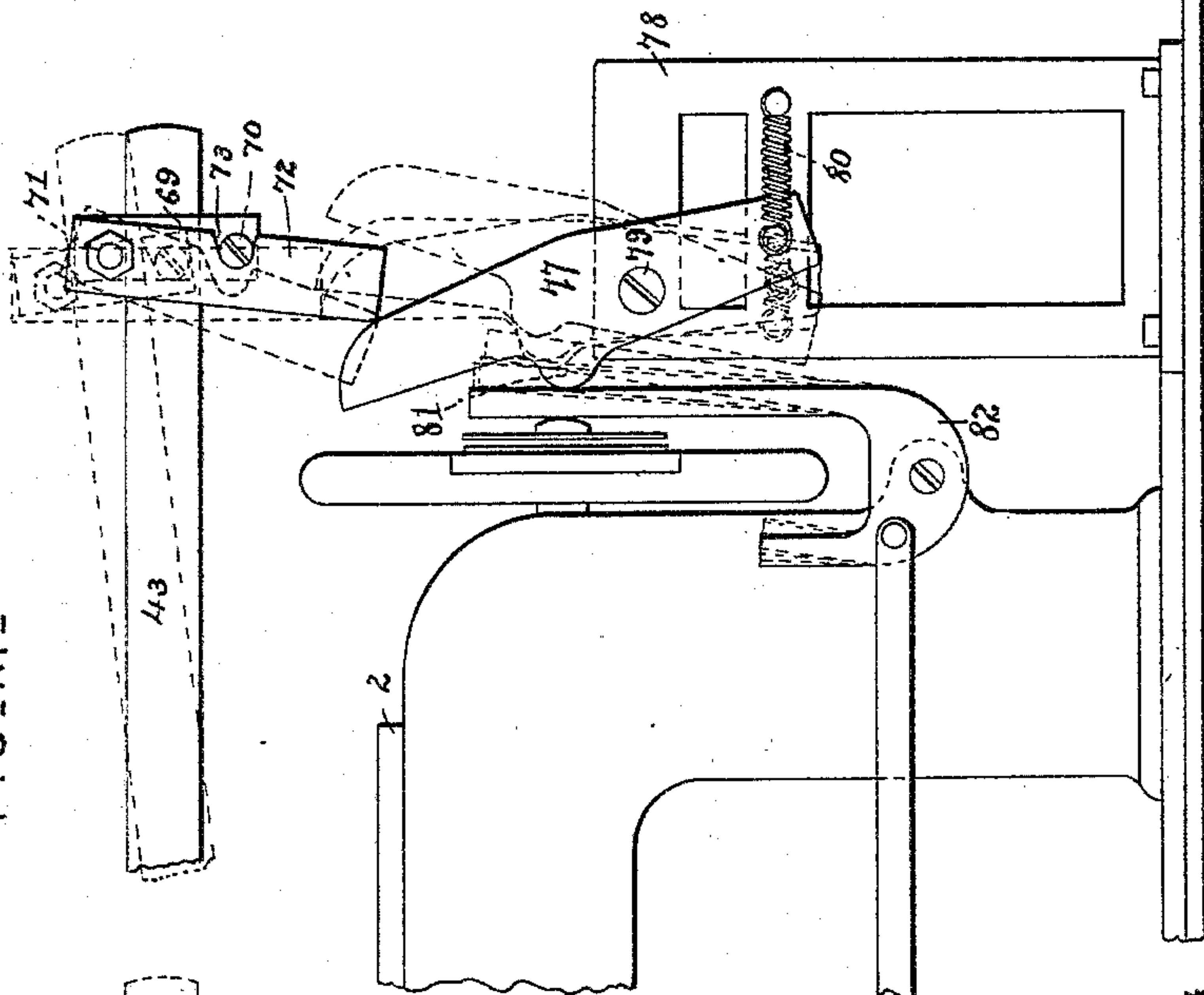


FIG. XIV -

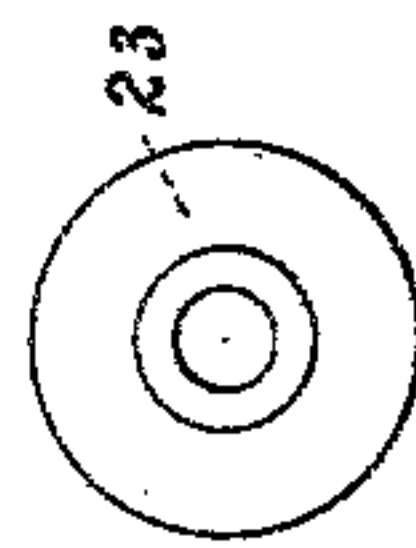


FIG. XIII -

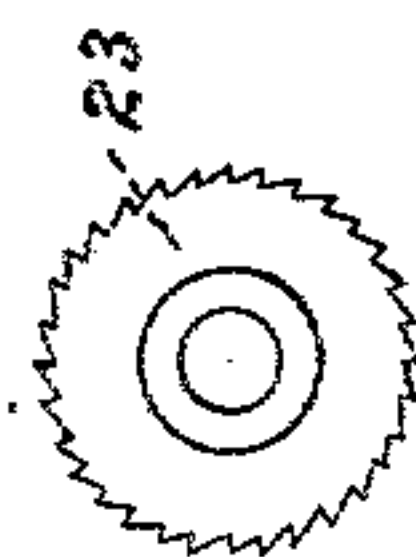


FIG. X -

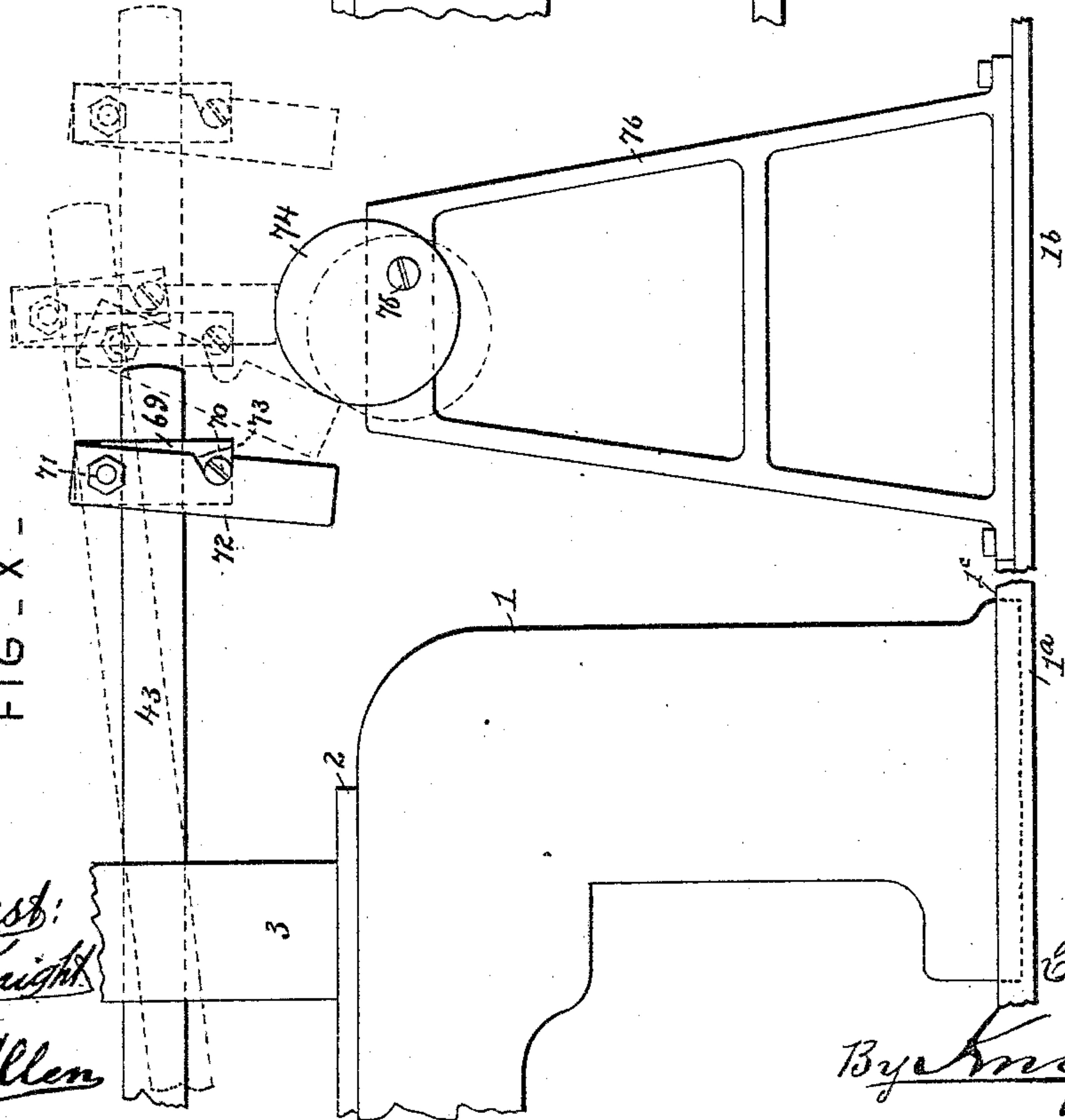
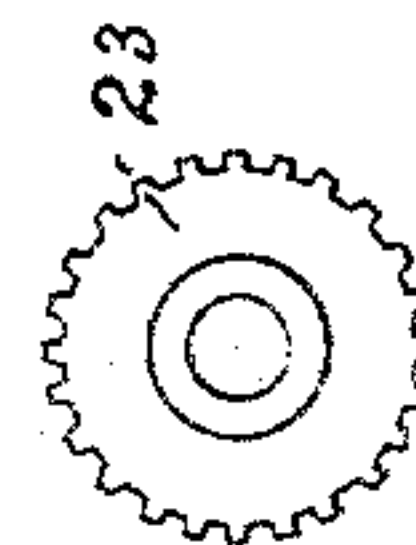


FIG. XII -



Attest:
H. E. Knight
W. Allen

Inventor:
Chas. J. Woodward
By H. E. Knight
attys.

C. J. WOODWARD.

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FIG - XVI -

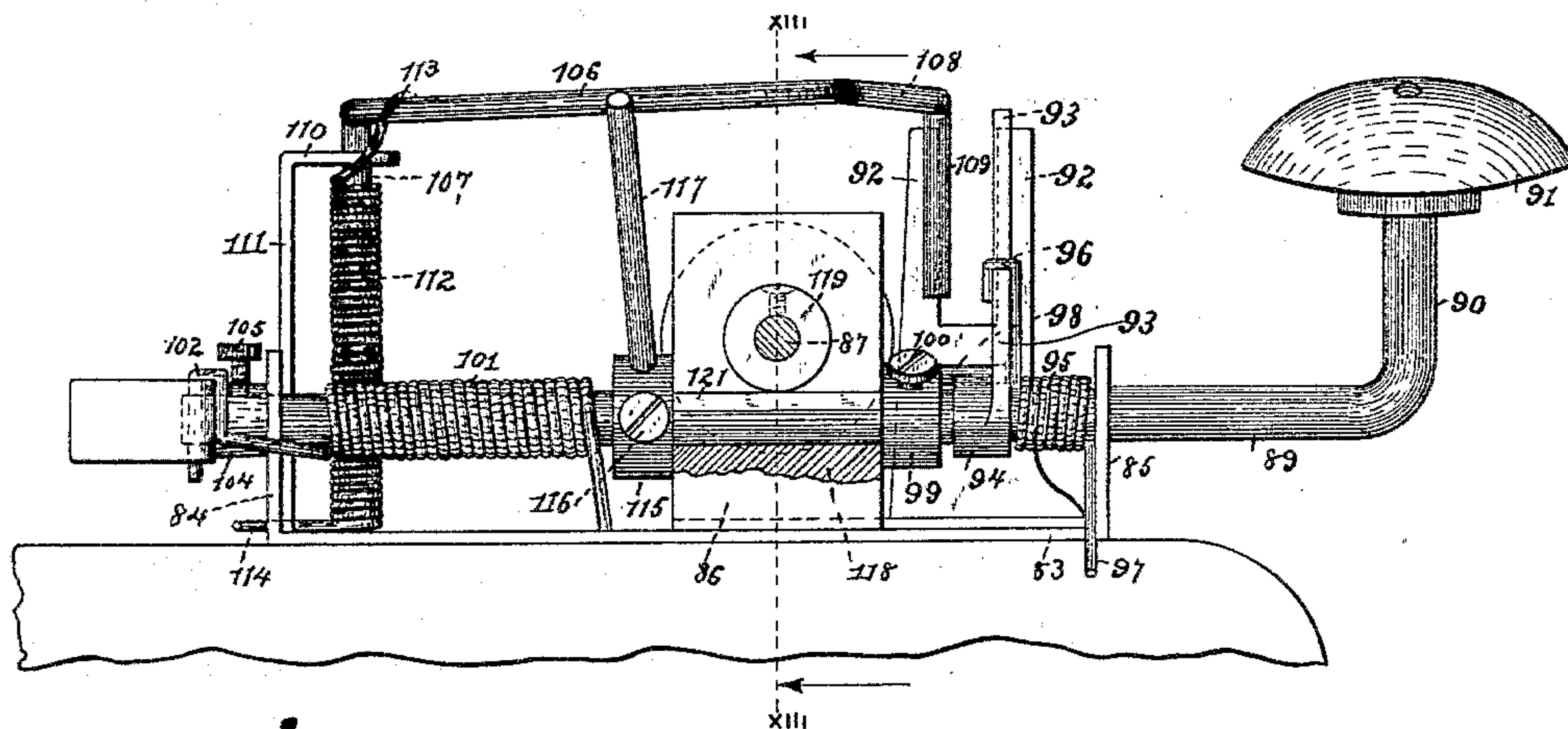


FIG - XV -

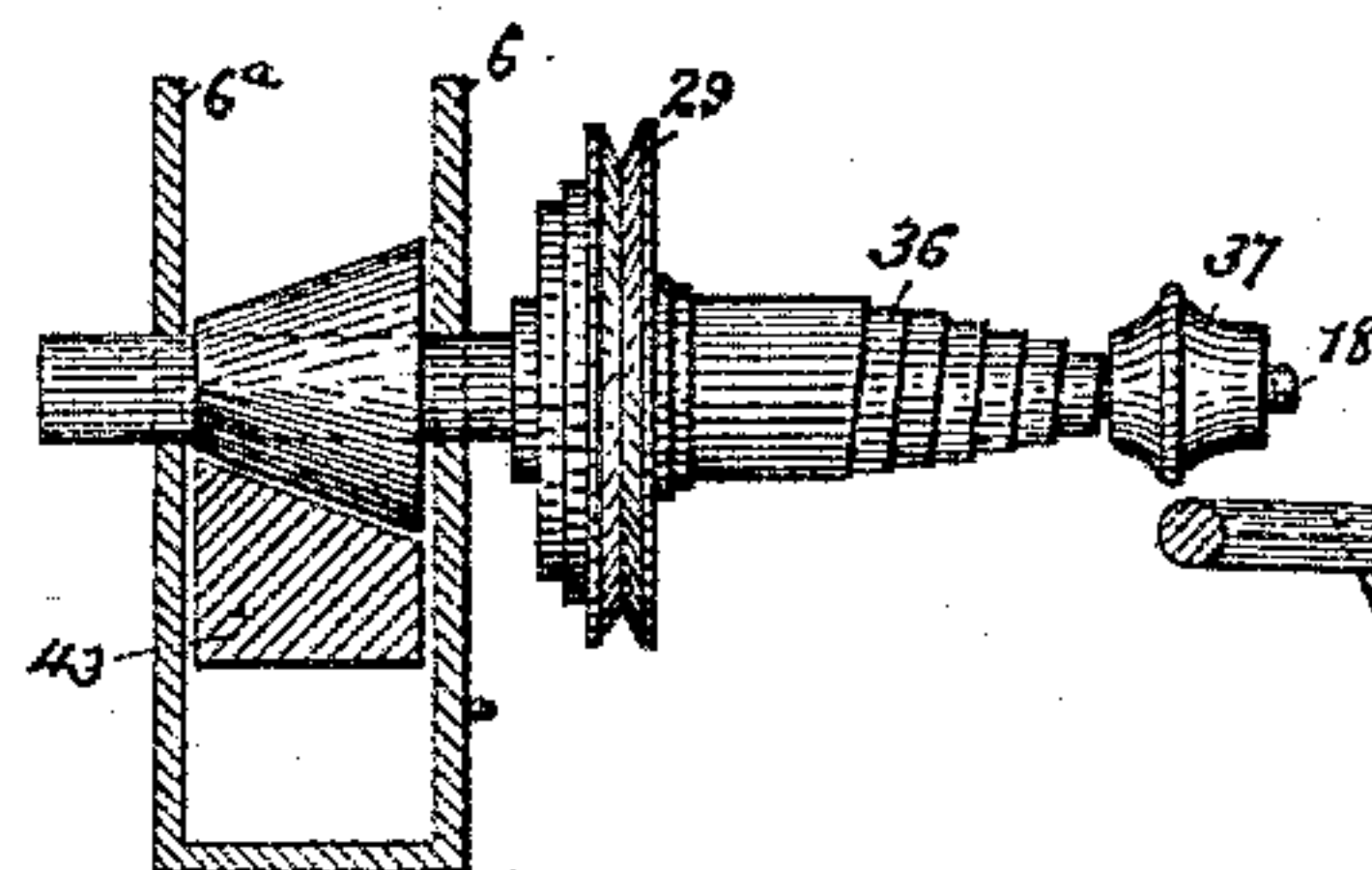


FIG - XVII -

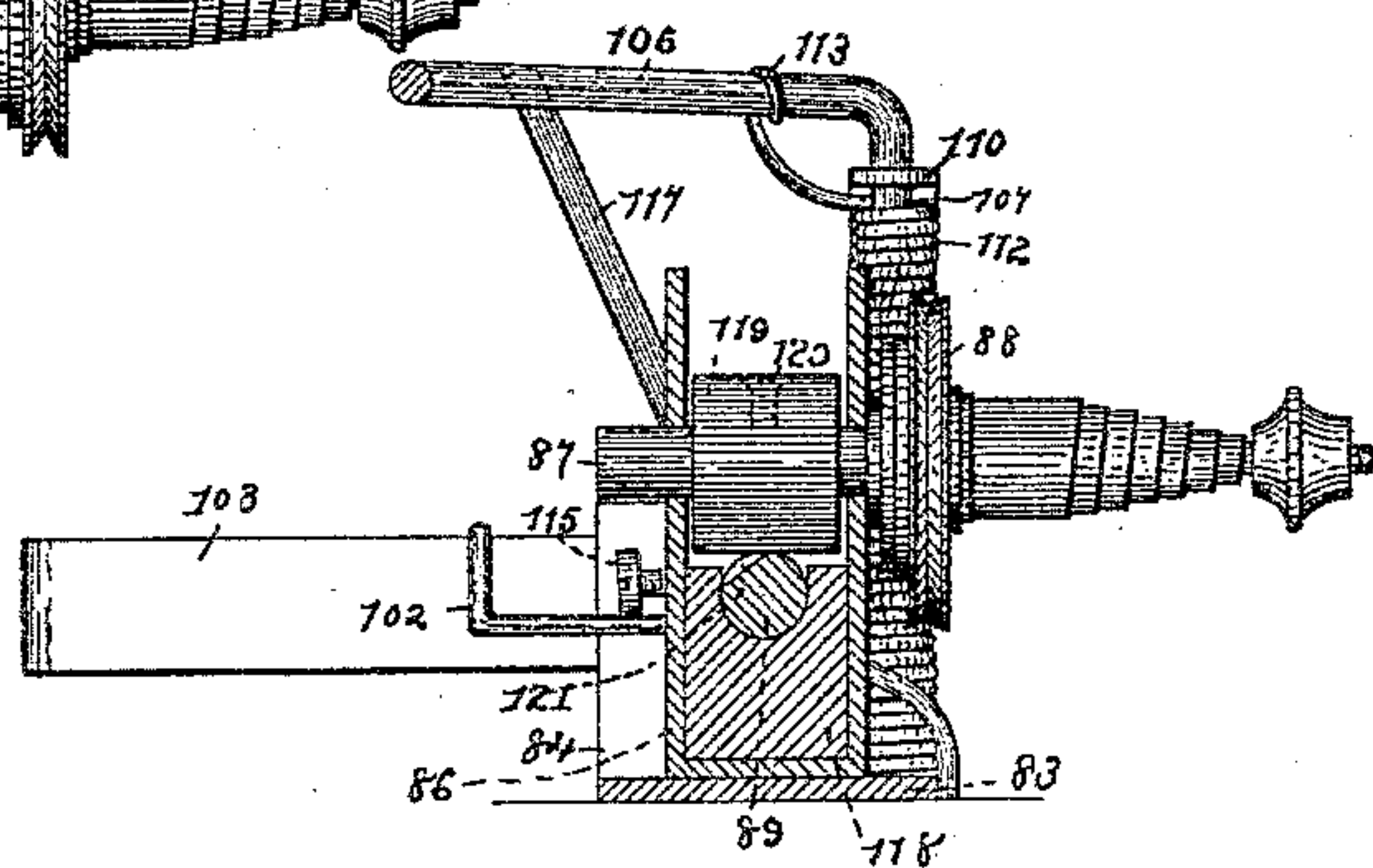
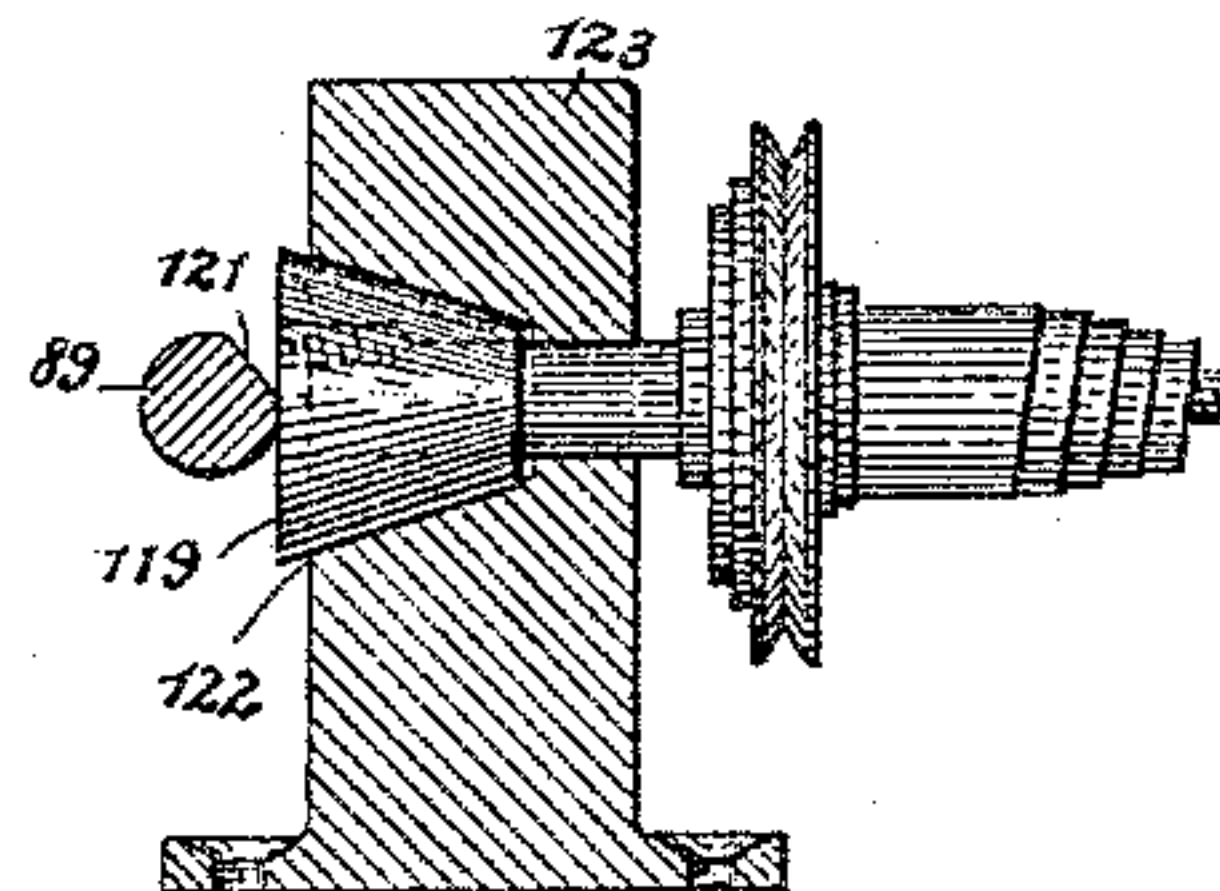


FIG - XVIII -



Attest
Geo. T. Smallwood.
Walter Allen

Inventor
Chas. J. Woodward
By Knights Bros.
Attys

UNITED STATES PATENT OFFICE.

CHARLES J. WOODWARD, OF BROOKLYN, NEW YORK.

THREAD-SLACKENING DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 411,702, dated September 24, 1889.

Application filed August 24, 1888. Serial No. 283,624. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. WOODWARD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Tension Devices for Sewing-Machines, of which the following is a specification.

My invention has for its object a device for relieving the tension on the needle-thread, nipping the latter, and drawing or pulling off any desired length of needle-thread, either by hand or automatically, without affecting the tension of the needle-thread or straining it, so as to enable the work to be removed at the end of a stitching operation.

My improvement consists in certain features of novelty hereinafter described, and particularly pointed out in the claims.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure I is a top view of my improved tension device applied to a part of the arm of a sewing-machine. Fig. II is a side elevation, the parts being shown in normal position in full lines and in operative position in dotted lines. Fig. III is a similar view looking at the device from the opposite side, the parts being shown in operative position in full lines and in normal position in dotted lines, and part being broken away to show the end of spindle, brake-wheel, and brake lever and shoe. Fig. IV is a rear elevation. Fig. V is a front elevation. Fig. VI is a perspective view of the retainer. Fig. VII is an axial section thereof. Fig. VIII is a side elevation of the tension-shaft and brake-wheel, the parts being separated. Fig. IX is a perspective view showing the connection between the nipper-lever and the pull-off lever, the parts being separated. Fig. X is a side elevation of the rear end of the brake-lever, showing means for automatically operating my tension device in connection with a sliding machine, the operative and inoperative positions of the latch-lever being indicated in dotted lines. Fig. XI is a side elevation of the rear end of the brake-lever, showing means for automatically operating my tension device connected with a stationary

machine, the operative and inoperative positions of the latch-lever being indicated in dotted lines. Figs. XII, XIII, and XIV are respectively side elevations of a gear-wheel, ratchet-wheel, and smooth wheel which are used as brake-wheels. Fig. XV is a detail sectional view showing a modification of brake-lever and a cone brake-wheel. Fig. XVI is a rear elevation of a modification of my invention, the back plate being broken away to disclose several details; and Fig. XVII is a vertical section of the same on the line XIII XIII. Fig. XVIII is a detail sectional view of the form of brake-wheel illustrated in Fig. XV, adapted to the modified form of my device.

1 is a part of the arm of a sewing-machine to which my tension device is secured, and 2 is the supporting-plate of my device. At the rear end of the plate is a lever-support 3, and at the front end is secured a stop-post 5, and intermediate of the lever-support and the stop-post are located the shaft-bearing plates 6 and 6^a.

I have shown the spool 8, for convenience of illustration, mounted on a pin 7, secured to the lever-support 3, the spool being held thereon by a nut 10 and having wound upon it the thread 9. It must be understood, however, that this is not the support of the spool in practice, as it is generally supported on the arm of the sewing-machine in various positions.

11 is a hollow retainer secured to the lower part of the bearing-plate 6 by means of a screw-threaded end 12, and is formed with a cut or opening 13 and thread-orifices 14, to which the cut or opening leads.

15 are the pressure-disks between which the thread is inserted in the opening 13, their pressure being regulated by a coil-spring 16, regulated in its pressure and held in position by a screw-threaded conical plug 17. This is, however, an old form of retainer and does not require further description.

Journalled in the bearing-plates 6 and 6^a above the retainer is a tension shaft or spindle 18, formed with flattened parts 19 and 20, screw-threaded outer part 21, and fixed circular plate or disk 22.

Mounted on the part of the tension-shaft

between the bearing-plates and fixed thereto is a brake-wheel 23 of preferred form, formed with projecting hub 24, circumferential grooves 25, and ribs 26, having diagonal cuts 27, forming with the grooves a roughened periphery to the brake-wheel. The brake-wheel is secured to the tension-shaft by means of a radial screw 28, (see Fig. V,) bearing on the flattened part 19 of the tension-shaft. On the tension-shaft outside of the fixed circular plate is the usual sheave or loose disk 29, having hub 30, bearing against plate 22, and the groove 31, in which the thread is carried from the retainer.

32 is a washer.

The perforated loose sheave is held in place by a collar 33, fitting the flattened part 20 of the tension-shaft and having a projection 34. Between the collar 33 and the disk 29 is a washer 35, surrounding the screw-threaded end of the shaft.

36 is the conoidal spring.

37 is a nut bearing on the end of the spring.

The devices just described form a part of the Wheeler & Wilson tension, and hence I do not claim them.

Secured by a screw 38 to the bearing-plate 6 is a bracket or frame 39, formed with a U-shaped part 40, having a lower jaw or table 41, over which the needle-thread 9 travels. Pivoted between the bearing-plates 6 and 6^a by means of a bolt or pin 42 at the rear side of the retainer is a brake-lever 43, formed with a brake-shoe 44, having a round key 45 at its front end, by which it is rocked on the bolt by hand.

Instead of or in addition to the key I employ means, as hereinafter described, at the other end of the brake-lever by which it will be operated automatically from the machine.

Secured on the inside of the lever-support is a stud 46, around which is coiled a spring, 47, whose inner front end 48 is hooked and engages the lower part of the lever-support, and whose outer end 49 is also hooked and extends rearward, and is engaged over the rear end of the brake-lever to hold it in normal position and to cause the lever and its brake-shoe to bear on the brake-wheel. Adjustable on the stop-post 5 by means of a set-screw 50 is a lever-stop 51, for limiting the movement of the brake-lever when releasing the brake-wheel to relieve and permit the tension-shaft to run freely while the nipper-lever holds the needle-thread, as now described. To the inner side of the lever-support near the top thereof is secured a bolt or pin 52. On this bolt or pin are mounted both the nipper-lever and the pull-off lever.

53 is the nipper-lever rocking on one end of the bolt, formed with a boxing 54, surrounding the bolt, and with an outturned end or upper jaw 55, adapted to bear on the table or lower jaw 41 of the bracket for nipping and holding the needle-thread, while the pull-off lever operates to draw the needle-thread.

56 is a pull-off lever rocking on the other end of the bolt 52 on the lever-bracket, also formed with a boxing 57, surrounding the bolt, and with an outturned finger 58, adapted to pass through the U-shaped part 40, for pulling the needle-thread from the spool, the needle end of the thread being held by the jaws.

Coiled around the boxings 54 and 57 is a spring 59, having its outer end 60 extending toward the front and hooked over the nipper-lever and its inner end 61 extending toward the front and hooked under the pull-off lever. The spring has therefore a tendency to press down the nipper-lever and elevate the pull-off lever.

To limit the movement of these parts, I provide a plate 62, secured to the nipper-lever and formed with a hook or lip 63, engaging the pull-off lever. This plate may be secured to the pull-off lever, its position being reversed. The brake-spring holds the brake-lever, nipper-lever, and pull-off lever in normal position until the brake-lever is operated, whereas the spring of the nipper-lever and pull-off lever simply tends to separate these levers, and while at the same time it permits a downward movement of the pull-off lever independently of the nipper-lever it also secures a connection between these two levers, so that they may be raised together by the brake-spring away from the U-shaped part and its table or jaw. The pull-off lever is coupled to the rear part of the brake-lever, so as to be rocked thereby by means of a pitman 64, connected at one end by means of a link 65 on the pull-off lever, having a connecting-pin 66, and at the other end with the brake-lever by means of a link 67, having a connecting-pin 68.

For operating my pull-off device automatically from the machine I place on the inner end of the brake-lever a split block or yoke 69, secured to the brake-lever by means of a bolt 70. Suspended from the split block or yoke by a bolt 71 is a latch-bar 72, having a recess 73, receiving the bolt 70, which forms a stop for the outward movement of the latch-lever, while the latter can move inward freely.

Where the arm of the sewing-machine is mounted on a slide 1^a, adapted to move in a way 1^c, as in the Riese machine, I provide an eccentric 74, adjustable by a set-screw 75 on a bracket or standard 76, secured to the table or base 1^b of the machine. When the arm of the machine is pulled forward at the completion of the work, the latch 72, made rigid by the stop-pin, climbs the eccentric and lifts the end of the brake-lever, thus releasing the brake-wheel and operating the nipper-lever and pull-off lever. The rearward movement of the arm brings the latch-lever against the eccentric, which it passes over freely without operating the brake-lever.

Where the machine is stationary I provide a lifting-lever 77, mounted on a bracket 78 by means of a screw-pin 79. This lifting-le-

ver is held in normal position by a spring 80, connecting its lower end with the bracket. The inner side of the lifting-lever is formed with a projection 81, which is struck by the
 5 stopping and starting lever 82 to operate it. The lifting-lever 77, when its free end is pressed outward, forces the latch-lever upward to lift the brake-lever and operate the pull-off device, and then passes beyond it.
 10 When the machine is started, the latch-lever is pushed out of the way by the return of the lifting-lever.

I will now describe the modification of my invention, which, instead of being operated
 15 by a reciprocating lever, is operated by a rock-shaft, the nipping-lever and pull-off lever being also modified in their construction and operation; but they both operate to nip the thread and pull it off, as in the principal
 20 form.

83 is the base-plate on which the parts are mounted, and it is turned up at each end at 84 85.

86 is a metallic plate bent into U shape
 25 and secured to the base-plate with its ends extending upwardly. The tension-spindle 87 is mounted loosely in the upper ends of the plate 86 and carries the tension-wheel 88.

89 is a rock-shaft journaled in the upturned
 30 ends of the base-plate, and which operates the nipper and pull-off levers. This rock-shaft is bent into an arm 90 at one end, on which is fixed the key 91, for rocking the shaft. The slotted plate 92, through which
 35 the thread is drawn by the pull-off lever, is secured to the base-plate by suitable means.

93 is the nipper arm or lever, which is provided with a hub 94, by which it is loosely
 40 mounted on the rock-shaft 89. A spring 95 is wound around the rock-shaft and is extended upward at one end, where it is bent into a hook 96, which engages behind the nipper-lever, and is also extended downwardly at 97, where it bears against the base-plate.
 45 The tendency of this spring is to press the nipper-lever forward into engagement with the plate 92. The nipper is prevented from engaging the plate by a finger 98, projecting horizontally in front of it from a collar 99,
 50 secured rigidly to the rock-shaft by a set-screw 100. The finger 98 is held up against the nipper by means of a spring 101, wound around the rock-shaft, one end of which spring is provided with a hook 102 and the other
 55 end engages the base-plate. The hooked end 102 of this spring bears down upon a horizontal arm 103, provided with a hub 104, which is passed onto the end of the rock-shaft and secured by a set-screw 105.

60 106 is the pull-off lever, of L shape, one end of which extends down and constitutes a vertical shaft 107, and the other end 108, which is the short branch of the L, is bent down into a finger or arm 109. The vertical shaft 107
 65 is journaled in the horizontal extension 110 of a standard 111, secured to the upturned

end 84 of the base-plate, and the lower end of the shaft is stepped in the base-plate. The pull-off is normally held from engagement
 70 with the plate 92 by means of a spring 112, wound around a shaft 107, the upper end of which spring is provided with a hook 113, which engages the pull-off lever, and its lower end is provided with a hook 114, which en-
 75 gages the standard 111.

115 is a collar, which is secured to the rock-shaft by a set-screw 116, and from which extends an arm 117, which engages the rear of the pull-off lever, and which, when the rock-shaft is operated, presses the pull-off lever
 80 forward, so that its finger passes through the slot of the plate 92. Before the pull-off lever is pressed forward through the slot of the plate 92 the nipper will be permitted to bear
 85 against plate 92 and hold the thread by reason of the finger 98 of the hub 99 being brought down away from engagement therewith.

118 is a bearing-block for the rock-shaft, situated in the bottom of the U-shaped plate
 90 86.

119 is the brake-wheel, which may be of any of the forms represented, which is secured to the tension-spindle 87 by set-screw
 120. In this instance the braking of the spindle is secured by flattening the shaft at
 95 121, so that when the shaft is in its normal position it will bear on the brake-wheel, and when the shaft is rocked the flat portion will be brought up, which does not touch the brake-wheel, so that the spindle may revolve freely
 100 in its bearings.

Modifications of the braking devices are shown in Figs. XV and XVIII. In the former figure the brake-wheel 23 is cone-shaped, while the upper side of the operating-lever 43
 105 is inclined. This is applicable to the principal form of my invention. In the latter figure the brake-wheel 119 is also cone-shaped; but when the rock-shaft 89 engages therewith it forces it into frictional contact with the
 110 sides of a complementary socket 122, formed in a suitable bearing-block 123. This form is applicable to the modification of my invention.

Having thus described my invention, the
 115 following is what I claim as new therein and desire to secure by Letters Patent:

1. In combination with the pull-off mechanism, the nipper mechanism, a tension-shaft having tension device and a brake-wheel fixed
 120 thereon, a brake-lever adapted to engage said brake-wheel, one end of said lever carrying a latch-lever, and mechanism for tripping the latter, substantially as and for the purpose
 125 set forth.

2. The combination of the pull-off and nipper levers, said pull-off lever having a projection for acting on the thread, the brake mechanism having connection with said levers, whereby both may be operated simultaneous-
 130 ly, the tension-shaft and brake-wheel thereon, and the bed or table with which the nipper-le-

ver engages to nip the thread when the brake-wheel is released by said brake mechanism, substantially as set forth.

3. The combination of the tension device 5 mounted on a revoluble shaft carrying a brake-wheel, pull-off and nipper levers, said pull-off lever having a projection, a spring connected with said levers and tending to press them in opposite directions, a stop for 10 preventing said levers being pressed away from each other, mechanism for operating the two levers carrying a brake-shoe for acting on the brake-wheel, and a bed or table with which the nipper-lever engages to nip the thread 15 when operated by said mechanism, substantially as and for the purpose set forth.

4. The combination of the brake-lever and tension-shaft having a brake-wheel and tension device with pull-off and nipper levers 20 connected by adjustable pitman and links to said brake-lever, said pull-off lever having a projection, and a bed or table with which the nipper-lever engages, substantially as and for the purpose set forth.

5. The combination of the tension-shaft 25 having a brake-wheel, the brake-lever, a spring adapted to throw said lever against the brake-wheel, nipping mechanism by which the thread may be held, a tension device 30 around which the thread passes to said nipping mechanism, pull-off mechanism, and a stop to limit the movement of the lever when withdrawn from the brake-wheel, substantially as described.

6. The combination of the tension-shaft 35 having a tension device and a brake-wheel, the brake-lever formed with a brake-shoe, a spring for holding the brake-lever in normal position, means for releasing the brake-lever, 40 a pull-off lever connected with and operated by said brake-lever, said pull-off lever having

a projection for acting on the thread, and nipper mechanism, substantially as described.

7. The combination of the tension-shaft 45 having a tension device and brake-wheel thereon, a braking device, a bracket having a U-shaped part and jaw, the nipper-lever having a jaw, and the pull-off lever having a laterally-projecting end, and operating mechanism for said levers and brake, substantially 50 as described.

8. The combination of the tension-shaft and wheel, the bracket having a U-shaped part and lower jaw, the nipper-lever having an upper jaw, the pull-off lever having a pro- 55 jection, the brake-lever, connection between the nipper-lever and pull-off lever, and connection between the pull-off lever and brake-lever, substantially as and for the purpose set forth. 60

9. The combination of the tension-shaft, the bracket having a U-shaped part and lower jaw, the nipper-lever having an upper jaw, a pull-off lever having a finger, a bolt by which the levers are fulcrumed, a spring surround- 65 ing the bolt and having one end engaging over the nipper-lever and the other end engaging under the pull-off lever, and means for operating the levers.

10. The combination of the brake-lever, the 70 block secured to the rear end of the brake-lever, the latch-lever, hinged to the block, a sewing-machine and its tension mechanism, a bracket, a device on the bracket for lifting the latch-lever, and the nipper and pull-off 75 mechanism, substantially as and for the purpose set forth.

CHAS. J. WOODWARD.

Witnesses:

CHAS. HAGEDORN,
W. H. MOTT.