

No. 688,032.

Patented Dec. 3, 1901.

F. G. SHELAIN.

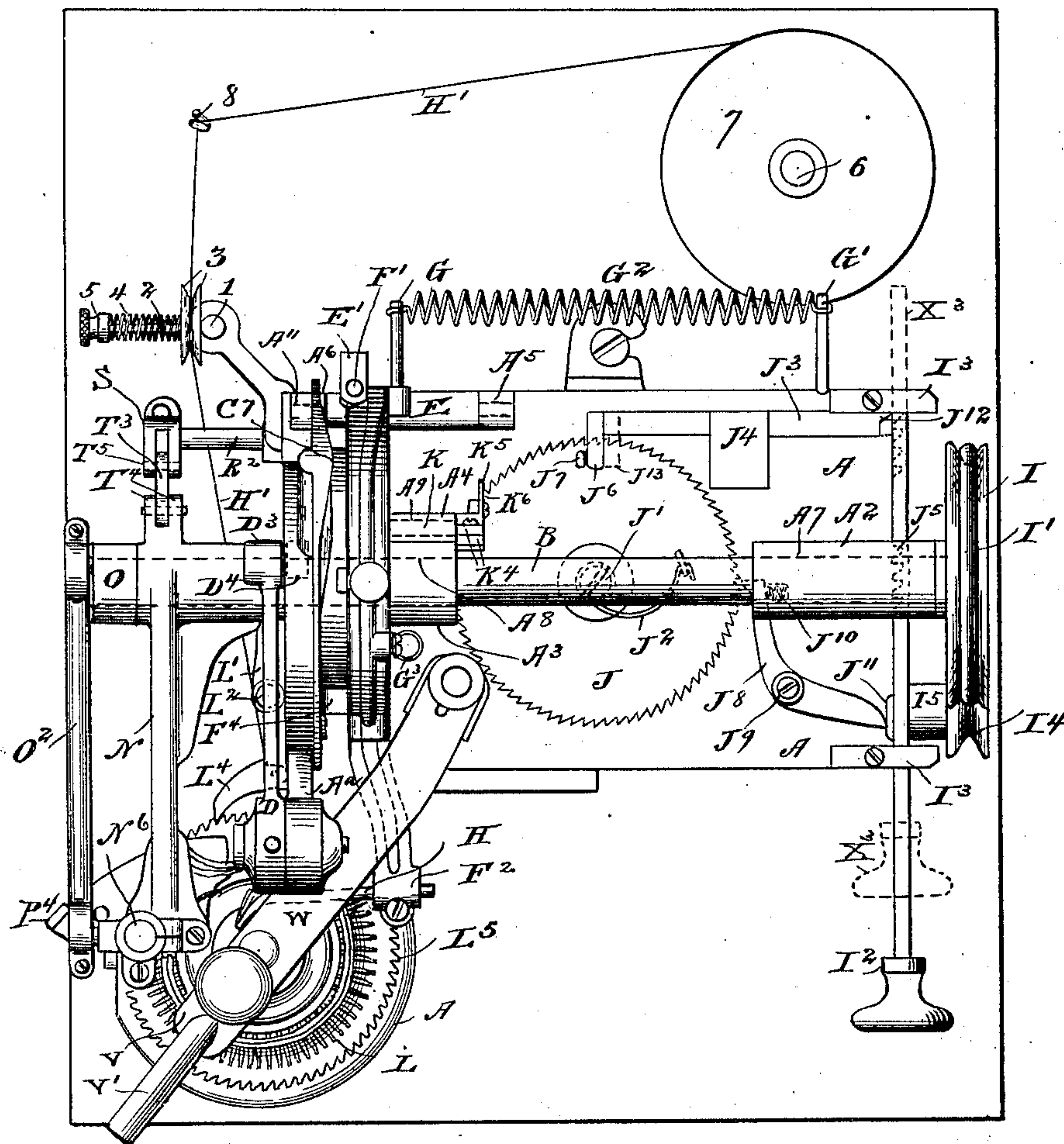
TRIMMING MECHANISM FOR MACHINES FOR SEWING LOOPED FABRICS.

(Application filed July 2, 1901.)

(No Model.)

6 Sheets—Sheet 1.

Fig. 1.



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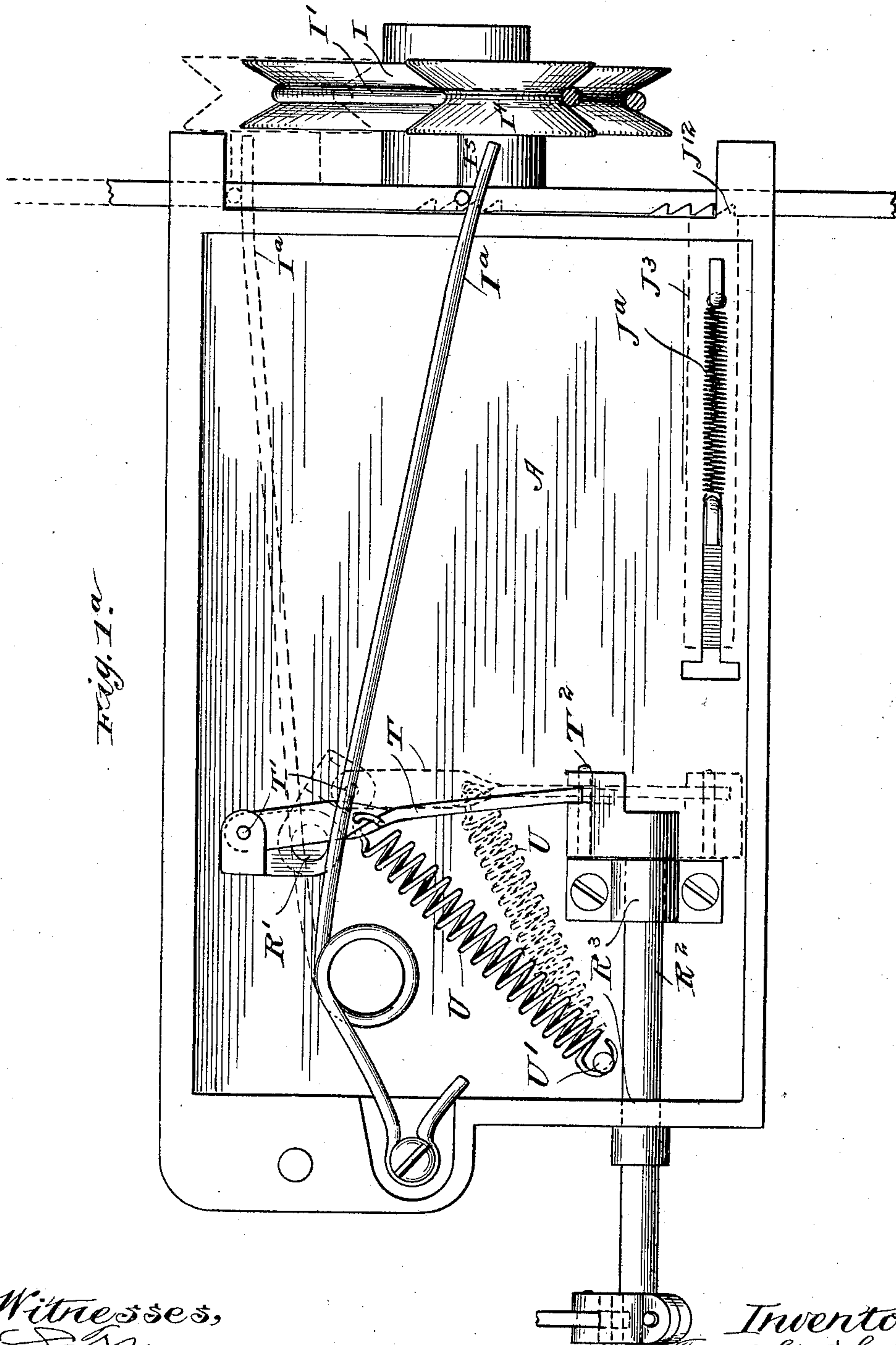
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6 Sheets—Sheet 2.



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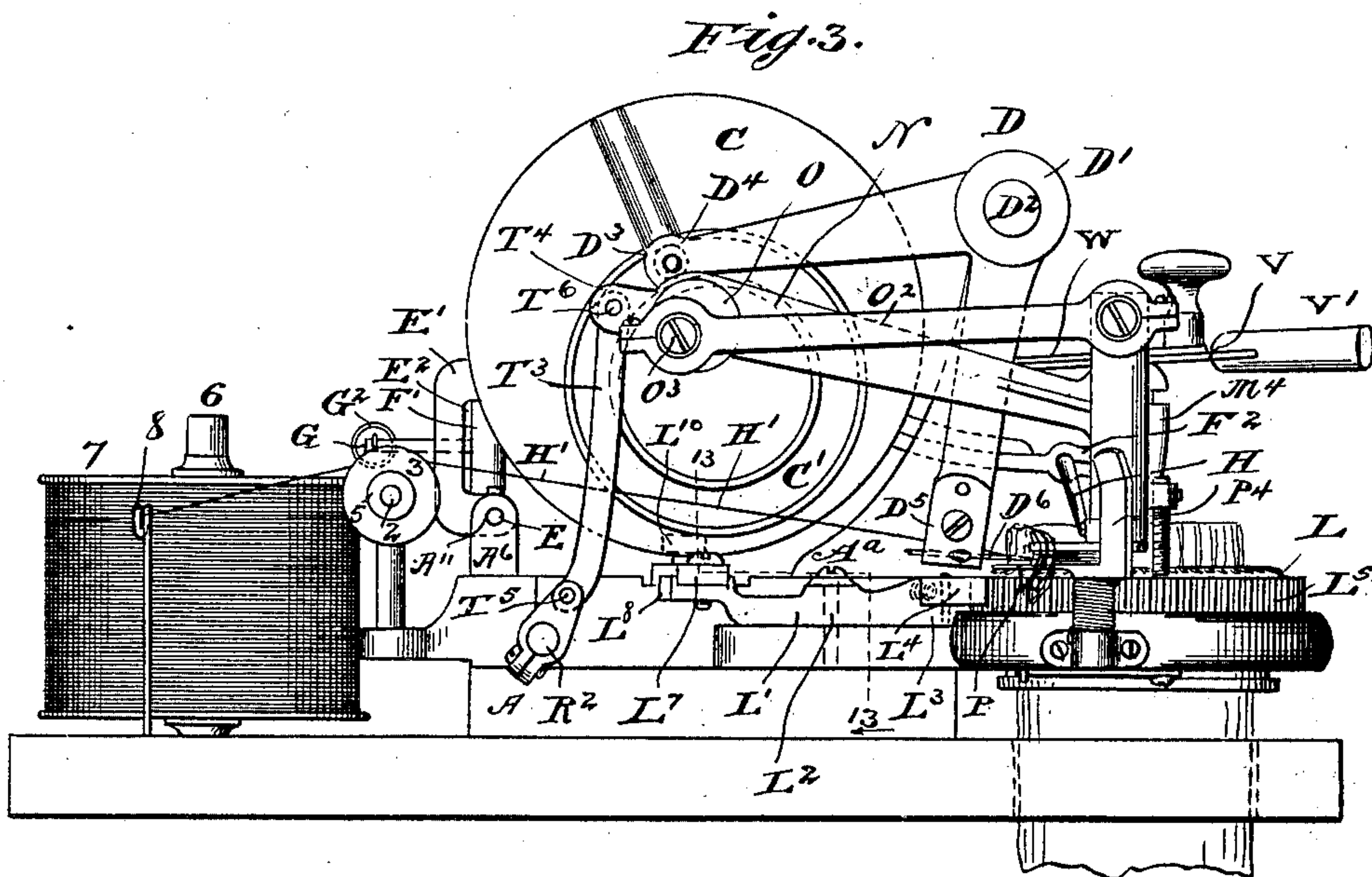
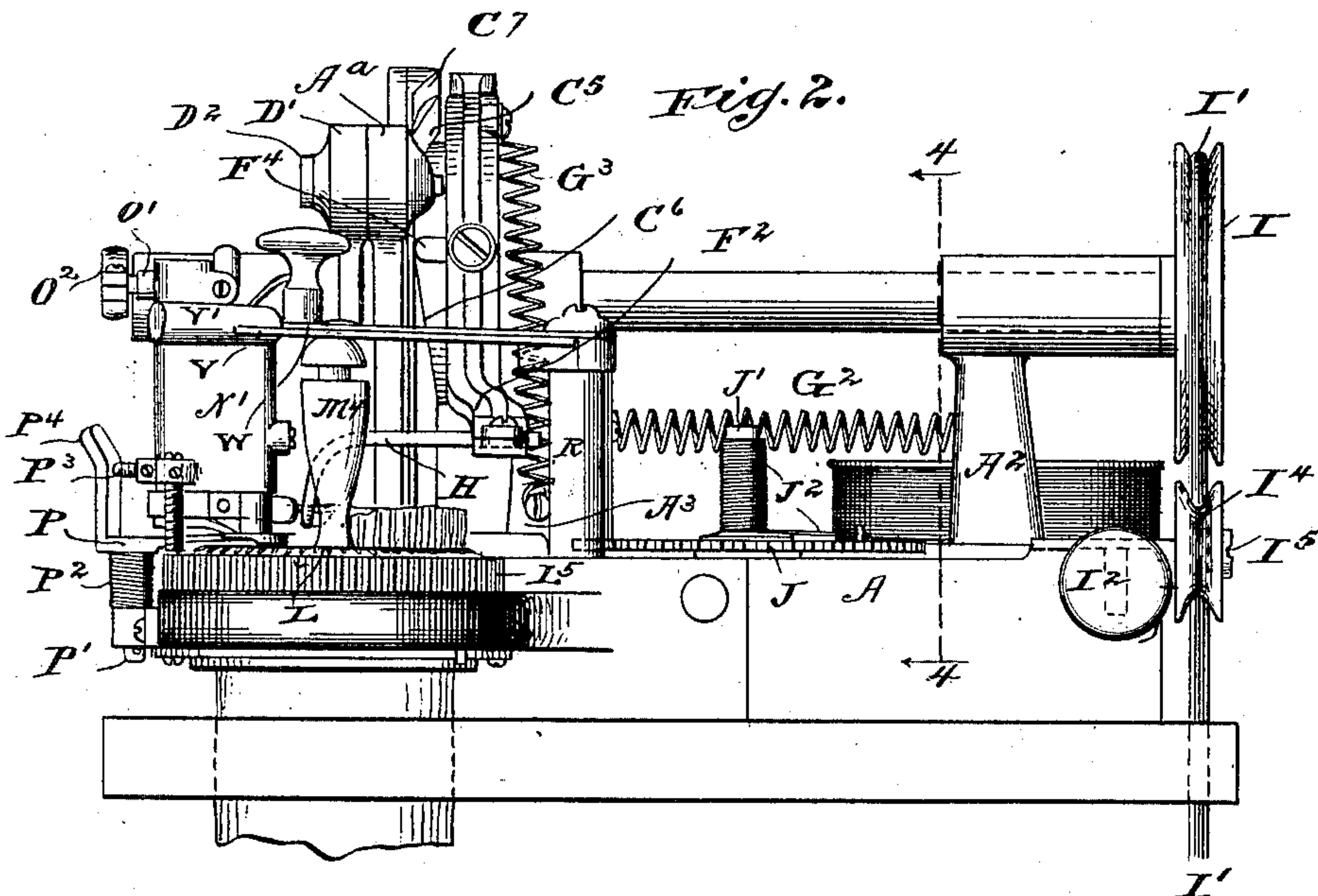
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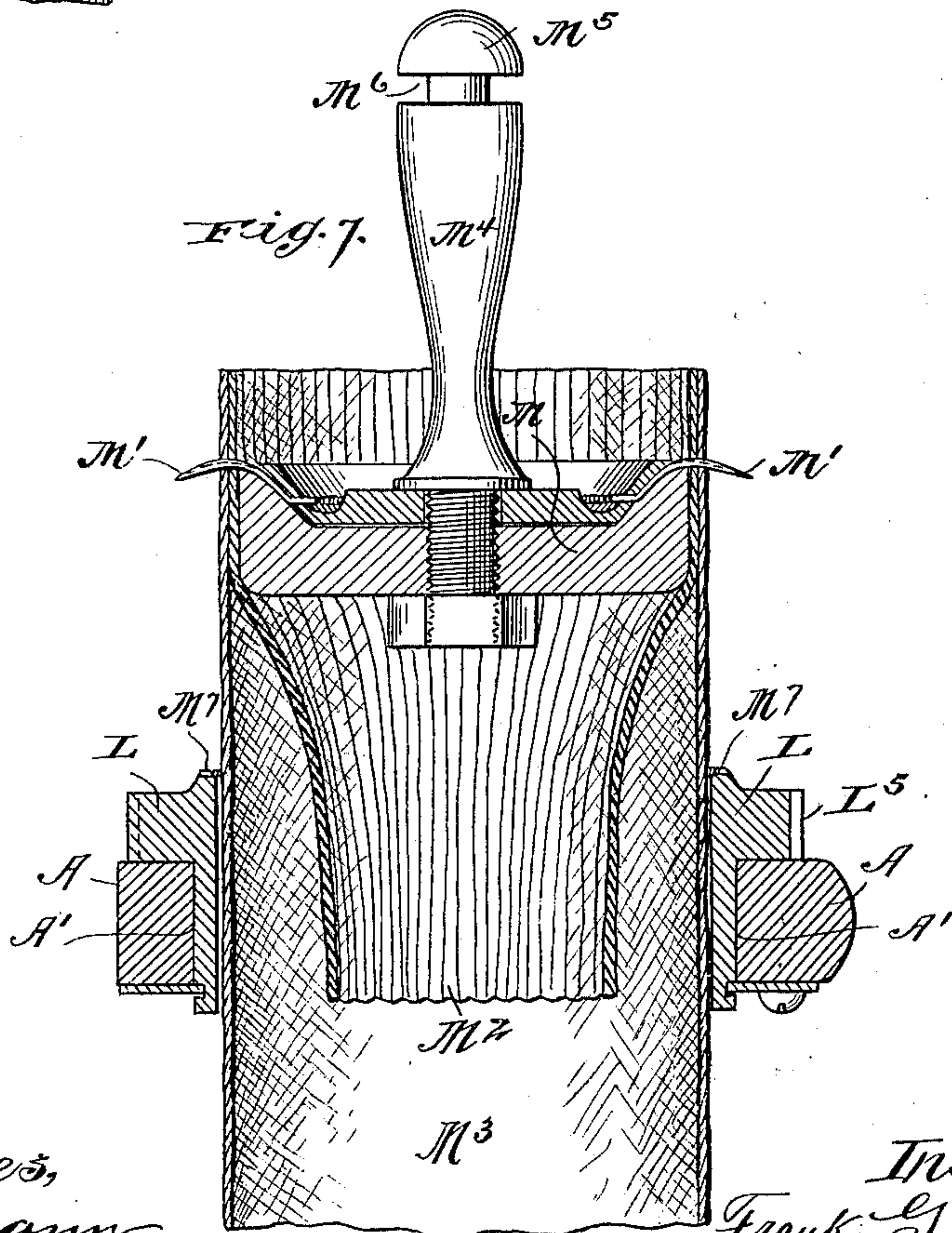
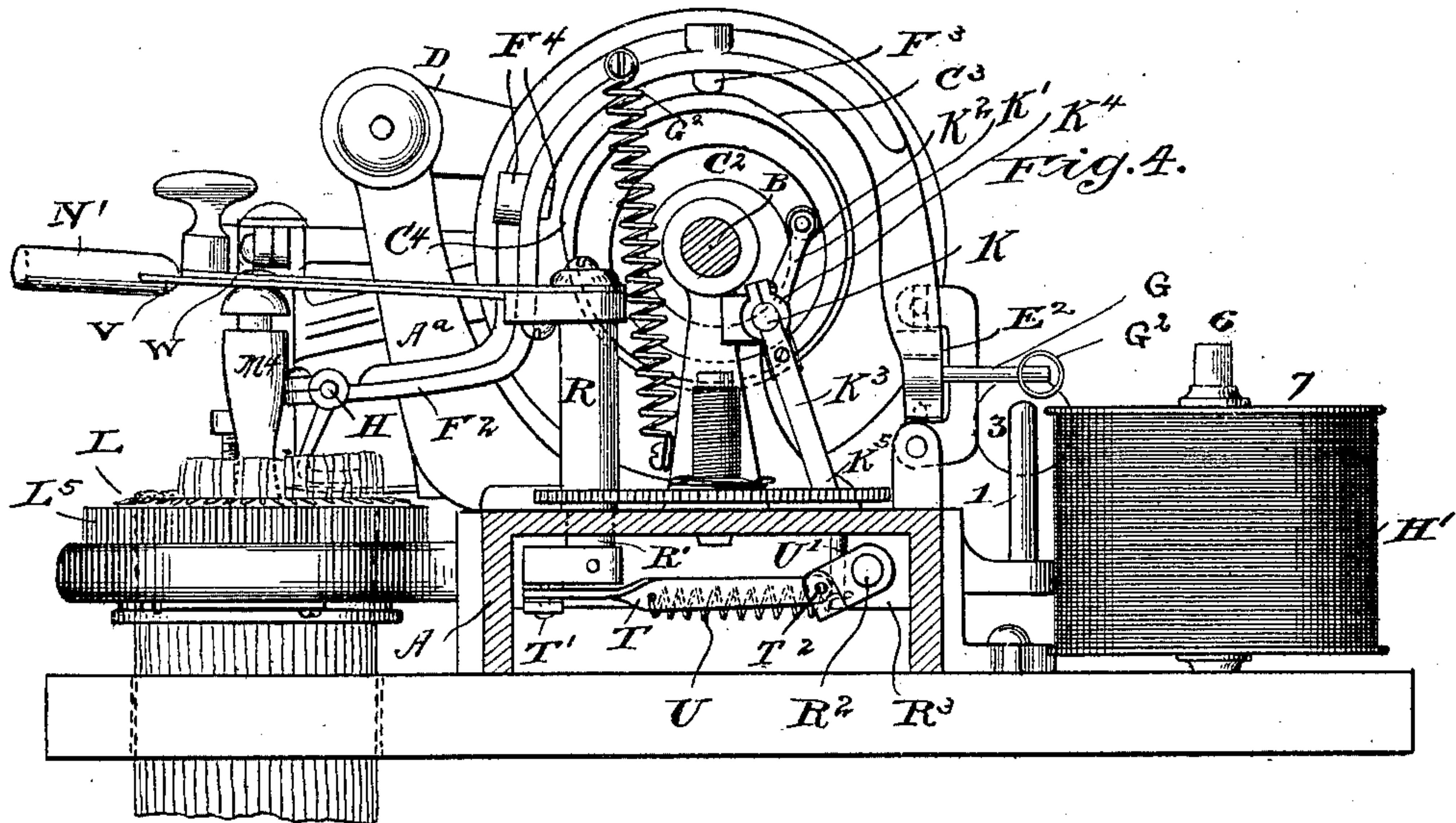
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(No Model.)

6 Sheets—Sheet 4.



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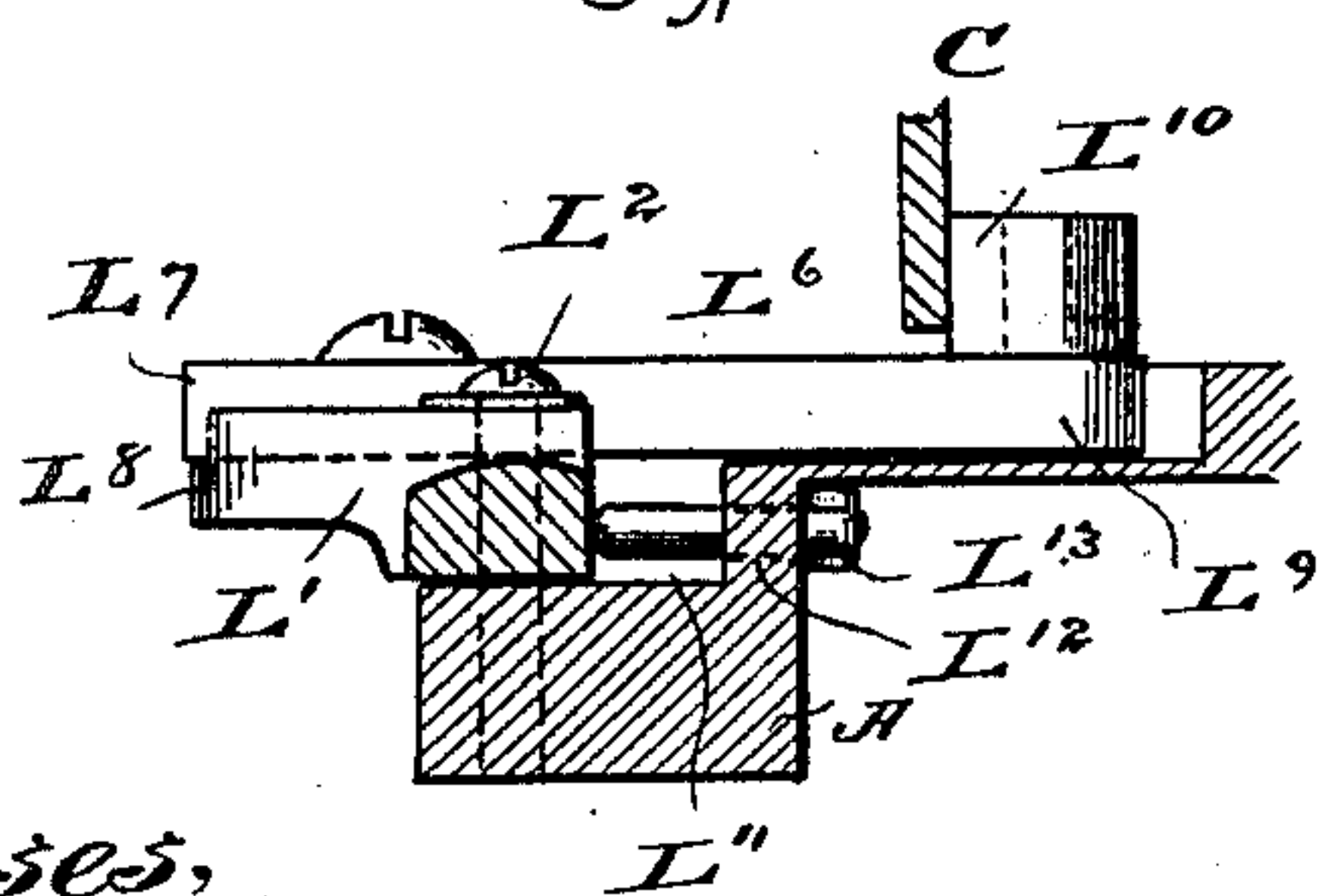
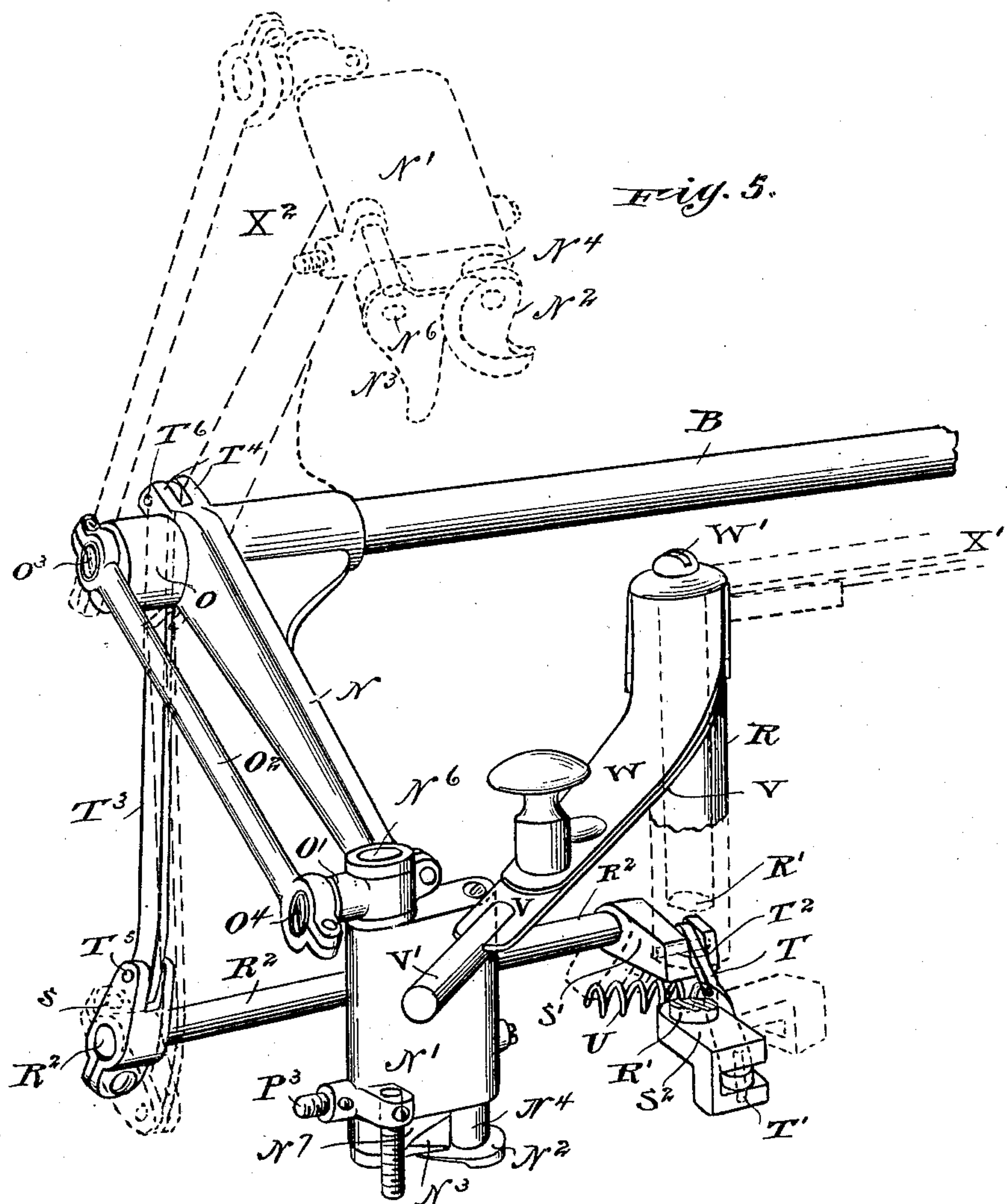
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6 Sheets—Sheet 5.



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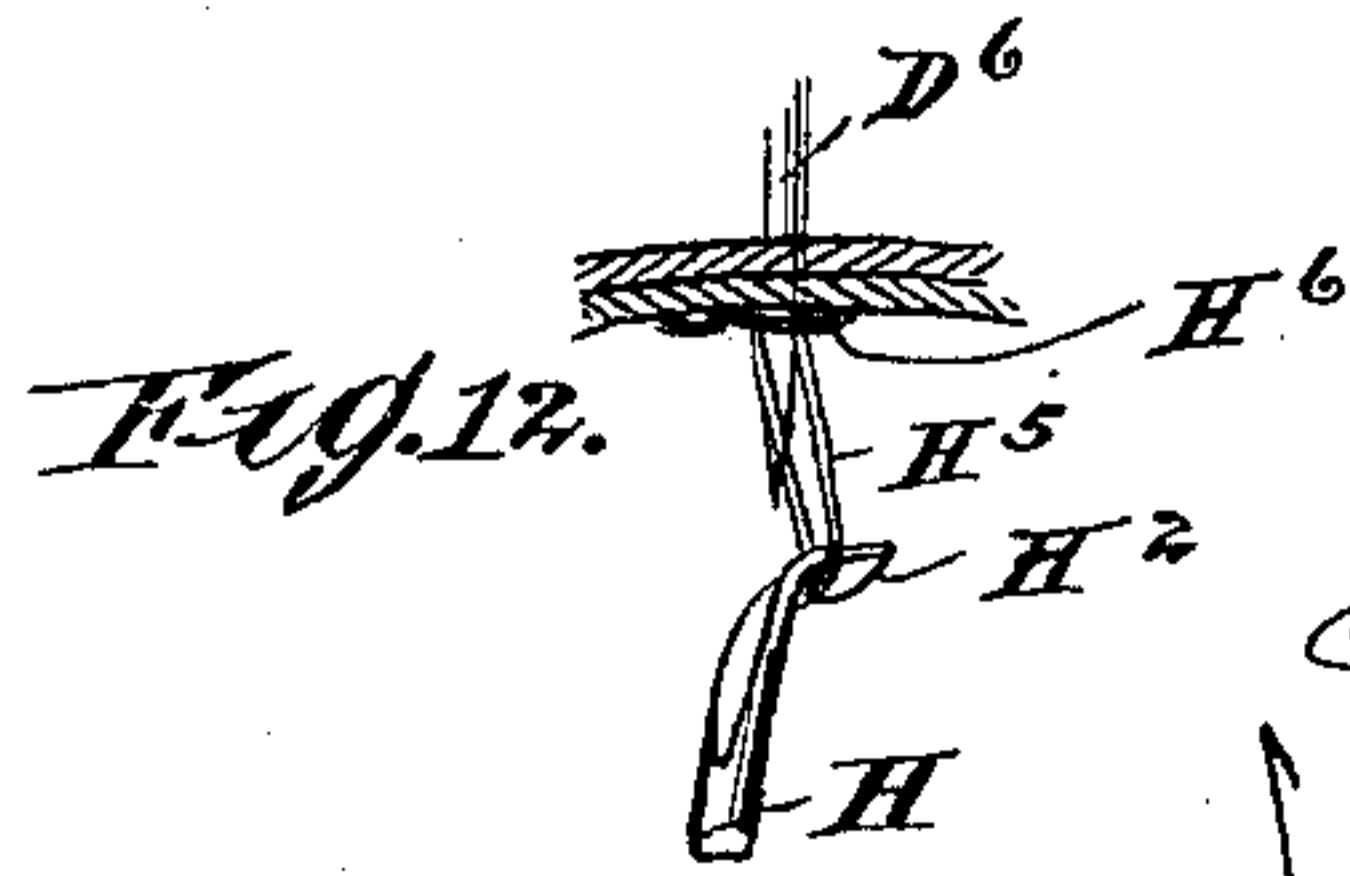
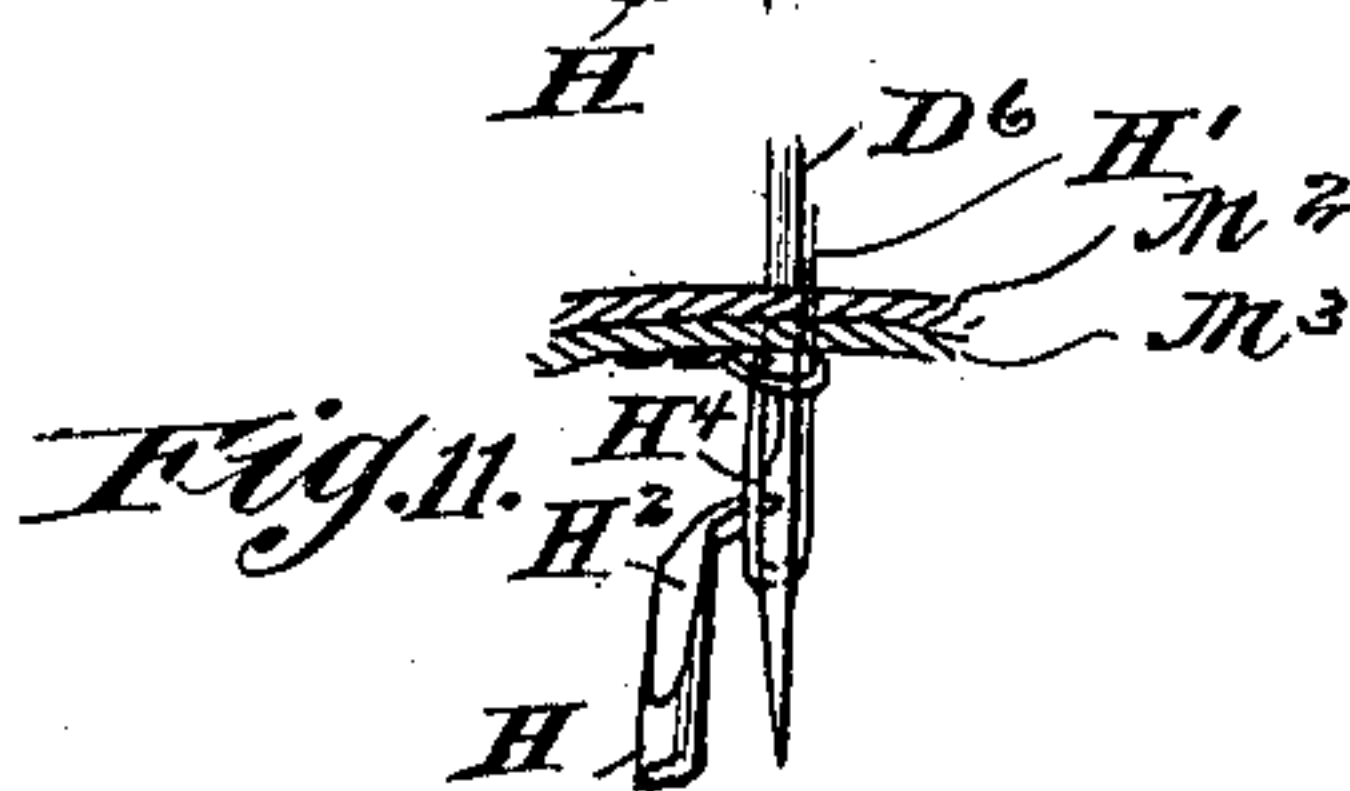
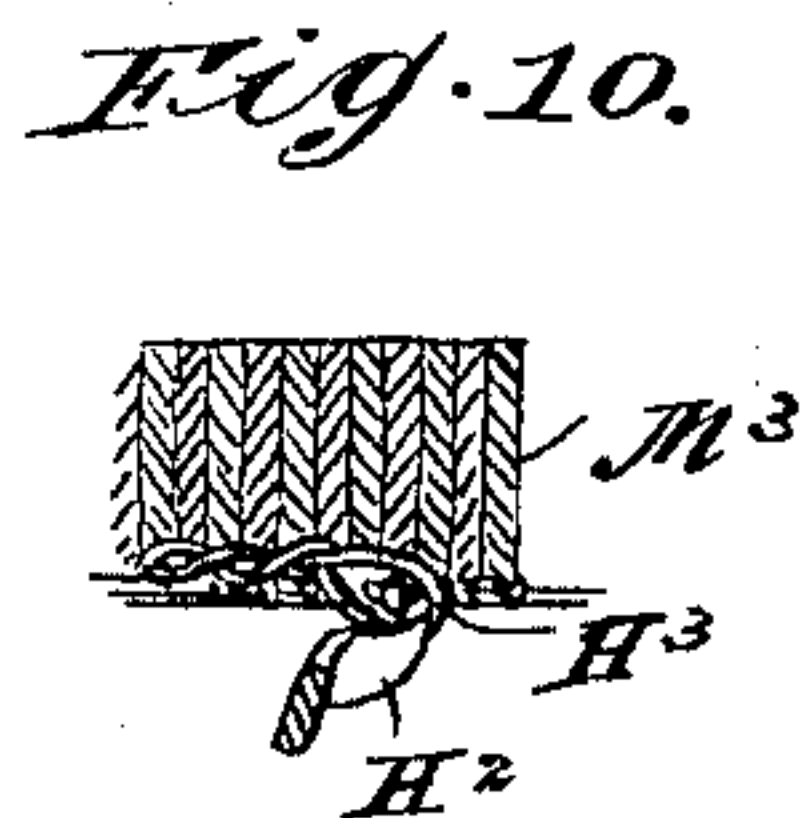
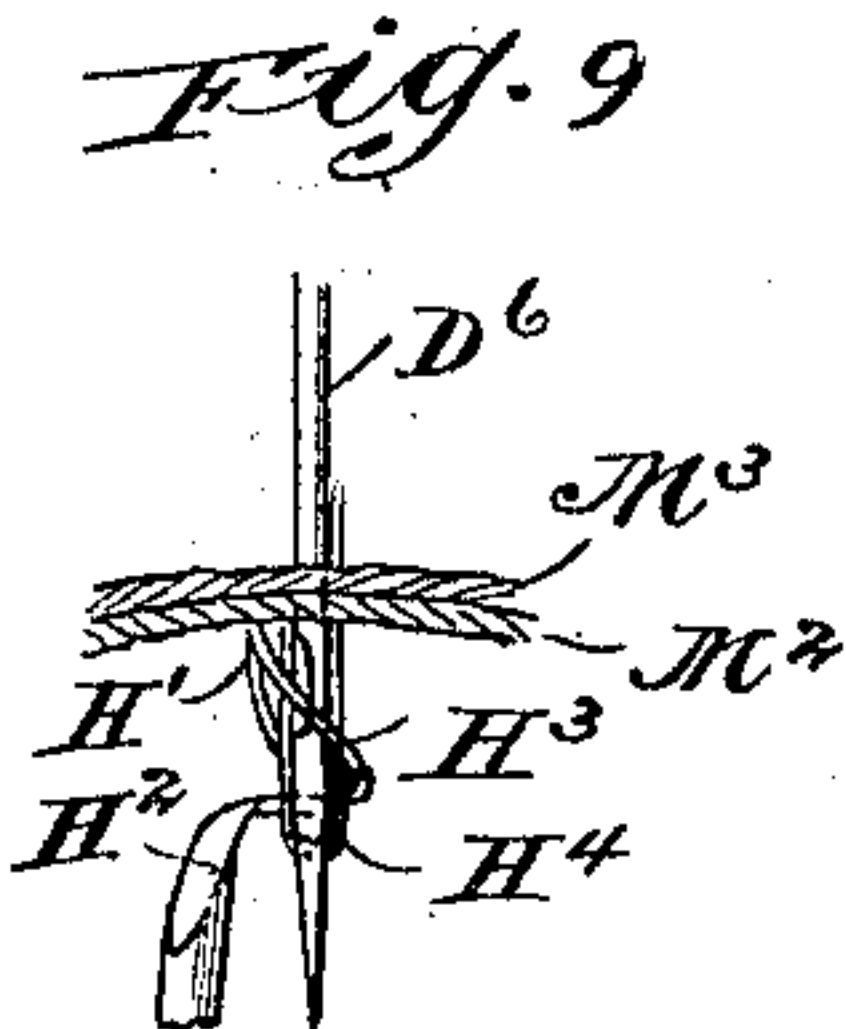
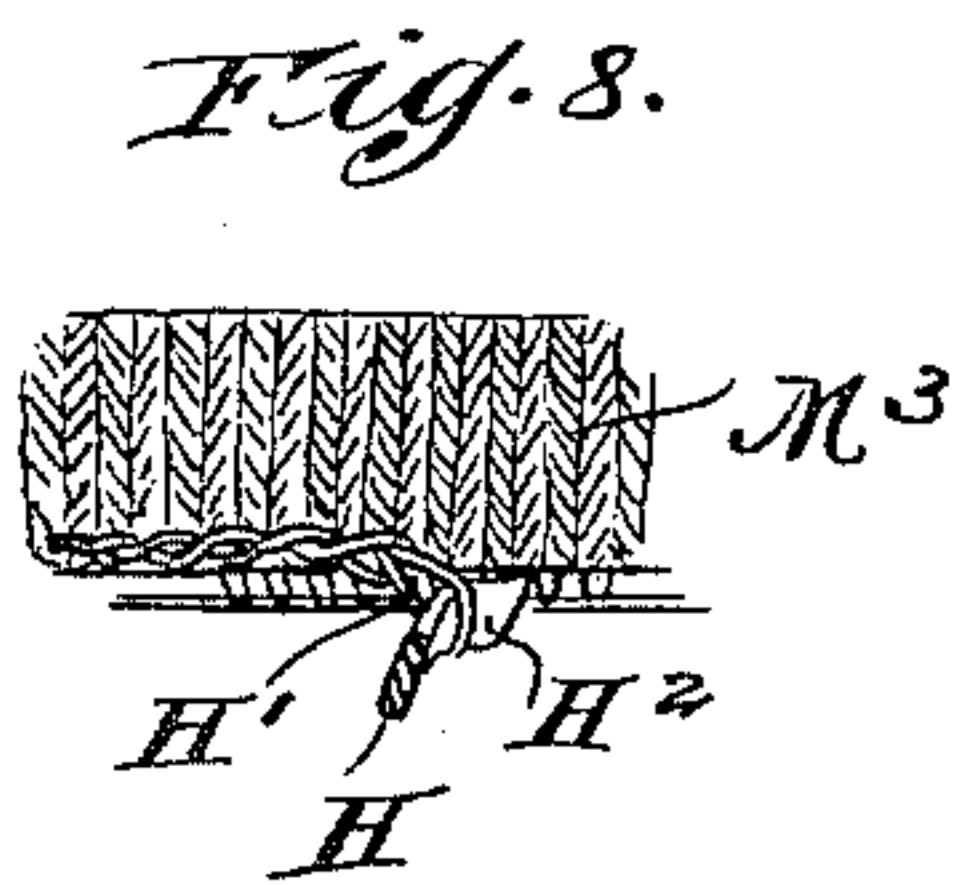
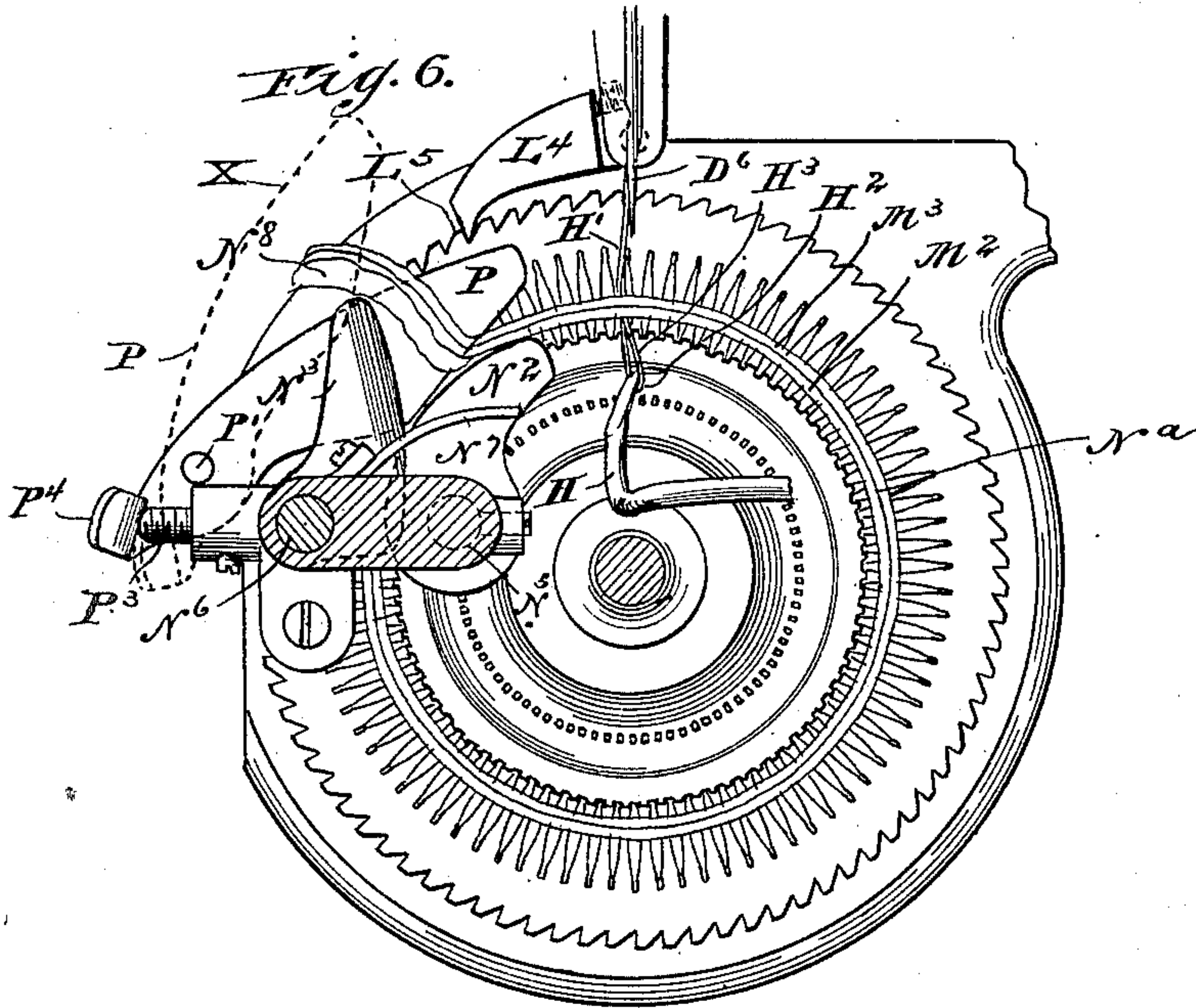
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6 Sheets—Sheet 6.



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UNITED STATES PATENT OFFICE.

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TRIMMING MECHANISM FOR MACHINES FOR SEWING LOOPED FABRICS.

SPECIFICATION forming part of Letters Patent No. 688,032, dated December 3, 1901.

Application filed July 2, 1901. Serial No. 66,917. (No model.)

To all whom it may concern:

Be it known that I, FRANK G. SHELAIN, a citizen of the United States of America, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Trimming Mechanisms for Machines for Sewing Looped Fabrics, of which the following is a specification.

My invention relates to a machine for sewing tops onto hosiery, ankle and wrist bands onto knit underwear, &c., and in which the work is trimmed off parallel with and closely adjacent to the line of stitches being formed thereby simultaneously with the sewing operation; and it consists of certain new and useful features of construction and combinations of parts especially devised and designed therefor, all as hereinafter fully described, and specifically pointed out in the claims.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a top plan view of a machine embodying my invention. Fig. 1^a is a bottom plan view of the same with parts omitted. Fig. 2 is a front elevation of the same entire. Fig. 3 is a left side elevation, also of the same. Fig. 4 is a vertical section at the line 4 4 in Fig. 2 of parts there shown, other parts also being in elevation. Fig. 5 is an isometrical detailed view of the trimming mechanism of the machine and the combined devices for elevating the same when not in use. Fig. 6 is a top plan enlarged view of parts of the machine shown in Figs. 1 to 4, inclusive. Fig. 7 is a central vertical sectional detailed view of the ends of a stocking-leg and the top thereof connected together by means of a work-holder and being inserted through the feeding-cylinder of the machine preparatory to having the top sewed thereon and the edges trimmed thereoff, the work-holder and feeding-cylinder also being shown in like section. Figs. 8 to 12, inclusive, are views illustrating the successive operations of the needle and looper of the machine while forming a stitch. Fig. 13 is a section at the line 13 13 in Fig. 3 of parts there shown.

Like characters of reference indicate corresponding parts throughout the several views.

A is the machine-base, having a circular opening A', Fig. 7, therethrough to admit and support parts to be described hereinafter and

provided with upwardly-projecting lugs A², A³, A⁴, A⁵, and A⁶, Fig. 1, having bearings A⁷, A⁸, A⁹, A¹⁰, and A¹¹ therein to support rotatable and oscillatory parts.

B is the main shaft of the machine and is mounted in the bearings A⁷ A⁸ in the lugs A² A³.

C is a cam-wheel fast to the shaft B, having formed in and on the opposite faces thereof eccentrics and other cams for operating the machine. Of these C' is an eccentric for operating the part that carries the needle, C² is an eccentric for actuating the arm that drives the stop-motion mechanism, C³ C⁴ are cams for vertically reciprocating, and C⁵ C⁶ are cams for horizontally reciprocating, the looper-arm, and C⁷ is a cam for operating the feeding mechanism of the machine.

D is a belt-crank mounted by its angle D' on an integral or rigid arm A³ on the base A by means of a pivot-bearing D², provided at one end D³ with a roller-stud D⁴, connecting it with the eccentric C' in the cam-wheel C and furnished at its free end D⁵ with a needle D⁶, which reciprocates endwise in the arc of a circle when sewing.

E is a rock-shaft mounted horizontally in the bearings A¹⁰ A¹¹ in the lugs A⁵ A⁶ and provided with a vertical bracket E', integral or rigidly connected therewith and having a recess E² therein to receive a part to be described hereinafter.

F is a looper-arm mounted on a vertical pivot F' in the recess E² in the bracket E' on the horizontal rock-shaft E. The horizontal rock-shaft E and vertical pivot F' allow the free end F² of the looper-arm F to be reciprocated both vertically and horizontally.

F³ F⁴ are respectively vertical and horizontal studs integral or rigidly connected with the looper-arm F and projecting therefrom into the paths of the cams C³ C⁴ and C⁵ C⁶ thereon.

G G' are pins rigidly connected with and projecting from the looper-arm F and the base A, respectively.

G² is a coiled spring connecting the outer ends of the pins G G' and constantly acting horizontally through the former and the looper-arm F to keep the horizontal stud F⁴ on the latter in engagement with the cam-wheel C.

G³ is a coiled spring connecting the looper-

arm F with the lug A³ on the base A and acting constantly and vertically to keep the vertical stud F³ thereon in engagement with the cam-wheel C.

5 H is a looper projecting from the free end F² of the looper-arm F down to cooperate with the needle D⁶ to produce from a single thread H', passing therethrough, a chain-stitch of the ordinary form.

10 I is a peripherally-grooved driving-pulley fast to the right-hand end of the shaft B and provided with a belt I', communicating power thereto from a continuously-rotating driving-shaft. (Not shown.)

15 I² is a spring-actuated slide-bar arranged to move endwise in guides I³, fast to the base A, and having a peripherally-grooved belt-tightening pulley I⁴ mounted on a stud-journal I⁵, projecting therefrom.

20 J is a ratchet-wheel mounted to rotate on the vertical stud-journal J', projecting from the base A and provided with a spring J², fast by one end thereto and by the other end to the journal J', normally sustaining the same in the position shown in Fig. 1.

25 J³ is a spring-actuated detent arranged to slide endwise in the guide J⁴, fast to the base A, and engage the notches J⁵ on the slide-bar I² and provided with a transverse lug J⁶, projecting into engagement with the lug J⁷ on ratchet-wheel J.

J⁸ is a spring-actuated detent mounted on a pivot J⁹ on the base A and shown held out of engagement, Fig. 1, with the ratchet-wheel J against the action of the spring J¹⁰ by means of the lug J¹¹ on the slide-bar I².

K is a rock-shaft mounted in the horizontal bearing A⁹ in the lug A⁴, Fig. 1.

40 K', Fig. 4, is a crank-arm fast by its lower end to the rock-shaft K and provided at its upper end with a roller-stud K², projecting into and engaging the eccentric C² in the cam-wheel C.

K³ is an arm fast by its upper end K⁴ to the rock-shaft K and having its lower end K⁵ projecting downward to adapt it to engage one tooth K⁶ on the ratchet-wheel J at each oscillation of such rock-shaft K, and thereby advance it against the action of the spring J².

50 L is a peripherally-ratcheted feeding-cylinder fitted into and adapted to rotate in the circular opening A' in the base A.

L' is a pawl-lever mounted on the pivot L² on the base A and provided at its front end 55 L³ with a pivoted spring-actuated pawl L⁴ to engage the teeth L⁵ on the feeding-cylinder L and therethrough operate the same.

L⁶ is an arm fast by its outer end L⁷ to the rear end L⁸ of the pawl-lever L' and projecting transversely therefrom and immediately below the cam-wheel C and provided on the upper side of its inner end L⁹ with a vertical roller-stud L¹⁰, projecting into the path of the cam C⁷ on the cam-wheel C, so that rotation 65 of the latter, cooperating with the sliding pin L¹¹, mounted in the slideway L¹² and actuated by the spring L¹³, will reciprocate the pawl-

lever L' and its pawl L⁴ to operate the feeding-cylinder L.

M is a circular work-holder having a series 70 of pointed metal quills M' projecting radially from the periphery thereof to receive and support pieces of tubular fabric M² M³ to be sewed together and trimmed by the machine and provided with a handle M⁴, inserted there- 75 through and vertically projecting from the center thereof and terminating above in a rounded boss M⁵, having a horizontal annular groove M⁶ therein to adapt it to be secured into a support to have placed thereon the 80 pieces of fabric to be joined together. The quills M', Fig. 7, of the work-holder M correspond in number and also register with the radial grooves M⁷ in the upper end of the feed- 85 cylinder L, so that when the former is seated in the latter—as in Figs. 4 and 6, for instance—they rotate together.

N is a vertically-swinging arm pivotally mounted on the main shaft B, terminating at its free end in a head N', carrying a shear- 90 trimmer consisting of a stationary inner blade N² and a vibrating outer blade N³, the former, N², being adjustably connected therewith by means of the supporting-shank N⁴, set into a socket N⁵ therein, and the latter, N³, being sup- 95 ported and operated by means of the rock-shaft N⁶, mounted therein, and both blades being so fashioned and arranged as to coact to trim the edge of a seam N^a, Fig. 6, while being formed by the combined sewing devices 100 of the machine.

N⁷ is a deflector-arm for removing the severed material N⁸ from the stationary blade N² after each stroke of the vibrating blade N³, rigidly connected by one end with the rock- 105 shaft N⁶ and projecting and vibrating immediately above such stationary blade.

O is a wrist-wheel fast to the main shaft B.

O' is a crank-arm fast to and projecting from the upper end of the rock-shaft N⁶. 110

O² is a pitman connecting the wrist O³ of the wrist-wheel O with the free end O⁴ of the crank-arm O' on the rock-shaft N⁶.

P is a presser-arm for holding a seam N^a being trimmed against the edge of the sta- 115 tionary inner blade N² of the shear-trimmer, mounted on a vertical pivot P' on the frame A and normally held out of action by means of a spring P², as indicated by dotted lines X, Fig. 6. When the head N' is lowered from 120 the position indicated by dotted lines in Fig. 5 to the position there shown in solid lines, the lug P³ thereon will engage the lug P⁴ on the presser-arm P and swing it from the position shown in dotted lines X in Fig. 6 to the 125 position there shown in solid lines and there retain it until the head N' is again raised to the position indicated by dotted lines in Fig. 5.

R is a tubular bearing projecting vertically from the upper side of the base A and hav- 130 ing mounted therein a rock-shaft R', extending through and somewhat below the under side of such base A.

R² is a horizontal rock-shaft mounted in

bearings R^3 in the base A below the under side of such base.

S S' are crank-arms fast to the outer and inner ends, respectively, of the rock-shaft R^2 .

5 S^2 is a crank-arm fast to the lower end of the rock-shaft R' .

T is a link connecting the free ends of the crank-arms S' S^2 through the pivots T' T^2 .

10 T^3 is a link connecting the free end of the crank-arm S with the free end of the crank-arm T^4 , projecting from and integral with the rear portion of the arm N, through the pivots T^5 T^6 .

15 U is a spring fast by one end to the link T and by the other end to a bearing U' on the base A.

V is a lever fast by one end to the upper end of the rock-shaft R' and terminating at its free end in an operating-handle V' . The 20 lever V serves a double purpose, the first being to raise and lower the head N' and the second to lock the work-holder M into the feed-cylinder L by pressing upon the boss M^5 on the top of the handle M^4 . If the lever V, 25 Fig. 5, be swung to the position indicated by dotted lines X' , the rock-shaft R' being turned thereby will swing the crank-arm S^2 to the position indicated by dotted lines, which movement of the crank-arm S^2 , acting through 30 the link T, will turn the crank-arm S' down to the position indicated by dotted lines, and the downward movement of the crank-arm S' , communicated through the rock-shaft R^2 , will turn the crank-arm S downward to the 35 position indicated in dotted lines, and the descent of the crank-arm S, acting through the link T^3 and crank-arm T^4 , projecting from the rear portion of the arm N, will elevate the latter and its head N' to the position shown 40 in dotted lines X^2 , and the spring U by its tension will sustain the parts to which reference has just been made in the positions indicated by dotted lines until the lever is restored to its original position, when all the 45 parts affected thereby will be returned to the positions shown in solid lines in Fig. 5. While the parts composing the trimming mechanism of the machine are in the positions indicated by dotted lines in Fig. 5 the 50 work-holder M, with the pieces of fabric to be sewed together placed thereon, Fig. 7, is placed in working position in the feed-cylinder L, Fig. 4, and locked thereinto by means of the lever V.

55 W is a lever mounted concentrically with the lever V on a separate pivot-bearing W' and superimposed normally thereon. Sometimes after two pieces of tubular fabric have been sewed together and the edges of their 60 joining-seam N^a have been trimmed by the blades N^2 N^3 of the shear-trimmer it will be found that stitches have been dropped or that the sewing is otherwise defective. The head N' , with its trimming devices, may in such case 65 be elevated out of the way, as shown in Fig. 5, and the free end of the lever W be placed on the top M^5 of the work-holder handle and

the two pieces be again sewed together by the machine without being trimmed a second time, as a second trimming of the same would 70 be liable to result in making the selvage of their connecting-seam too narrow, and consequently too weak, to properly support the line of stitching uniting them together.

1 is a vertical stud fast to the base A and 75 supporting a horizontal arm 2, carrying two friction-disks 3, an adjusting-spring 4, and nut 5 to form a thread-tension.

6 is a vertical stud upon which a spool 7 turns, carrying thread H' , passing through a 80 guide-eye 8 between the tension-disks 3 and thence through the eye of the needle D^6 .

The needle D^6 and looper H, employing a single thread H' , produce, as already stated, a chain-stitch of the ordinary form. Figs. 6 85 and 8 show the relative positions of the needle D^6 , looper-hook H^2 , and the thread H' at the instant a stitch is completed. Figs. 9 and 10 show the point of the needle D^6 passing inward through the loop H^3 to furnish thread 90 H^4 , Fig. 9, to form the next succeeding stitch. Fig. 11 shows the looper-hook H^2 , which has moved to the left upward and thence to the right from the position shown in Figs. 9 and 10, just picking up the portion of thread H^4 95 from the upper side of the needle D^6 to form a new loop H^5 , Fig. 12, where the looper-hook H^2 is shown as supporting such loop H^5 until the needle D^6 returns to the position shown in Fig. 6, and thereby draws taut and com- 100 pletes the stitch H^6 , Fig. 12. While the needle D^6 was retiring from the position shown in Fig. 12 to that shown in Fig. 6 the looper-hook H^2 descended lower than the point of the needle D^6 , so that upon the return of such 105 needle it might again pass inward above the looper-hook H^2 , as in Figs. 9 and 10, to furnish thread for another stitch.

The stop-motion mechanism, consisting of the parts from I^2 to K^6 , inclusive, has but one 110 function—to stop the machine at end of each operation of sewing two pieces of fabric together. Understanding the ratchet-wheel J to have at least as many or more teeth K^6 as the 115 feeding-cylinder L, that the parts comprising the stop-motion mechanism are in the positions shown in Figs. 1 and 1^a , and that the driving-pulley I and its belt I' are motionless, push the slide-bar I^2 inward against the action of the spring I^a until the lug J^{11} thereon 120 is disengaged from the detent J^8 and the notch J^5 therein is opposite the point J^{12} of the detent J^3 . The detent J^8 will then be thrown into engagement with the ratchet-wheel J by the spring J^{10} , and the spring J^a will push the 125 point J^{12} of the detent J^3 into engagement with the notch J^5 in the slide-bar I^2 and lock it in the position indicated by dotted lines X^3 in Fig. 1, and thus through the belt-tightening pulley I^4 , being thereby held tightly 130 against it, tighten the belt I' and cause it to drive the pulley I and its shaft B and connections. Each rotation of the cam-wheel C, Fig. 4, acting through the eccentric C^2 , arm K' ,

rock-shaft K, and arm K³, will cause the free end K⁵ of the latter to vibrate and engage a tooth K⁶, Fig. 1, on the ratchet-wheel J and advance it in the direction contrary to that traveled by the hands of a watch and against the action of the spring J², one tooth, the detent J⁸, locking it after each advancement. The operations just described will normally continue until the ratchet-wheel J has nearly completed a revolution or until the lug J⁷ thereon has traveled around to J¹³, when it will engage the lug J⁶ on the detent J, and thereby withdraw it from engagement with the notch J⁵ in the sliding bar I², whereupon its actuating-spring I^a will return it to the position shown in solid lines, Fig. 1, and the driving-pulley I and its belt I' will again become motionless, and thus suffer the machine to stop. As the slide-bar I² is returned to its original position by its spring I^a the lug J¹¹ thereon disengages the detent J⁸ from the ratchet-wheel J, and its spring J², being thereby left free to act, turns it backward to its original position or until the lug J⁷ thereon has traveled from the right side to the left side of the lug J⁶ on the detent J³. At each rotation of the cam-wheel C the cam C⁷ thereon, acting through the roller-stud L¹⁰, arm L⁶, pawl-lever L', and pawl L⁴, advances the feeding-cylinder L one tooth L⁵, and with it the work-holder M, which conveys the two pieces of fabric M² M³ past the point of the needle D⁶ to be seamed together thereby and thence between the edges of the stationary blade N² and the presser-arm P to have the edge of the seam N^a thereon trimmed off by the co-action of the stationary and vibrating blades N² N³ of the shear-trimmer, the deflector-arm N⁷ removing the severed material N⁸ from the trimmer-blades during the opening movement of its vibrating blade.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a trimming mechanism for machines for sewing looped fabrics, in combination, a shear-trimmer comprising a stationary inner blade and a pivoted vibrating outer blade co-acting therewith, a pivoted deflector-arm located and vibrating immediately above the stationary blade, a head—supported by a vertically-swinging arm—carrying the stationary blade and having a rock-shaft, supporting and operating the vibrating blade and deflector-arm, mounted therein, and means for oscillating the rock-shaft and for raising and lowering the vertically-swinging arm substantially as and for the purpose specified.

2. The combination, with the machine-frame, of a main shaft mounted therein, a vertically-swinging arm—pivotedly mounted on the main shaft—terminating, at its free end, in a head carrying a shear-trimmer, comprising a stationary inner blade and a pivoted vibrating outer blade coacting therewith, and a deflector-arm located and vibrating

immediately above the stationary blade, and having a rock-shaft, supporting and operating the vibrating blade and deflector-arm, mounted therein, a pitman connection between the main shaft and rock-shaft, and means for raising and lowering the vertically-swinging arm and its head, substantially as and for the purpose specified.

3. The combination, with the machine-frame, of a main shaft mounted therein, a head—supported by a vertically-swinging arm pivotedly mounted on the main shaft—carrying a shear-trimmer, comprising a stationary inner blade and a pivoted vibrating outer blade coacting therewith, and a pivoted deflector-arm located and vibrating immediately above the stationary blade, and having a rock-shaft, supporting and operating the vibrating blade and deflector-arm, mounted therein, a crank-arm on the rock-shaft, a crank-wheel on the main shaft, a pitman connecting the crank-arm and crank-wheel, substantially as and for the purpose specified.

4. In a trimming mechanism for machines for sewing looped fabrics, in combination, a main frame, a rotatable feeding-cylinder mounted therein, a work-holder seated in and rotating with the feeding-cylinder, a shear-trimmer, consisting of a stationary inner blade and a pivoted vibrating outer blade, a presser-arm for holding a seam being trimmed against the edge of the stationary inner blade, and a pivoted vibrating deflector-arm, for removing the severed material from the stationary blade, substantially as and for the purpose specified.

5. The combination, with the machine-frame, of a rotatable feeding-cylinder mounted therein, a circular work-holder seated in and rotating with the feed-cylinder, a shaft mounted in the main frame, a vertically-swinging arm—pivotedly mounted on the shaft—terminating, at its free end, in a head carrying a shear-trimmer, comprising a stationary inner blade and a pivoted vibrating outer blade coacting therewith, and a deflector-arm located and vibrating immediately above the stationary blade, and having a rock-shaft, supporting and operating the vibrating blade and deflector-arm, mounted therein, a presser-arm for holding a seam being trimmed against the edge of the stationary inner blade, a pitman connection between the main shaft and rock-shaft, and means for raising and lowering the vertically-swinging arm and its head, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK G. SHELAIN.

Witnesses:

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