(No Model.) 3 Sheets—Sheet 1.

F. MÜLLER.

MACHINE FOR WINDING SEWING MACHINE BOBBINS.

No. 495,990. Patented Apr. 25, 1893.

Fig. 1.

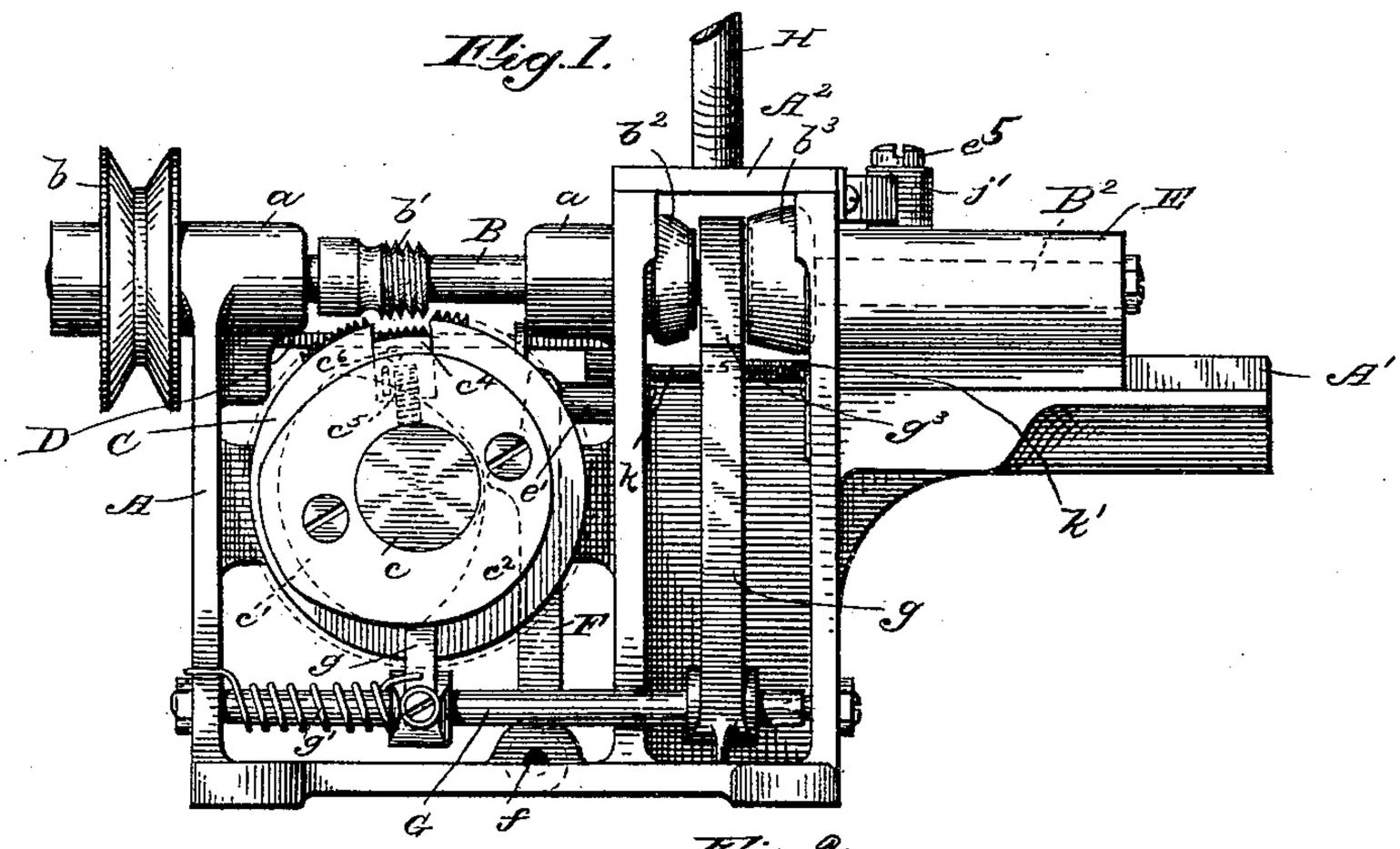
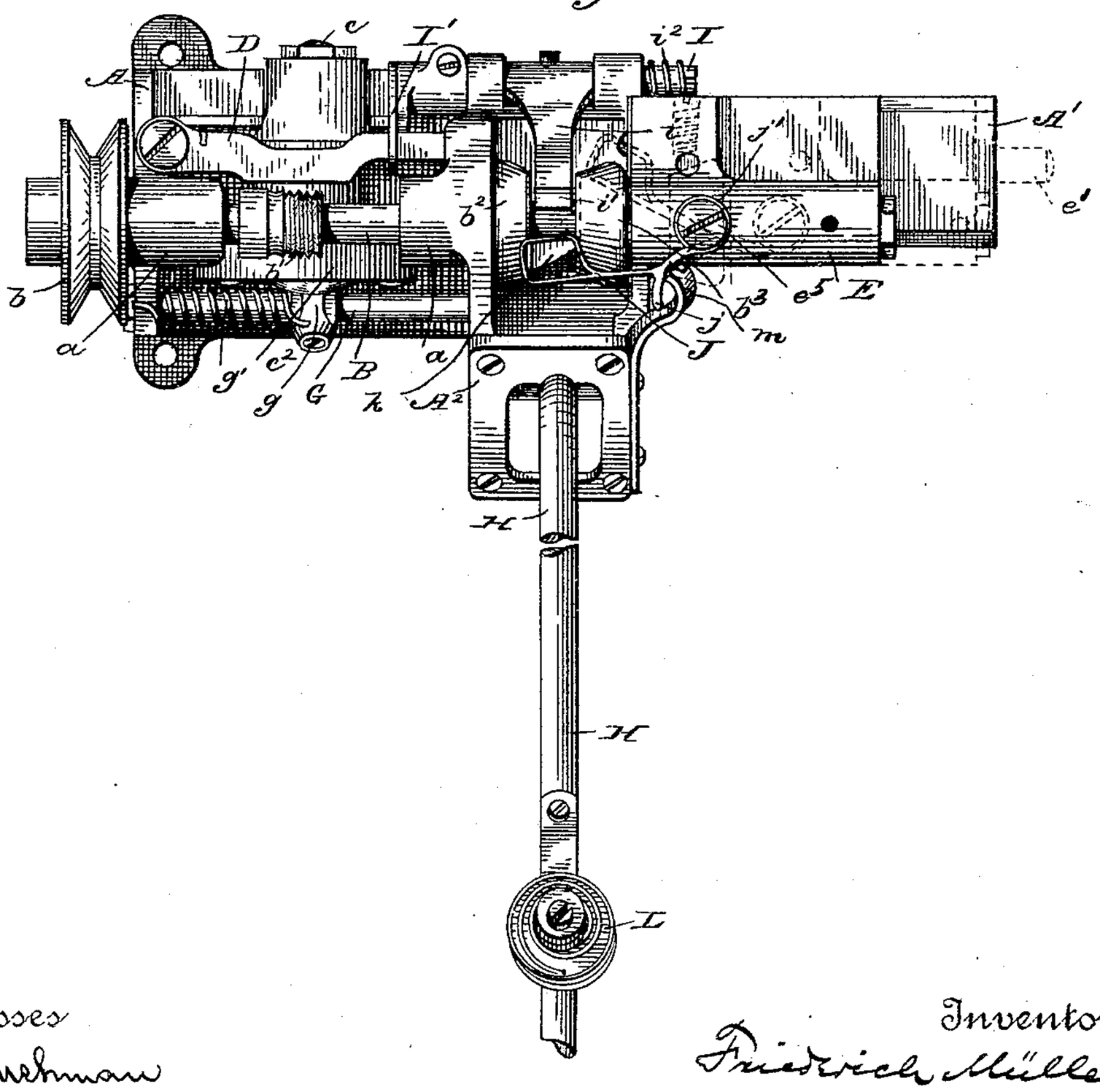


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

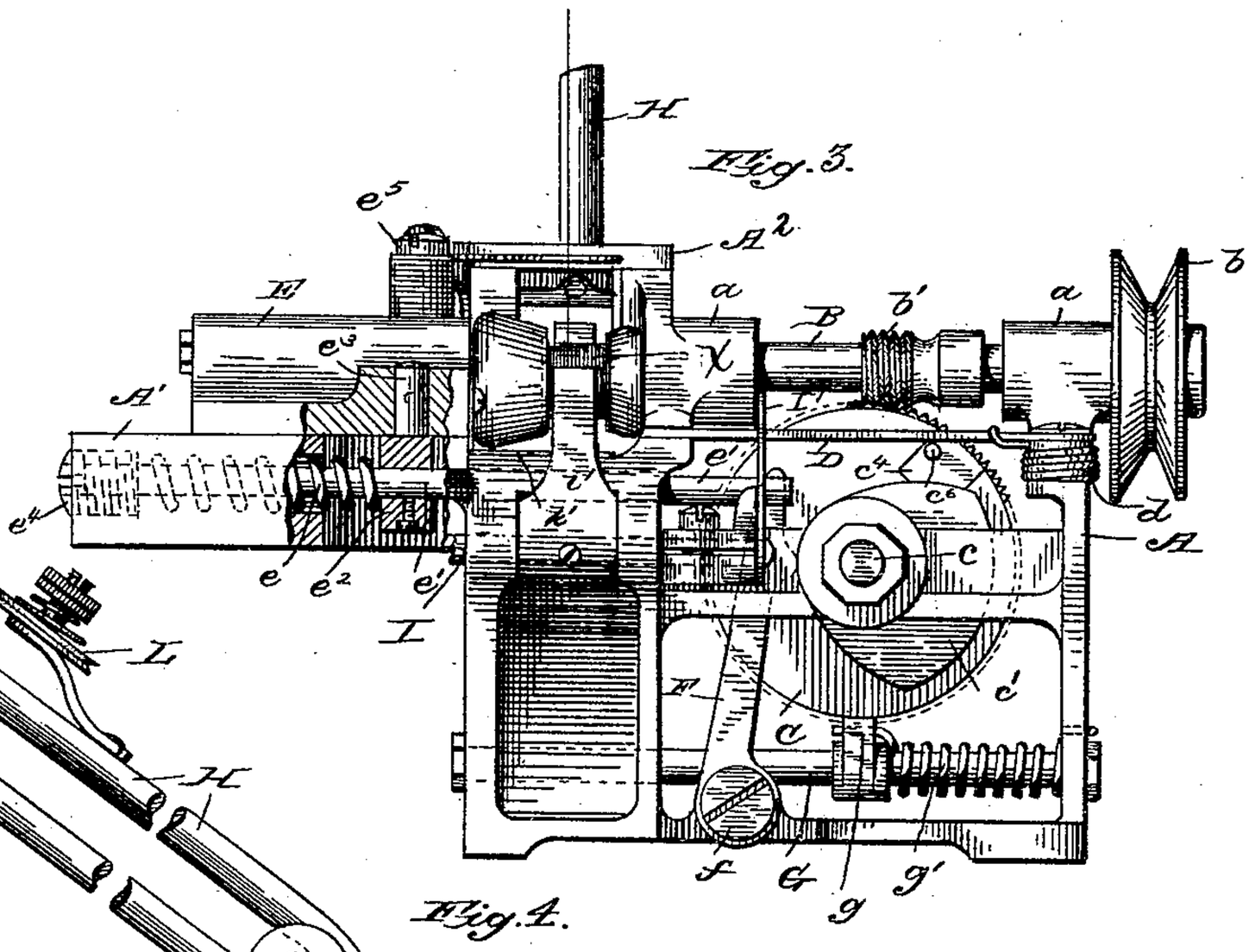


Fig. 4.

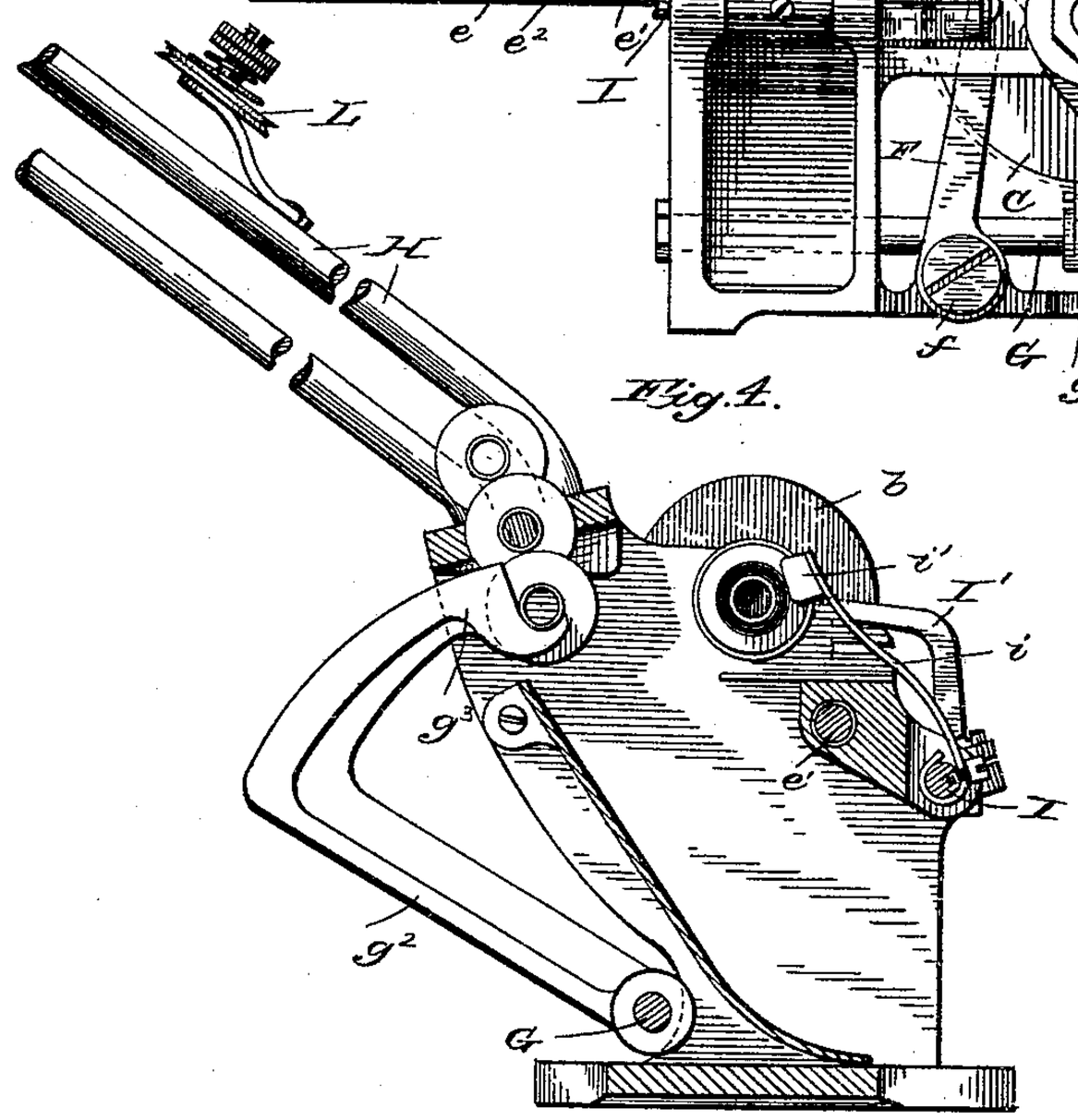
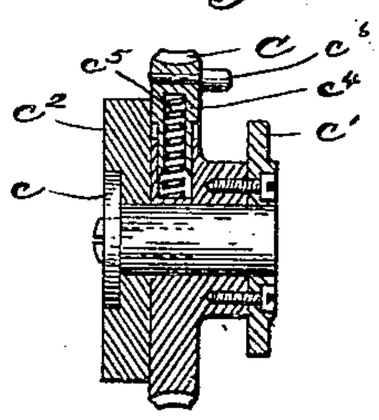


Fig. 6.



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F. MÜLLER.

MACHINE FOR WINDING SEWING MACHINE BOBBINS.

No. 495,990. Patented Apr. 25, 1893.

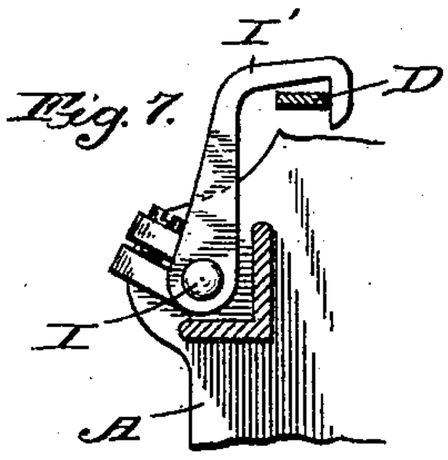


Fig. 7.

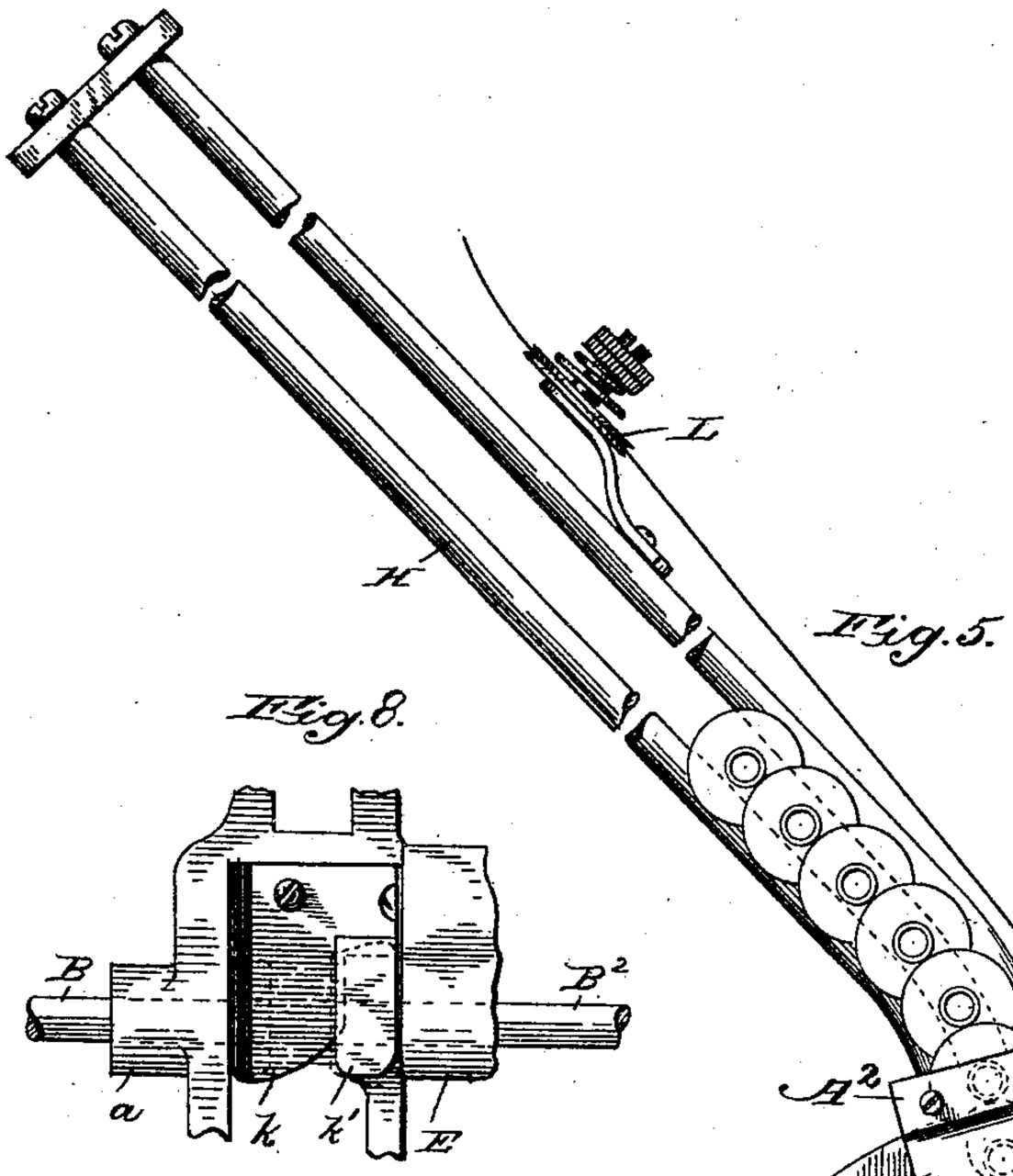
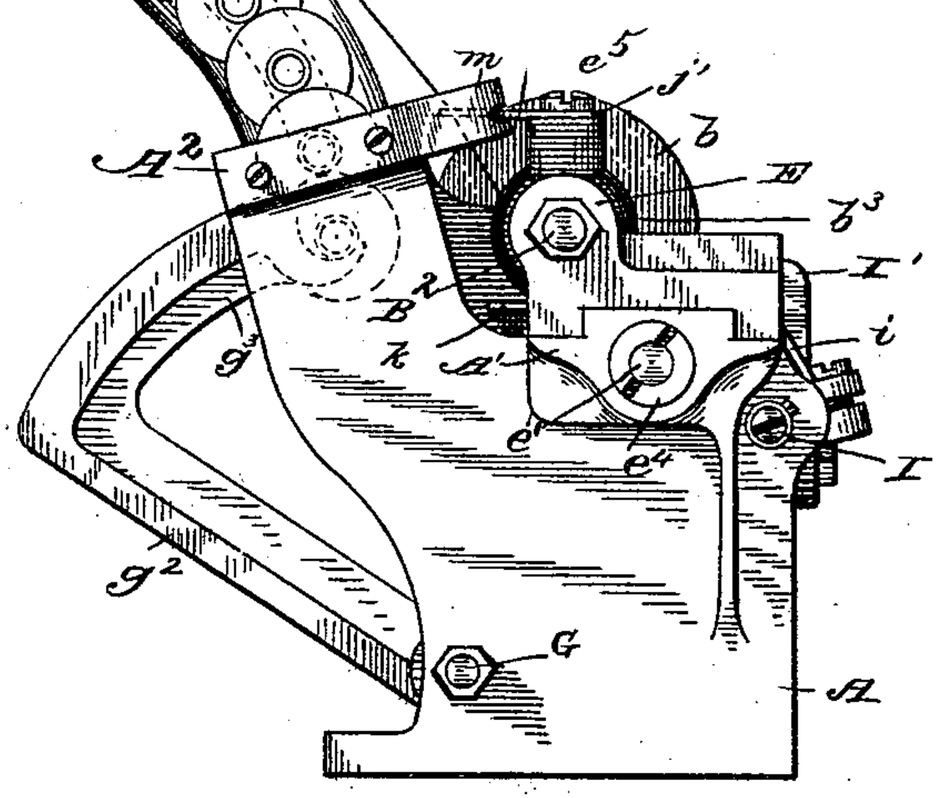


Fig. 5.

Fig. 8.



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UNITED STATES PATENT OFFICE.

FRIEDERICH MÜLLER, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY OF NEW JERSEY.

MACHINE FOR WINDING SEWING-MACHINE BOBBINS.

SPECIFICATION forming part of Letters Patent No. 495,990, dated April 25, 1893.

Application filed April 18, 1892. Serial No. 429,627. (No model.)

To all whom it may concern:

Be it known that I, FRIEDERICH MÜLLER, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Machines for Winding Sewing-Machine Bobbins, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object to provide an automatic machine, of simple construction, for winding bobbins for sewing machine shuttles; the machine being of such a character that a series of bobbins placed in a chute, trough or other suitable receptacle will be supplied in proper succession to the machine so that the latter will run continuously as long as empty bobbins are supplied thereto from the bobbin chute or receptacle; the full bobbins being automatically released and the empty bobbins supplied to the machine during the winding operation which operation will automatically continue as long as may be desired, or until the thread supply is exhausted.

In carrying my invention into effect I provide two suitable rotating disks or heads between which the bobbins are clamped in winding and one of which is movable toward and from the other to clamp and release the bobbins. One of these rotary disks or heads is on the driving shaft of the machine, and thus receives motion directly therefrom, while the other merely rotates through frictional contact with the bobbins. The driving shaft is provided with a worm meshing with a worm wheel which operates suitable cams from which the bobbin releasing and supplying devices, and thread severing and holding or controlling devices are operated, as will hereinafter more fully appear.

In the drawings Figure 1 is a front elevation of my improved automatic bobbin-winder with the bobbin-supplying chute or trough partly broken away, and Figs. 2, 3 and 4 are plan, rear and sectional views of the same. Fig. 5 is an end view of the same, looking from the right of Figs. 1, and 2, and Figs. 6, 7 and 8 are detail views of parts of the machine.

A denotes a suitable metallic frame having bearing portions *a* in which is mounted a driving shaft B provided with a driving pulley *b* and worm *b'*, the said shaft having at its inner end the bobbin-holding head or disk b^2. On a transverse stud *c* attached to the frame A is mounted a worm-wheel C secured to or formed integral with which are the cams *c'* and c^2. The worm-wheel has a portion of its periphery removed and in the space thus formed is a movable section c^4 normally pressed outward, to make the toothed portion of said wheel complete, by a spiral spring c^5 housed within the wheel, the said section c^4 being at times pressed inward, to disconnect said wheel from its driving worm, by a pivoted latch D arranged to be engaged by a pin c^6 on the said section c^4.

Arranged in line with the shaft B is a second shaft B' carrying a bobbin holding head or disk b^3 between which and the head b^2 on the shaft B the bobbins to be wound are held. The shaft B' is mounted in a slide E adapted to receiprocate on suitable ways afforded by the portion A' of the frame A, the said slide being normally held toward the left (Fig. 1) by a spring *e* but being forced to the right or away from the shaft B, when a filled bobbin is to be released, by a lever F, pivoted at *f* at its lower end and operated by the cam *c'* connected with the worm wheel C, the upper end of said lever engaging the inner end of a sliding bar *e'* movable in the portion A' of the frame A. A block e^2 is rigidly fixed to said bar *e'* and the said block is provided with a pin or portion e^3 extending up into the slide E and thus serving to communicate the movements of said bar *e'* to said slide, the spring *e* held in its cavity by the screw e^4, pressing against said block and thus holding or moving the sliding bar *e'* and slide E to the left, as will be understood.

Journaled in the lower part of the frame A is a rock-shaft G having a short arm or tappet *g* engaging the periphery of the cam c^2 with which it is held in contact by a torsional spring *g'*; and attached to the said shaft G is an arm g^2 having a segmental portion g^3 arranged beneath a bobbin-holding chute or guide-way H attached to a portion A^2 of the

frame A and having at its inner end a seat or recess into which the spindles of the bobbins fit.

Journaled in suitable bearings in the frame A on the rear side of the machine is a rock-shaft I having a pressing arm i to bear on the thread being wound on a bobbin X, the bearing portion or block i' of the said arm being forced against the thread on a bobbin by a torsional spring i^2 on said shaft. The shaft I is also provided with a latch-releasing arm I′ engaging the latch D in such a manner that as the arm i is lifted by the accumulating thread on a bobbin the said latch, when the bobbin is filled, will be withdrawn from above the pin c^6 so that the movable section c^4 of the worm-wheel may be forced outward by the spring c^5 into engagement with the worm b' which will then rotate the worm-wheel and the cams c' c^2 connected therewith. The cam c', when in rotation, operates the lever F and slide E, to cause the release of the filled bobbin; and the cam c^2 operates the shaft G to cause the segmental part g^3 of the arm g^2 to transfer an empty bobbin from the chute H to between the rotary bobbin holding heads or disks b^2, b^3.

When the pin c^6 passes away from the latch D the latter is returned to its normal position by a spring d so that when said pin again comes around beneath the said latch it is depressed by contact therewith and thus the section c^4 of the worm wheel is forced inward so that the worm wheel is again disconnected from its operating worm b' and the movement of the said worm wheel and the camps operated thereby is arrested.

Mounted on a pin e^5 on the slide E is the thread guide J having an arm j which is in contact with a stop or projection m attached to the base of the chute H, a torsional spring j' normally holding the said arm j in contact with said stop. When the slide E moves outward to release a filled bobbin the guide J swings around to the position denoted by dotted lines in Fig. 2 to hold the bobbin-supplying thread passing loosely through said guide in such position that it will be caught between the flange of the empty bobbin and the head or disk b^3 when the latter returns to clamp the bobbin between itself and the head or disk b^2.

Attached to the frame A beneath the bobbin being wound is a stationary knife k and attached to the slide E is a movable knife k'. When a bobbin is being wound the said knives overlap each other, but when the slide E is moved outward to release a filled bobbin they are so separated that, as the filled bobbin falls into the receiving cavity beneath, the thread from the bobbin will run between the separated knives so that when the latter again come together they will sever the thread; or the latter, being pinched between the knives, will be broken off as soon as the winding of the next bobbin begins.

It will be observed that the bobbin holding guide or chute H is in line with or opposite to the space between the rotary heads or disks b^2 b^3 in which the bobbin to be wound is held so that the empty bobbins are transferred by the arm g^2 directly from said chute to their winding position, the segmental portion g^3 of said arm passing beneath the lower end of said chute as the arm swings inward to place an empty bobbin in winding position and thus holding up the other empty bobbins until said arm again swings outward when the lowermost empty bobbin will fall into the seat or recess at the inner end of said segmental portion of said arm to be in readiness to be transferred to winding position at the next movement of the arm.

The thread running to the bobbin being filled is led over a guide arranged centrally opposite the bobbin but at some distance therefrom so that it will be evenly distributed on the bobbin by the pressure of the block i' carried by the arm i, such pressure causing the thread being wound to be regularly traversed back and forth and thus be laid on the bobbin in regular spiral courses.

The guide above referred to consists, in the present instance, of an ordinary disk tension device L, to exert a proper tension on the thread passing to the bobbin being wound but the tension device may be differently placed, if desired, and any suitable guide substituted therefor in the position shown to center the thread running to the bobbin.

The operation of my invention is as follows: The bobbin-holding chute being supplied with bobbins, and the thread from any suitable source of supply being led through the tension device and thread guide L and the loop of the thread guide J to a position opposite the bobbin-holding disk or head b^3, and the driving shaft B being set in operation the cam c^2 causes the shaft G to be rocked thus moving the arm g^2 inward and causing the bobbin resting in the seat or recess at the inner end of the segmental portion g^3 of said arm to be transferred to a position between the rotary heads or disks b^2, b^3; and when the bobbin is in such position the cam c' has moved around so as to permit the lever F to swing to the left (Figs. 1 and 2) the slide E following such movements of the said lever under the stress of the spring e, thus bringing the rotary disk or head b^3 into contact with the bobbin and clamping the thread between the outer side of the bobbin flange and the said head, or disk as the latter forces the bobbin against the head or disk b^2. As soon as the bobbin is thus clamped between the rotary heads or disks b^2, b^3, it begins to rotate, and shortly thereafter the pin c^6 comes beneath the pivoted latch D so as to cause the section c^4 of the worm wheel C to be depressed out of engagement with the worm b' on the driving shaft, thereby disengaging the said worm wheel C from said shaft so that the said worm wheel and the cams operated thereby cease now their movements, the arm g^2 having meanwhile returned to its first position.

As the bobbin to be filled begins its rotation the thread is drawn beneath the pressure block i', and immediately begins to traverse back and forth on the bobbin, as above described, until the bobbin is filled; when the arm i is lifted causing the latch-releasing arm I' on the shaft I to move the latch D outward, thereby disengaging said latch from said pin c^6 and permitting the section c^4 of the worm wheel to be pressed outward by its spring c^5 into engagement with the worm b', thus again setting the worm wheel in motion, and causing the cams c' and c^2 to repeat their operations to release the filled bobbin and to transfer an empty bobbin into winding position. As the filled bobbin falls into the recess beneath the head b^2 b^3 the thread from said bobbin passes between the knives k and k' to be severed as above described, and the thread guide J holds the thread in such position that it will run across the inner face of the rotary disk or head b^3 so as to be clamped between the said head and the outside of the bobbin flange when the slide E next returns. Thus the operation continues automatically until the supply of empty bobbins in the chute H is exhausted or the thread supply gives out, and no further attention to the machine on the part of the operator is required until the desired number of bobbins has been filled, or a new supply of thread from which to fill the bobbins is to be furnished.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In an automatic bobbin winding apparatus, the combination with two rotary bobbin-holding heads or disks, one of which is movable toward and from the other, of a bobbin-holding chute or receptacle, a bobbin transferring arm beneath the lower end of said chute or receptacle, and an automatic mechanism for operating said bobbin-transferring arm, and said movable bobbin-holding disk or head, and an arm, operated by the accumulating thread on the bobbin being filled, for governing the operation of said automatic mechanism.

2. In an automatic bobbin-winding machine, the combination with two bobbin-holding heads or disks and means for moving one from and toward the other, and for supplying empty bobbins to the said heads or disks, of a driving shaft which operates one of the said heads or disks, a worm on said driving shaft, a worm-wheel to be engaged by said worm and having its periphery mutilated or partly removed so that when the mutilated part of said worm-wheel comes opposite said worm the worm wheel and worm will be disengaged and the former will stop, connections, operated from said mutilated gear, for shifting said movable head and for actuating the said bobbin-supplying mechanism and means for re-engaging said worm-wheel and worm when the worm-wheel is again to be set in motion.

3. In an automatic bobbin winding apparatus, the combination with a driving shaft provided with a worm and with a rotary bobbin-holding head or disk, of a slide movable toward and from the said rotary head or disk, a second rotary head or disk carried by said slide, a worm-wheel operated by said worm, two cams operatively connected with said worm-wheel one of said cams serving to move said slide and the movable head or disk away from the other head or disk, a bobbin-holding chute or receptacle, a bobbin-transferring arm passing beneath said chute or receptacle and operated from the other of said cams and an arm, controlled by the accumulating thread on the bobbin being filled, for governing the operation of said worm wheel.

4. In an automatic bobbin winding apparatus the combination with a driving shaft having a worm, of a worm-wheel provided with a radially movable spring-pressed section, two cams operatively connected with said worm-wheel, mechanisms operated by said cams, for releasing a filled bobbin and for transferring an empty bobbin into winding position, and a device, controlled by the accumulating thread on the bobbin, for governing the position of said spring-pressed section relative to said worm: whereby the worm-wheel may be stopped and started as desired.

5. In an automatic bobbin winding apparatus, the combination with a driving shaft having a worm, of a worm-wheel provided with a radially movable spring-pressed section, two cams operatively connected with said worm-wheel, mechanisms, operated by said cams, for releasing a filled bobbin and for transferring an empty bobbin into winding position, a latch for forcing said radially movable section inward to disengage the worm-wheel from its worm, and a latch-releasing arm, controlled by the accumulating thread on the bobbin, for moving said latch into position to permit said section to engage the worm when the bobbin has been filled.

6. The combination with the driving shaft B provided with the worm b', of the worm-wheel C, the cam c^2 operated by said worm-wheel, the rock-shaft G having an arm engaging said cam, and having also a bobbin-transferring arm, a bobbin-holding chute or receptacle H beneath which the said bobbin-transferring arm swings and an arm, controlled by the accumulating thread on the bobbin being filled, for governing the operation of the said worm wheel.

7. The combination with the driving shaft B provided with the worm b', a rotary bobbin-holding head or disk operated by said shaft, the worm wheel C, the cam c', the slide E operatively connected with said cam to be moved outward thereby, a spring for moving said slide inward, an arm having a block or portion arranged to press upon the accumulating thread upon the bobbin, and a stopping and starting mechanism for said worm-wheel operated by said arm.

8. The combination with the driving shaft

B provided with the worm b', rotary bobbin-holding heads or disks receiving movement from said shaft, the worm-wheel C, the cam c' operated by said worm-wheel, the lever F, the sliding bar e', the slide E operated thereby, the spring e, the shaft I and its torsional spring, the arms i and I′ carried by said shaft, the latch D operated by said arm I′, and the movable section of the worm-wheel held depressed by said latch or thrown into operative position when the latch is moved outward by the said arm I′.

9. The combination with two rotary bobbin-holding heads or disks one of which is movable toward and from the other, of a slide by which the movable bobbin-holding head or disk and its shaft are carried, a pivoted thread guide mounted on said slide and stationary stop by which said pivoted thread guide is caused to be thrown into position to guide the thread across the face of the movable bobbin-holding head or disk when a bobbin is to be clamped between the latter and its co-operating head or disk.

10. The combination with the rotary bobbin holding disks or heads, and automatic mechanism for releasing filled bobbins from and for supplying empty bobbins to said disks or heads, of a yielding pressure device to bear upon the thread as it is being wound upon the bobbin, a thread guide arranged centrally in line with the space between said disks or heads and at some distance therefrom, and connections between said yielding pressure device and said automatic mechanism whereby the operation of the latter is controlled.

11. The combination with the rotary bobbin holding disks or heads, and automatic mechanism for releasing the filled bobbins from and for supplying empty bobbins to said disks or heads, of a yielding pressure device to bear upon the thread as it is being wound upon the bobbins, connections between said yielding pressure device and said automatic mechanism, a bobbin-holding chute placed opposite the space between said disks or heads, and a tension device supported by said chute.

12. The combination with the rotary bobbin holding disks or heads, one of which is movable toward and from the other, of an automatic mechanism for releasing the filled bobbins and for supplying empty bobbins to the said disks or heads, a yielding thread pressure device connected to said automatic mechanism, to control the latter, and an automatic thread severing device consisting of a stationary knife or cutter, and a knife or cutter which is connected to and thereby movable with the said movable disk or head.

In testimony whereof I affix my signature in presence of two witnesses.

FRIEDERICH MÜLLER.

Witnesses:

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B. H. MARSH.