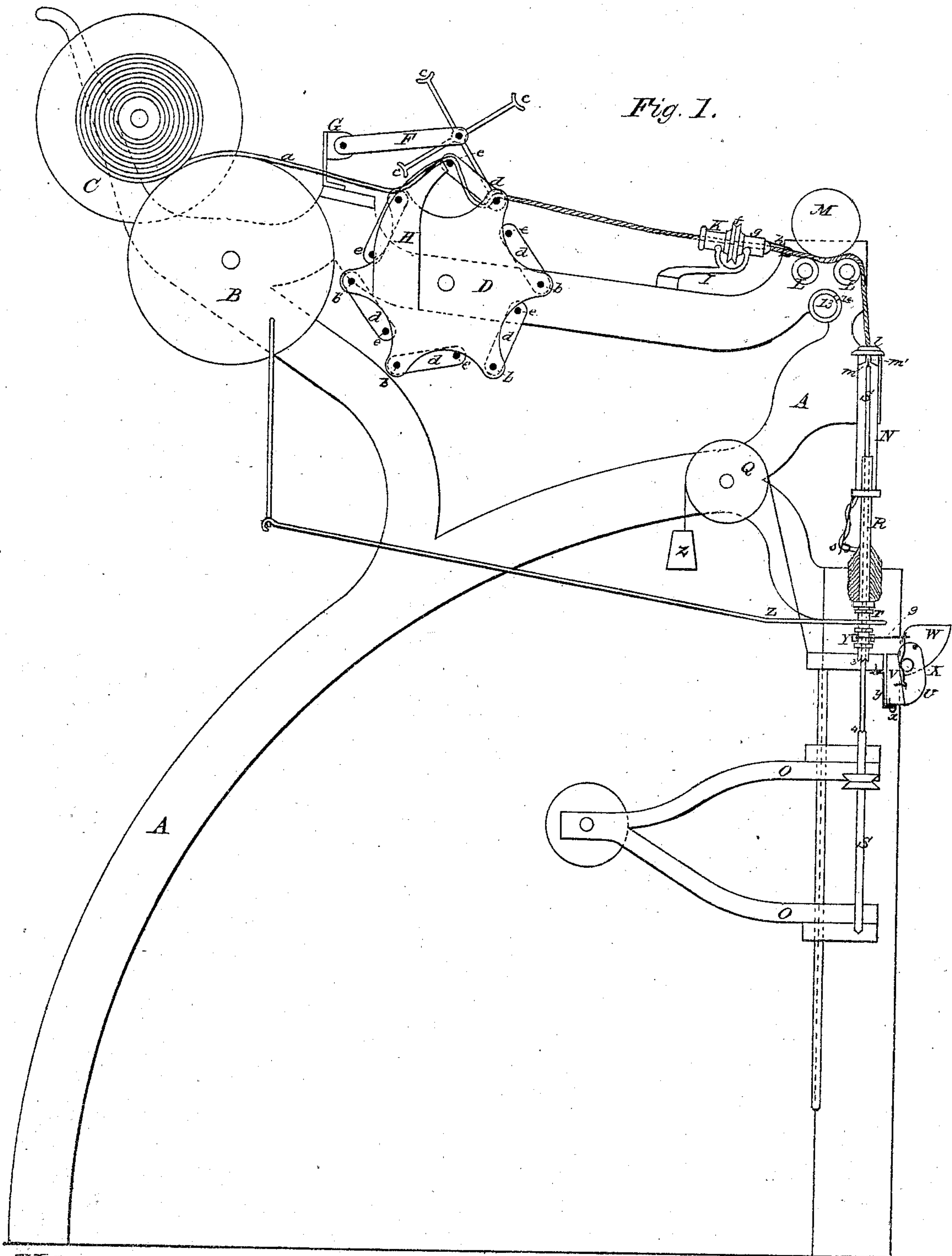


LUTHER W. FELT. 3 Sheets--Sheet 1.
 Improvement in Machines for Spinning Wool.
 No. 120,255. Patented Oct. 24, 1871.



Witnesses:

J. C. Brecht
 D. G. Stuart

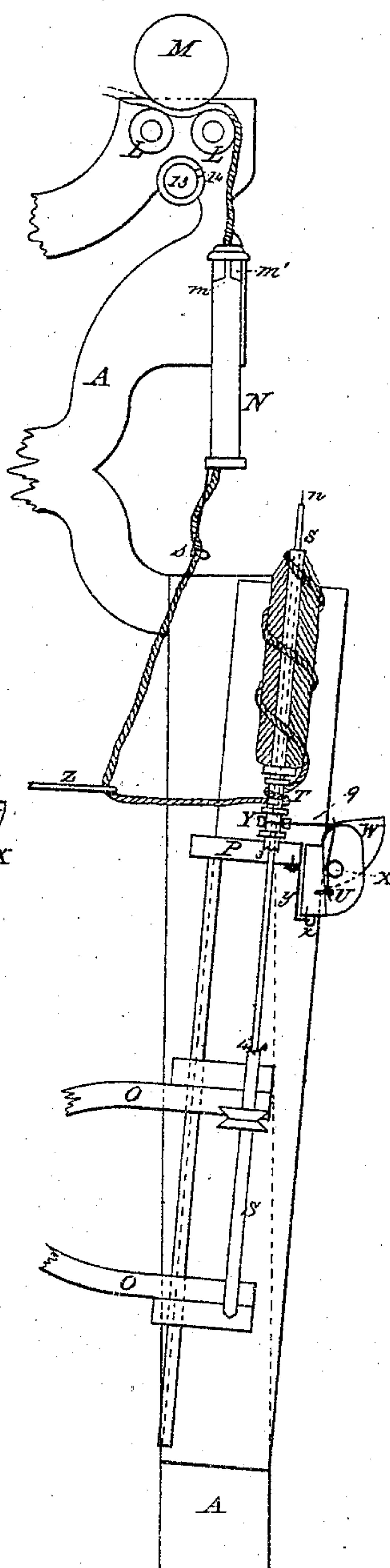
Inventor:

Luther W. Felt
 by his Atty
 C. Hannay

Patented Oct. 24, 1871.

Fig. 3.

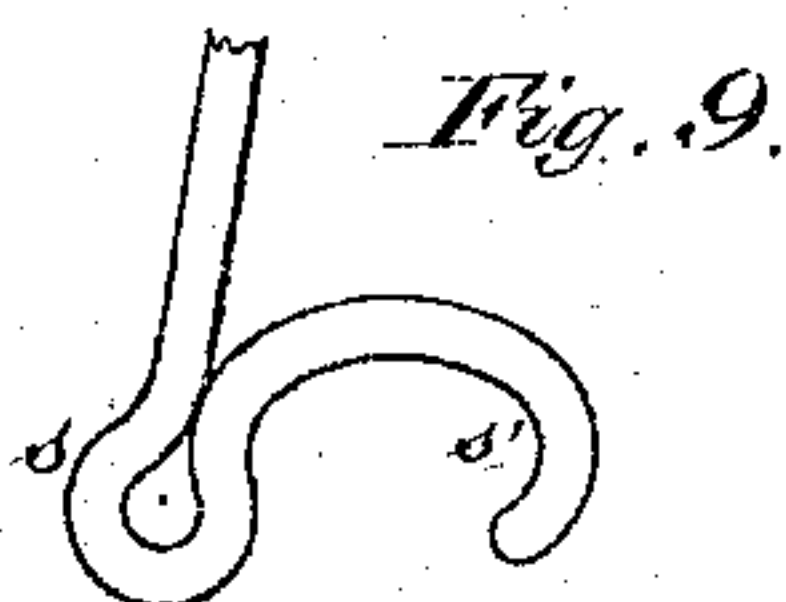
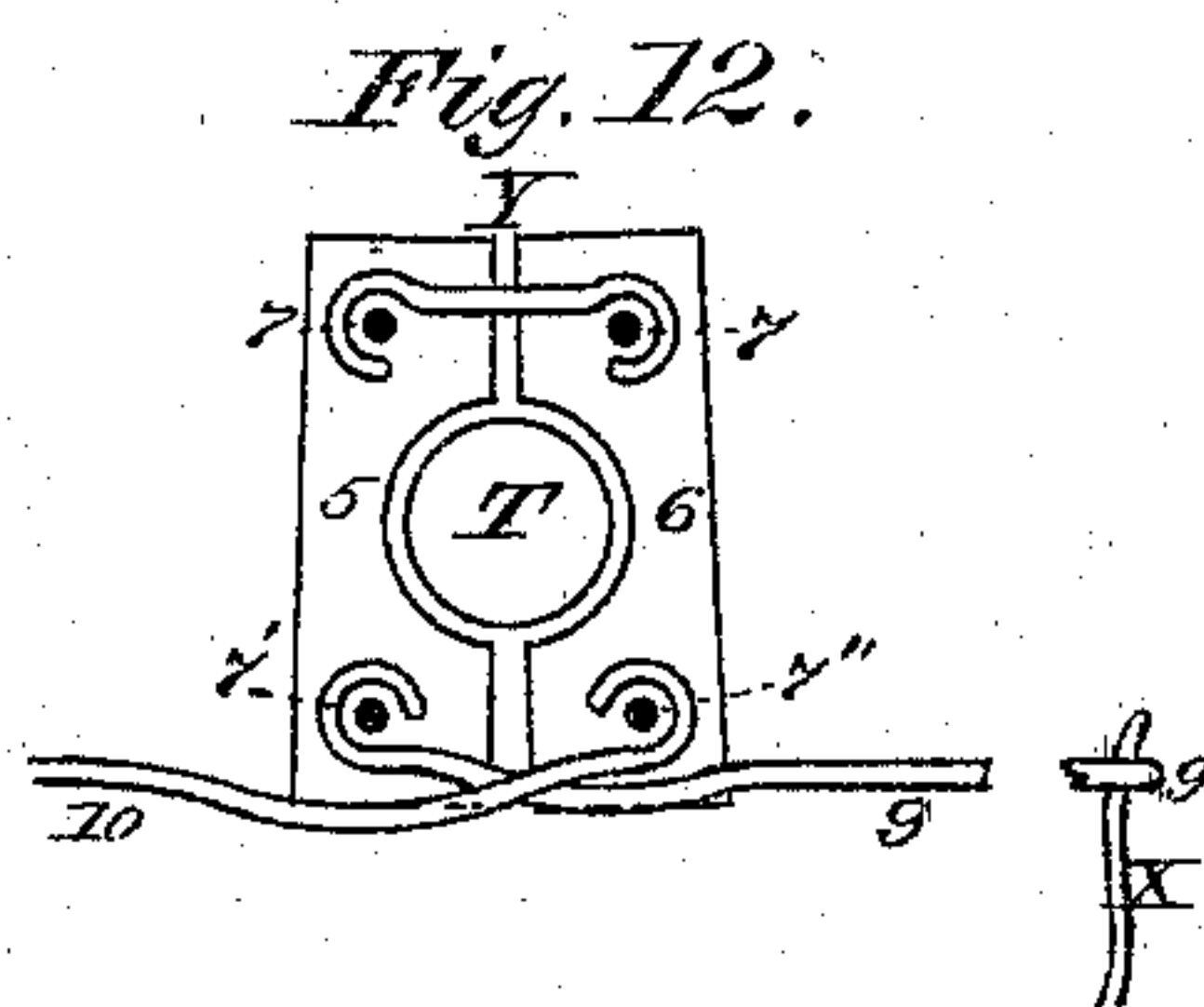
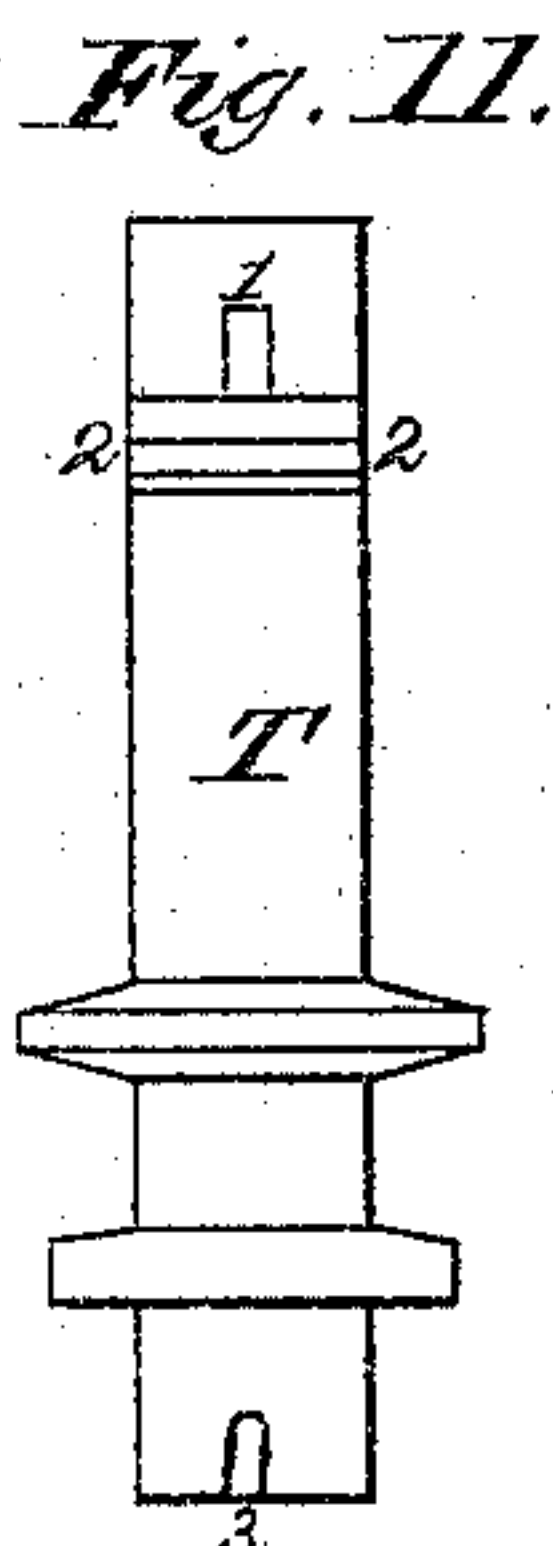
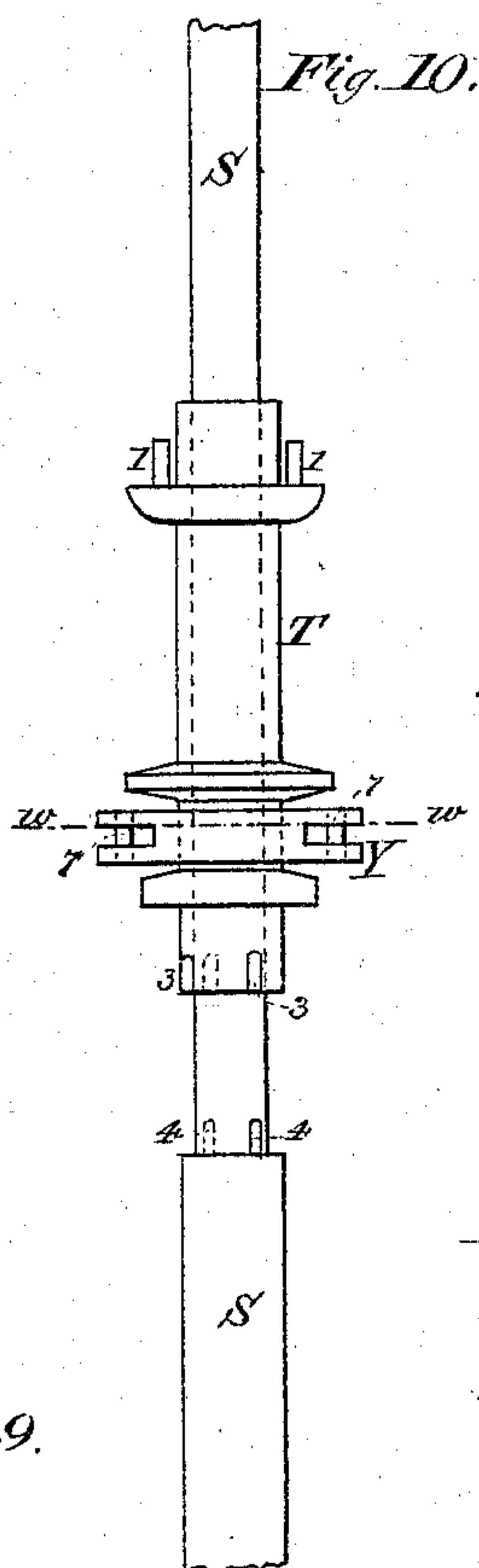
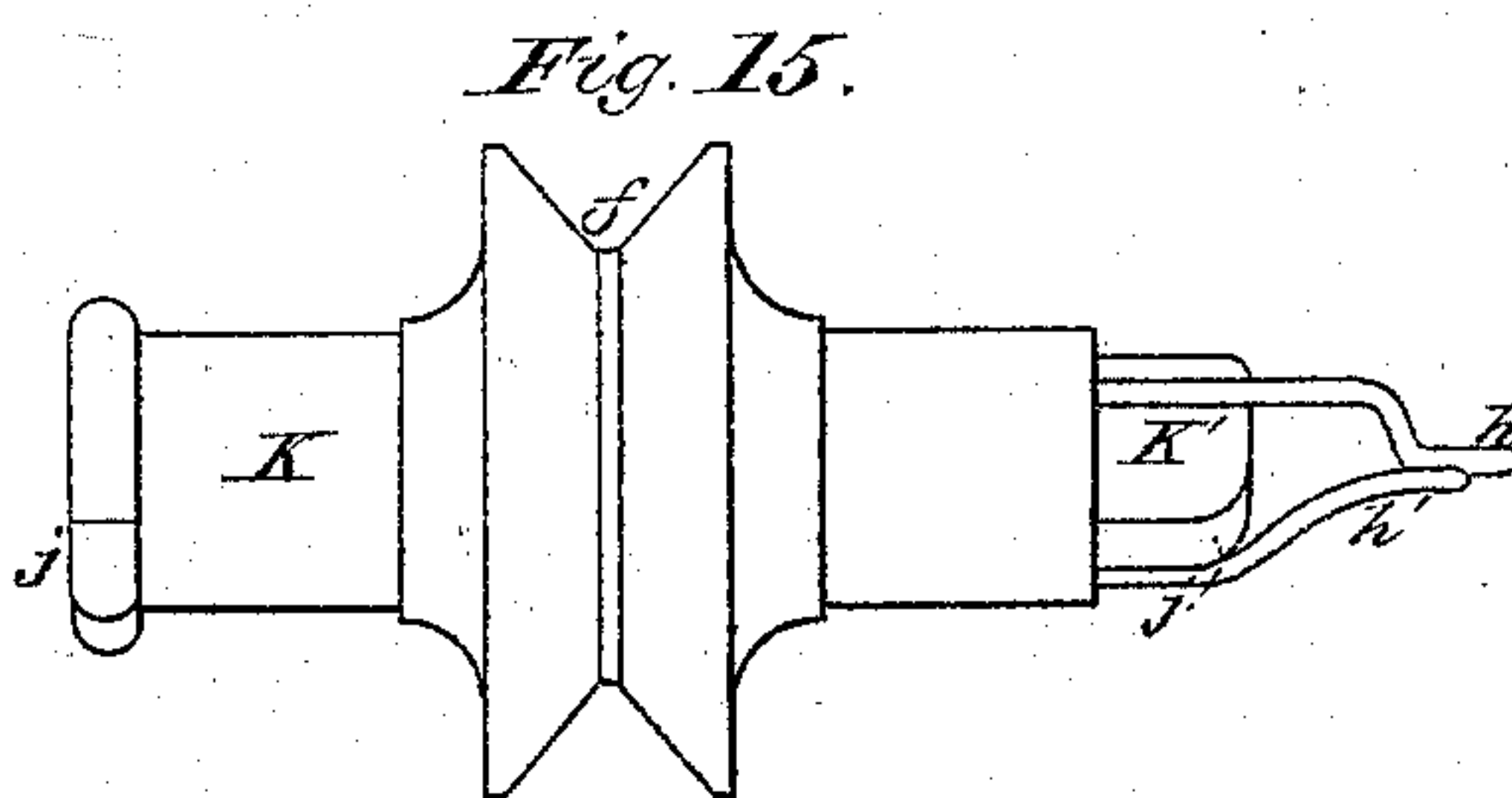
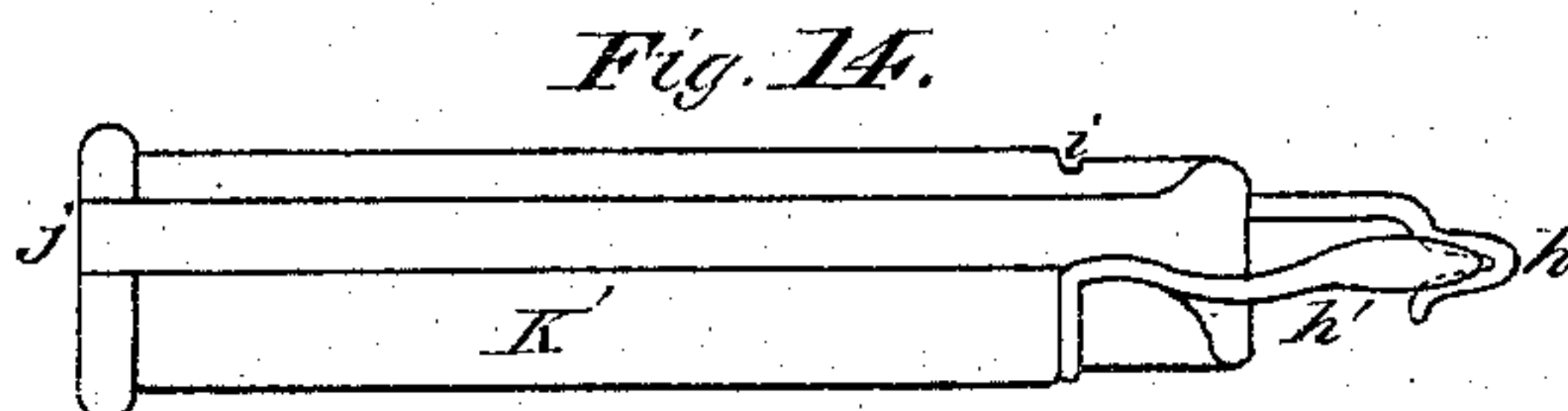
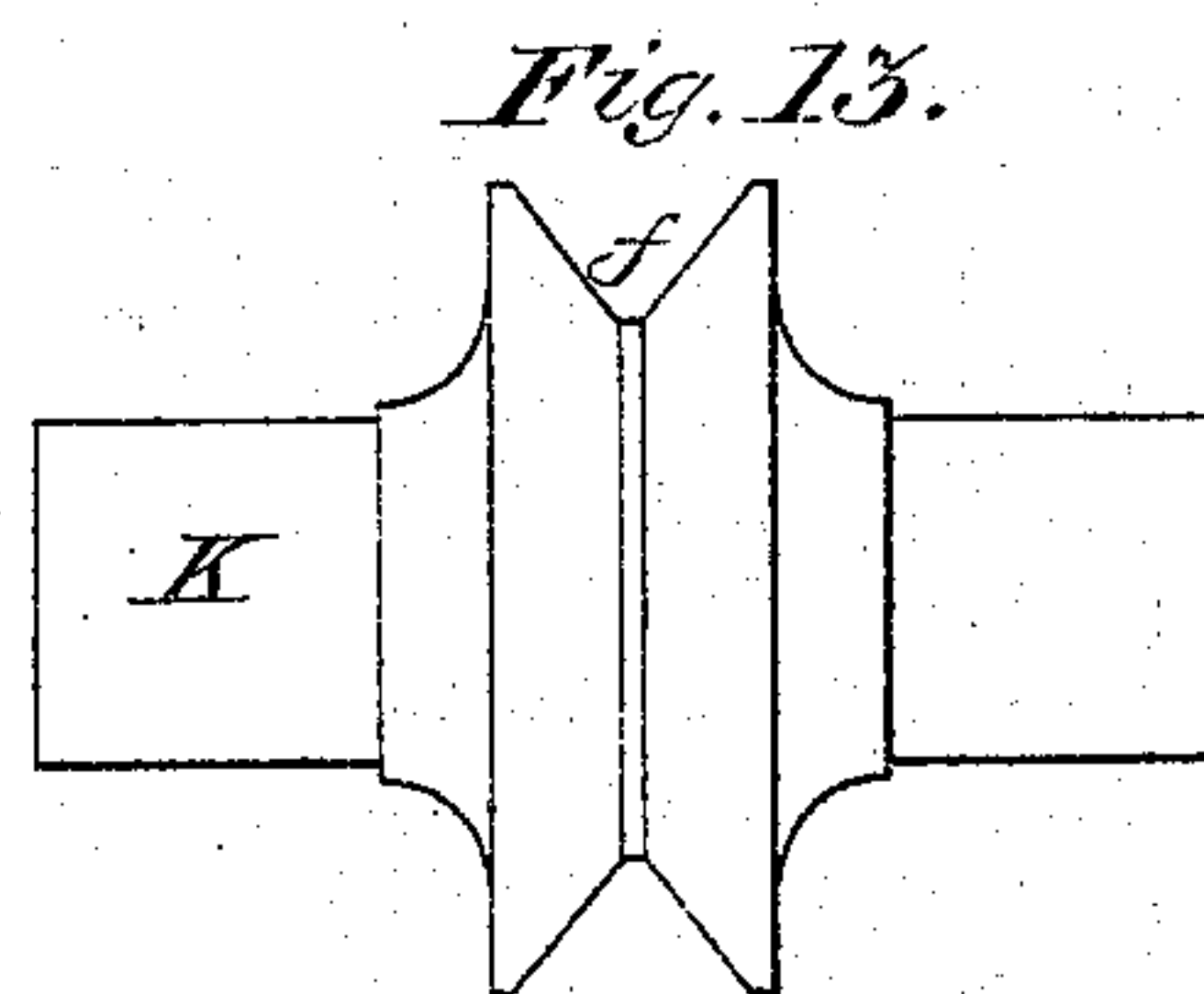
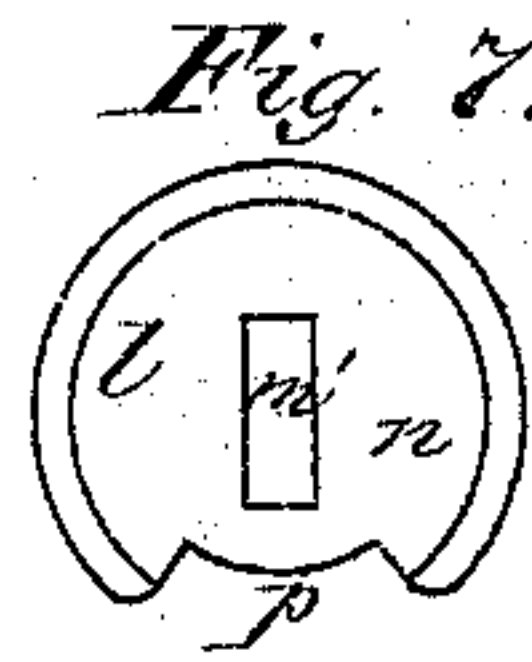
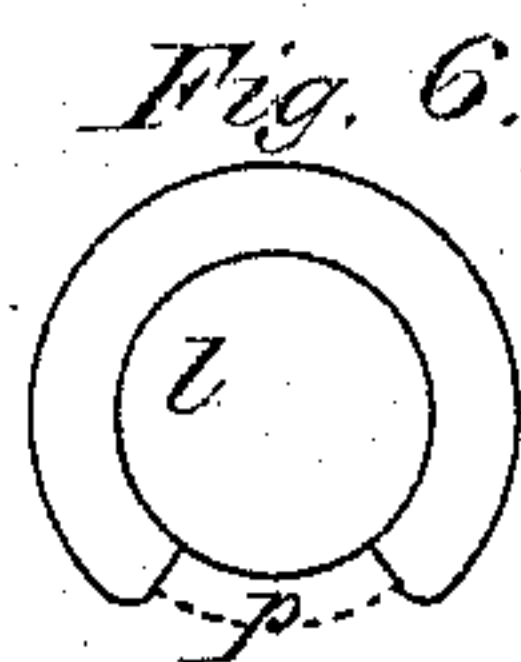
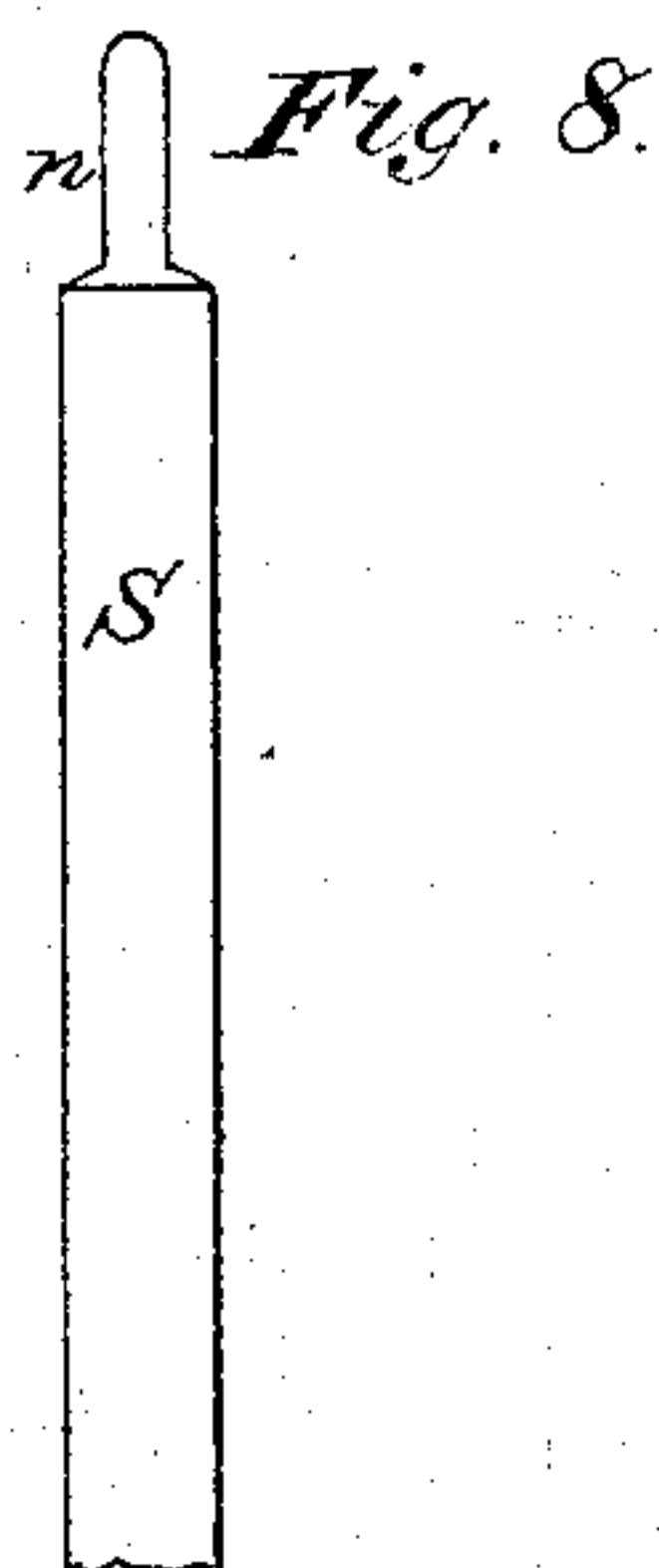
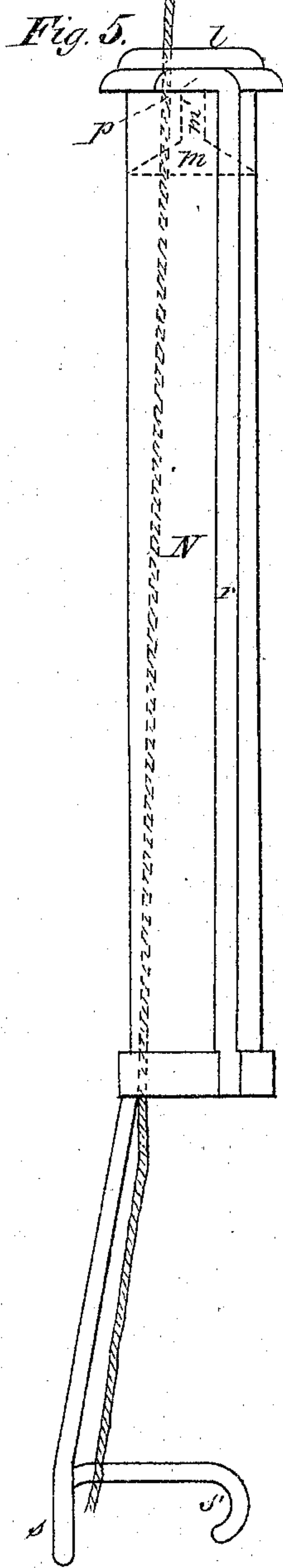
Fig. 4.



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LUTHER W. FELT.
Improvement in Machines for Spinning Wool.
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Witnesses:

T. C. Brecht.
D. S. Stuart

Inventor:

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UNITED STATES PATENT OFFICE.

LUTHER W. FELT, OF KEENE, NEW HAMPSHIRE.

IMPROVEMENT IN MACHINES FOR SPINNING WOOL.

Specification forming part of Letters Patent No. 120,255, dated October 24, 1871.

To all whom it may concern:

Be it known that I, LUTHER W. FELT, of Keene, in the county of Cheshire and State of New Hampshire, have invented certain Improvements in Machines for Spinning Wool, of which the following is a specification:

My invention relates, first, to certain improvements in the mechanism for imparting the primary twist to the roving, preparatory to its being drawn to the degree of fineness required for the finished yarn; secondly, it relates to certain improvements in the mechanism which gives the final twist to the yarn and winds it on the bobbin; and lastly, it relates to certain improvements in mechanism for facilitating the operation of doffing. The general object of my invention is to produce a better quality of yarn, and to do the same much more rapidly than can be done with the ordinary jack.

The following is an accurate description of those parts of a spinning-machine which embody my invention, reference being made to the accompanying drawing, of which—

Figure 1 is a transverse section or side elevation of a machine embodying my invention. Figs. 2, 3, and 4 are similar sections of the front parts of the same, showing parts in different positions. Figs. 5 to 15, inclusive, are details to be referred to.

A is the frame of the machine. I, Fig. 1, is a brace or arm carrying a twisting-tube, K, to be turned by a belt passing over the pulley *f*. Figs. 13, 14, and 15 show the construction of the tube. In Fig. 14, K' is a light removable tube with a slit, *j*, extending through its entire length. It also has a wire, *h*, bent into a hook at one end and passing around the tube K', in the notch *i*, and formed into a spring, *h'*, at the other end. The hook *h*, being made of spring wire, will retain its position upon the tube K' by its own elasticity, upon being sprung around it, as before mentioned, without the aid of other devices. The form of the hook will be readily understood by reference to Figs. 14 and 15. In the latter figure the tube K' is shown inserted in the driving-tube K. L and M are drawing-rolls. N is a flier, shown in Fig. 5. This flier consists of a tube, N, large enough to admit the bobbin freely without contact. The upper part of the tube N has an end piece, *l*, inserted, which has a projecting flange, and on one side a depression or notch, *p*, Figs. 5, 6, or 7. This notch *p* communicates on

one side with a slit, *r*, in the tube N. The lower part of the flier consists of a wire, *s*, bent into a loop, and a hook, *s'*. Fig. 9 is a view of this wire *s*, seen partly from below. The end piece *l* of the flier has a conical depression, shown by dotted lines at *m*, Fig. 5, which depression leads to a rectangular opening, *m'*, or hole of such shape and size as to nearly fit closely the flattened end *n* of the spindle S, which end *n* is shown in Fig. 8. Fig. 6 shows the end piece *l* of the flier, seen from above, and Fig. 7 the same seen from below. The spindle S is supported by a sliding frame-work, O, shown in its highest position in Figs. 1 and 2. P is another frame, sliding in O and carrying a spool, T, which moves freely over the spindle S, but does not partake of the motion of the latter, except when the teeth or projections 3 on the spool T are allowed to engage with the teeth or projections 4 on the larger part of the spindle S. Fig. 3 shows the teeth 3 and 4 thus in contact. Figs. 10 and 11 show the spool T, in which 1 1 are small projections from the spool T, which enter corresponding depressions in the bobbin R, and insure the motion of the spool T and the bobbin R together. V is a cross-piece hinged at *x* to a bar, *y*, fastened to the frame P. A projection, U, is attached to the cross-piece V, which projection carries a cam, W, turning on a pivot not concentric with the curved portion of the cam. X is a spring attached to the cross-piece V, pulling outward on a wire, 9, which passes and is attached to a yoke, Y, mounted on the lower part of the spool T. Fig. 10 shows a side view of the yoke Y, and Fig. 12 a view from above of a section of the same, made in the line *w* of Fig. 10. Y consists of two parts, which clasp the spool T, being hinged together by the wire 8 around the pins 7 7'. The wire 9 passes from the spring X to the pin 7' on the opposite side, and the wire 10 crossing the wire 9 to and around the pin 7'', is fastened at its other end to the frame P on the side opposite the spring X. The weight of the frame P and of what it carries is balanced by the weight *z*, both being suspended to the shaft and pulley Q. Z is a follower or wire to be used in doffing or changing bobbins.

The operation of these parts is as follows: As the roving is delivered from the griping-wheels D and E, (said wheels D and E being included in Letters Patent No. 103,858, dated June 7, 1870, already granted to me, and certain other parts

attached to said wheels being included in another application for a patent made simultaneously with this,) the roving is passed through the twisting-tube K and around the hook *h*, so that it (the roving) is grasped firmly enough to insure its revolving with the tube and being twisted. Motion is given to the rolls L and L, upon which the roll M rests, and the roving is thereby grasped and drawn. The point of the hook *h* is brought as closely as practicable to the point of contact of the drawing-rolls L L with the roll M, so that the twist imparted to the roving by the twisting-tube K is retained up to the point where the drawing-rolls are tangent to each other, in order that the strength of the roving may be sufficient to insure its being drawn without breaking. From the drawing-rolls the roving passes down by or in the depression *p* in the end piece *l*, and through the flier by means of the slit *r*, to and around the wire *s* to the hook *s'*, and thence to the bobbin R. When the frame O is in its highest position, so that the spindle S enters the hole *m'* of the end piece of the flier, and when the frame P is raised, bringing the bobbin R within the flier N and releasing the teeth 3 of the spool T from the teeth 4 of the spindle, motion is given to the spindle by a belt passing over the pulley on its lower part, the spindle turns the flier, and the yarn is spun and wound on the bobbin. The yarn is laid on the bobbin regularly in conical layers by mechanism not shown in the drawing. The tension of the yarn on the bobbin is regulated by the following means: In winding the yarn the frame P is alternately raised and lowered. When P is raised so as to cause the yarn to be wound on the larger part of the cone, as seen in Fig. 2, less strain is then exerted on the yarn; but the rise of the frame P and the friction of the cam W on the frame of the machine rolls the cam upward to the position seen in Fig. 2, when the cam pulls the frame or cross-piece V forward, and by the action of the spring X and yoke Y, pressure is exerted on the spool T, thus giving sufficient increase of tension to compensate for the difference of the size of the cone. When the frame P is again lowered so as to wind on the smaller part of the cone, as seen in Fig. 1, the cam W is rolled back outward, the spring X is released, and by this alternate action the tension is made perfectly uniform.

If the roving breaks between the wheels D and E and the drawing-rolls, the removable tube K' is taken out of the main tube K, and the roving is passed through the tube K' by the slit *j*, and around the hook *h* under the spring *h'*. The tube K' is then replaced without having the machinery stopped. If the yarn is broken below the drawing-rolls the end is taken from the bobbin, passed around the wire *s* of the flier N, between *s* and *s'*, thence up through the slit *r* into the flier, and is spliced with the roving next to the drawing-rolls. The front of the frame-work in which the flier N turns, is slotted to correspond with the slit *r* in the flier, so that the yarn is passed into the flier without removing the latter from the frame. A tube, 13, provided with a longitudinal slit or series of openings, 14, is placed

just below and parallel with the drawing-rolls, from which a current or jets of air are made to issue behind the threads toward the front, so that if the yarn breaks the roving coming out from between the drawing-rolls may not be drawn around the lower roll, but be blown outward so as to be easily caught and spliced.

When the bobbins are full, the frame O is lowered so as to bring the upper end of the spindles below the lower end of the flier. The wire or follower Z is raised from the position shown in Fig. 3, over and just behind the upper end of the spindles. The frame O is then raised, as seen in Fig. 3, and the frame P slightly lowered to bring the teeth of the spool T and the spindle together, but not to engage the spindle with the flier. The spindles are then turned backward to unwind a quantity of yarn, which is, at the same time, brought downward and backward by the wire or follower Z. A few turns of the spindles runs the yarn down off the bobbins to the spool T, thus securing the thread for the next bobbins. Fig. 4 shows this position of the wire Z and the yarn, and also the frames O and P tipped forward. The bobbins may now be pulled off, breaking the yarn, but leaving the end attached to the spool T. When the empty bobbins are put on, the frames are brought back to their erect position, the frame O is raised to its highest position so that the spindles may engage and turn the fliers, the frame P brings the bobbins within the fliers, and spinning recommences. The yarn immediately runs back from the spool T to the bobbin. The opposite sides of the upper flange of the spool T are removed, as seen at 2, Fig. 11, so that the accumulation of yarn on the spool may easily be cut off when desired.

Having described my improvements in spinning-machines, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a removable tube, K', and hook, *h*, constructed substantially as set forth, with a spring, *h'*, for the purpose described.
2. The combination of a removable tube, K', with a twisting-hook, *h*, secured as described.
3. A tubular flier, N, provided with a slit, *r*, cap-piece *l*, and depression *p*, in the manner substantially as and for the purpose set forth.
4. A tubular flier N, constructed as described, when provided with a wire, *s*, and hook *s'*, for the purpose set forth.
5. The combination of a tubular flier N, constructed as described, with the draw-rolls L L and M, for the purpose set forth.
6. The combination of a tubular flier, N, provided with a cap, *l*, and depression *m'*, with a retractable spindle, S, for driving the same, as set forth.
7. The combination of a tubular flier, N, provided with a cap, *l*, depression *m'*, and retractible spindle S, with a sliding frame, O, for carrying the latter, as set forth.
8. In combination with the tubular flier N, spindle S for driving the same, and sliding frame O, the sliding frame P, and spool or bobbin-carrier T, substantially as and for the purpose set forth.

9. The combination of a tubular flier, provided with a cap-piece, *l*, depression *m'*, and retractible spindle *S* for driving the same, with the draw-rolls *L L* and *M*, substantially as described.

10. The combination of a retractible spindle, *S*, for driving the flier, with a loose spool, *T*, and bobbin *R*, substantially as set forth.

11. The combination of a sliding frame, *P*, hinged cross-piece *V*, cam *W*, spring *X*, rod 9, and yoke *Y*, with a loose spool, *T*, carrying the bobbin, for the purpose set forth.

12. A friction-yoke, *Y*, formed in two parts and hinged at one end, when provided at the other with rods 9 and 10, attached in the manner and for the purposes set forth.

13. The combination of a tubular flier, *N*, and retractible spindle *S* for driving the former and carrying the spool and bobbin, as set forth, with a frame, *O*, for adjusting the spindle and frame

P for adjusting the bobbin, when so arranged and constructed that the spindle may be withdrawn from the flier and both frames simultaneously tilted forward, for the purpose described.

14. The combination of the tilting-spindle *S* with the wire *Z* and bobbin *R*, substantially as and for the purpose herein described.

15. The combination of a flier, *N*, tilting-spindle *S*, and wire *Z*, substantially as described.

16. The combination of a flier, *N*, tilting-spindle *S*, wire *Z*, bobbin *R*, and spool *T*, as described.

17. In combination with the drawing-rolls of a spinning-machine, an air-tube, 13, provided with a slit or series of openings, for the purpose set forth.

LUTHER W. FELT.

Witnesses:

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I. FOSTER.

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