

(No Model.)

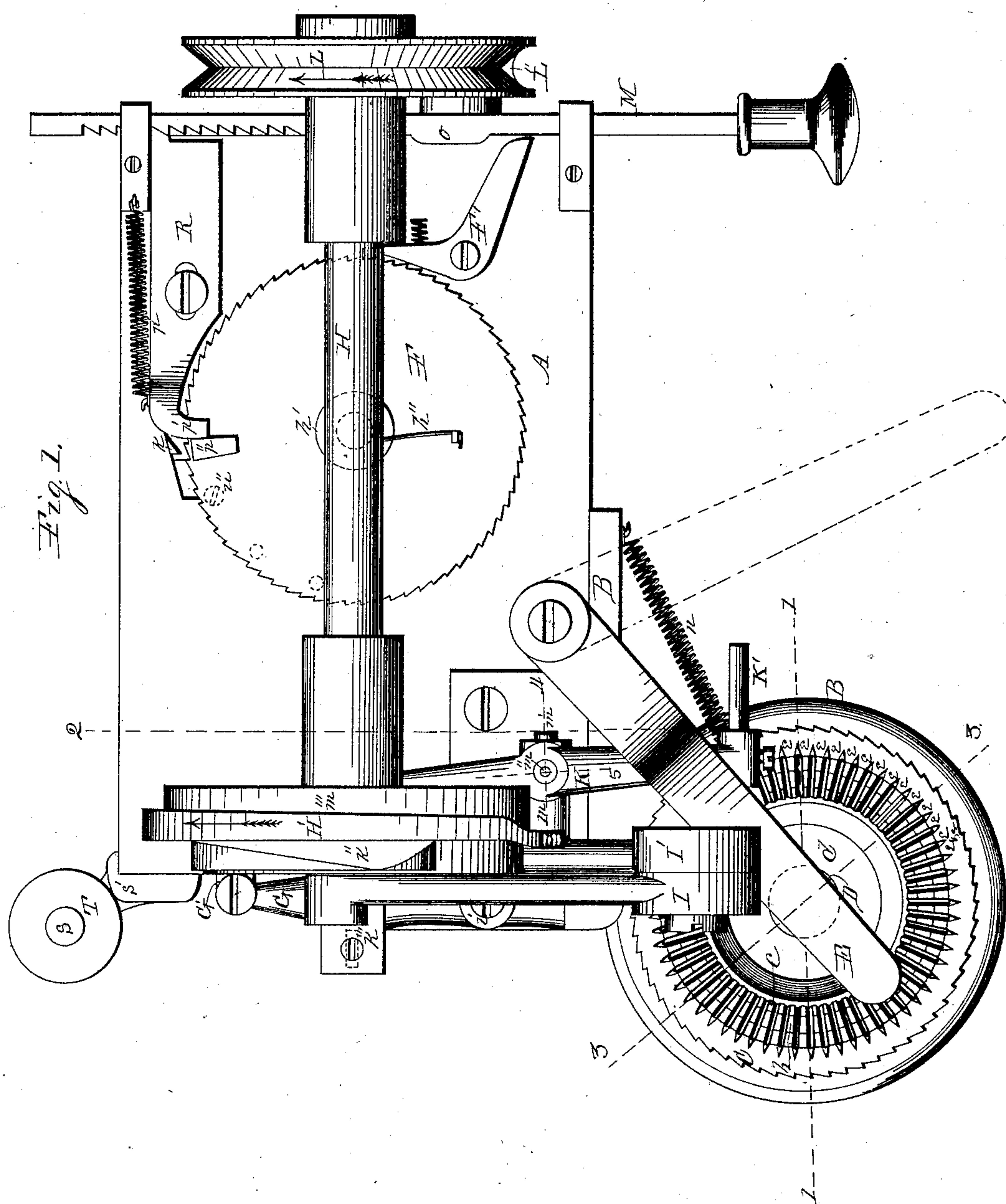
7 Sheets—Sheet 1.

A. NELSON.

MACHINE FOR SEWING LOOPED FABRICS.

No. 374,422.

Patented Dec. 6, 1887.



Witnesses,
E. H. Behel
A. O. Behel

Inventor,
Alfred Nelson,
Per Jacob Behel
Atty.

(No Model.)

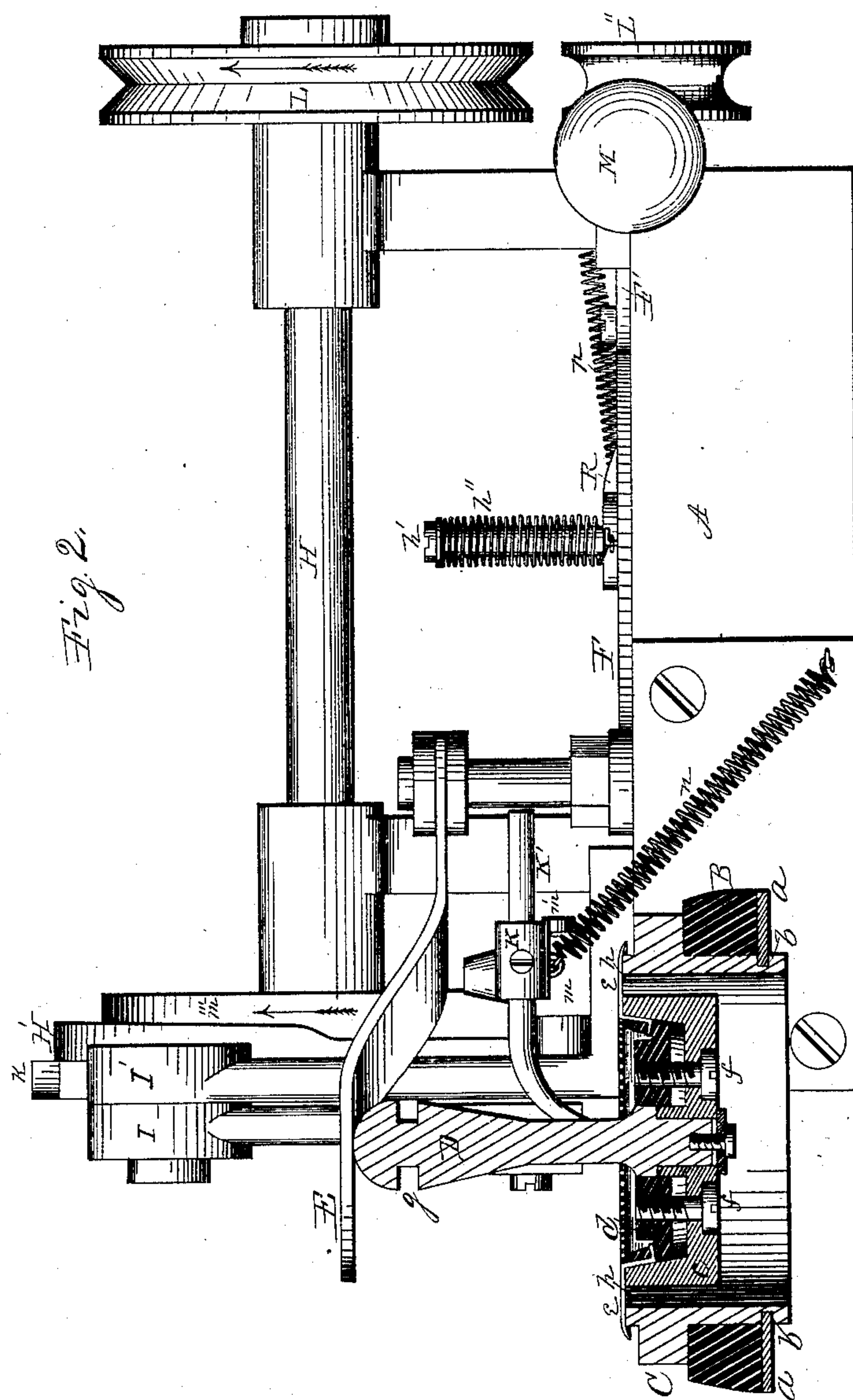
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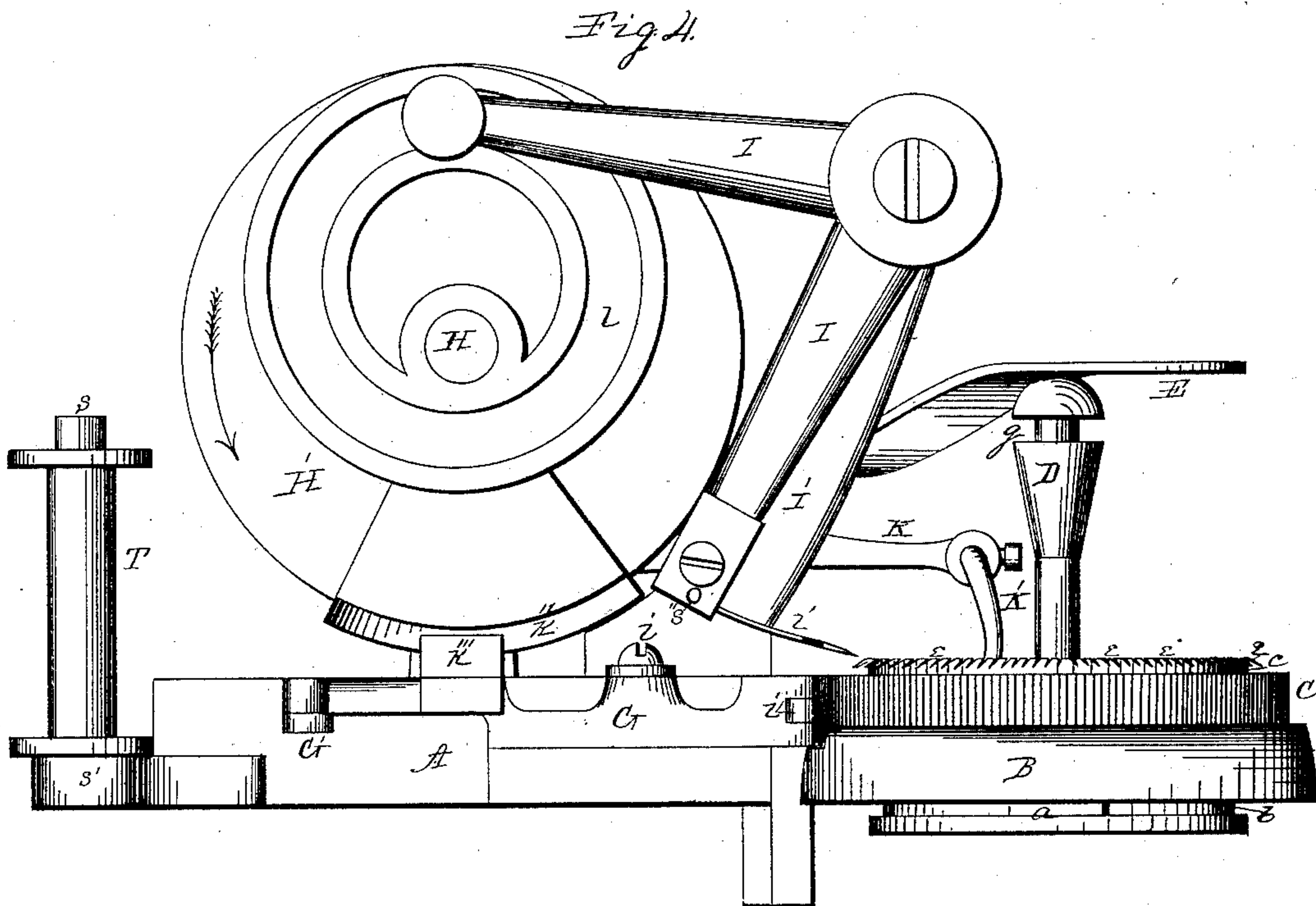
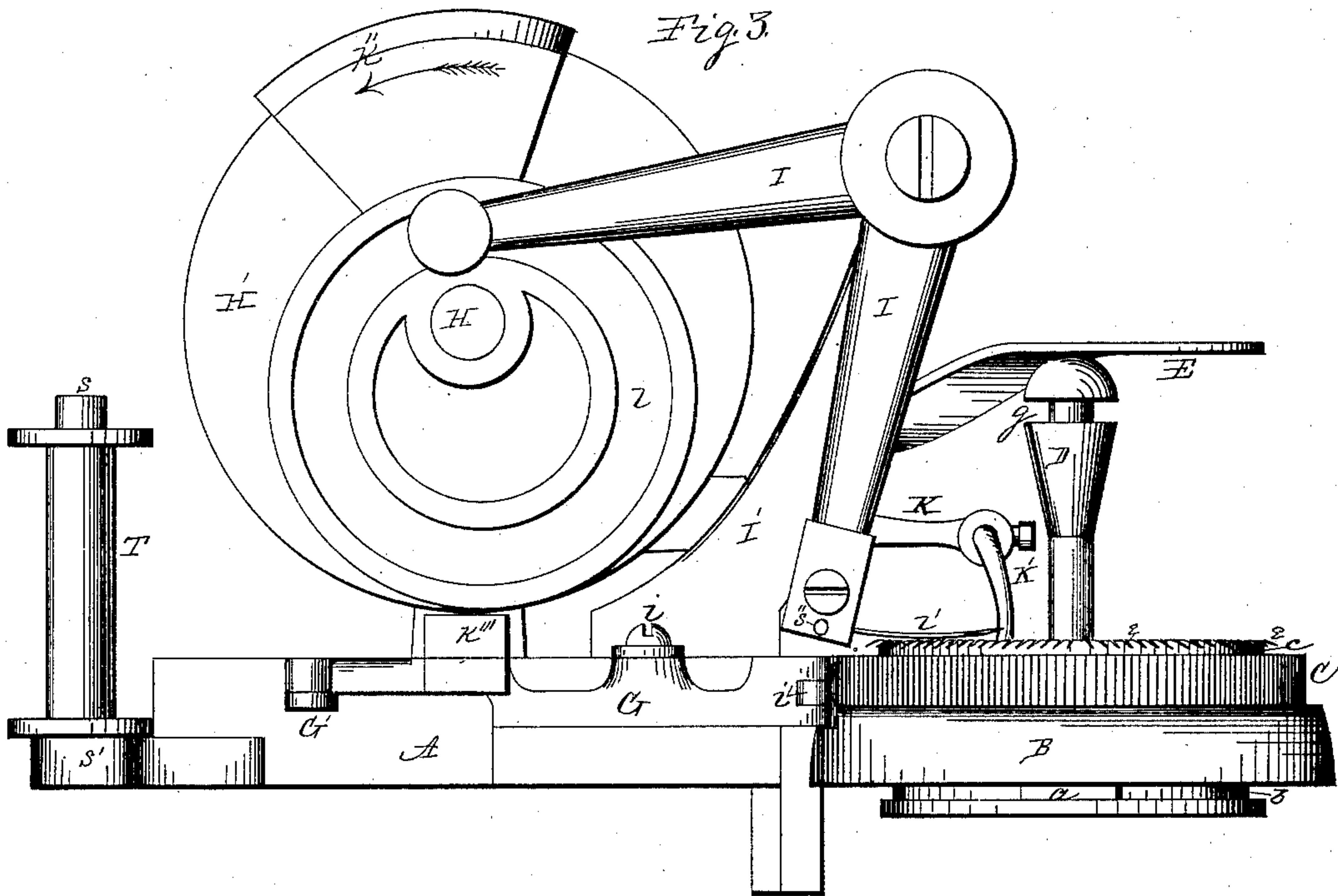
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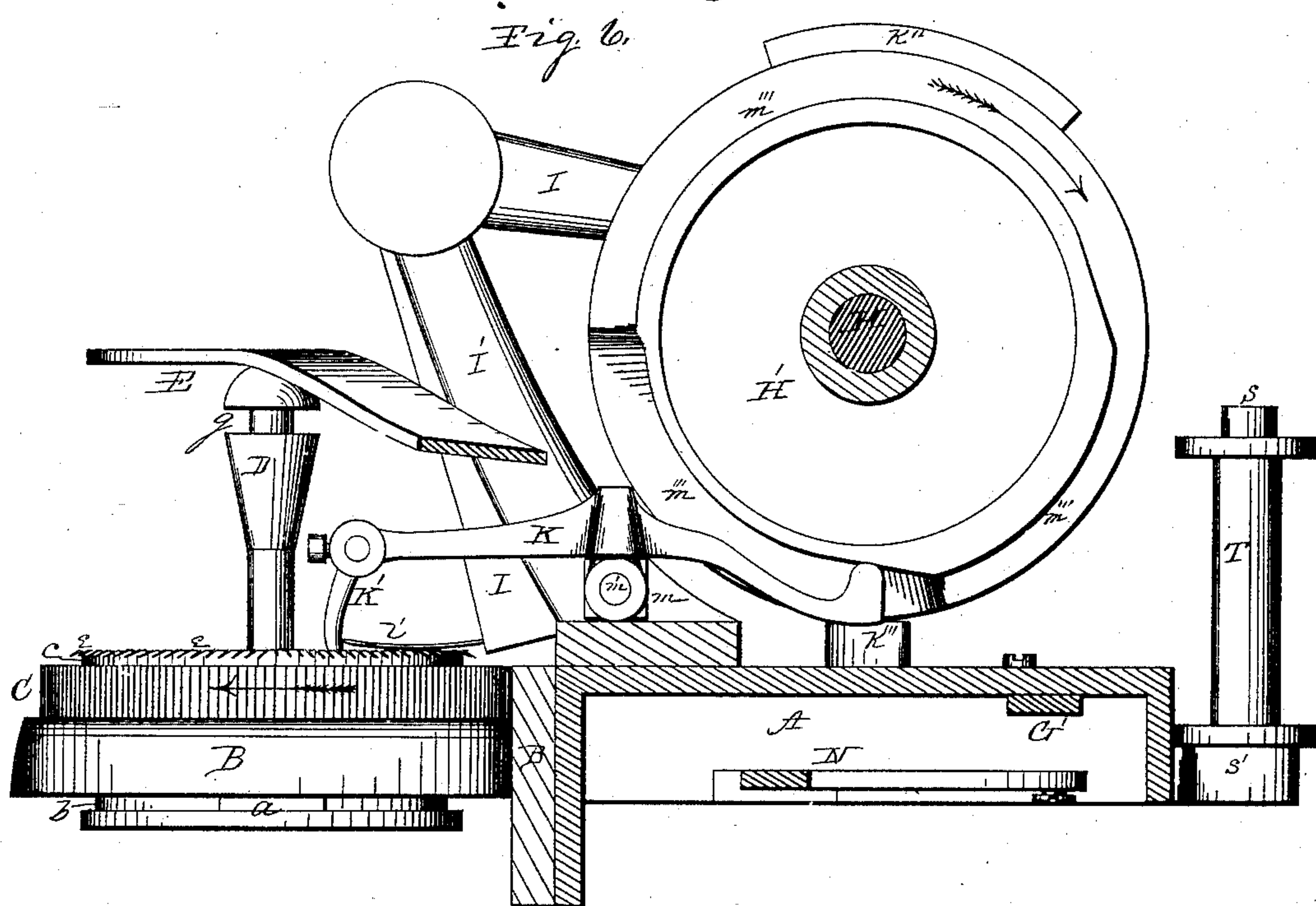
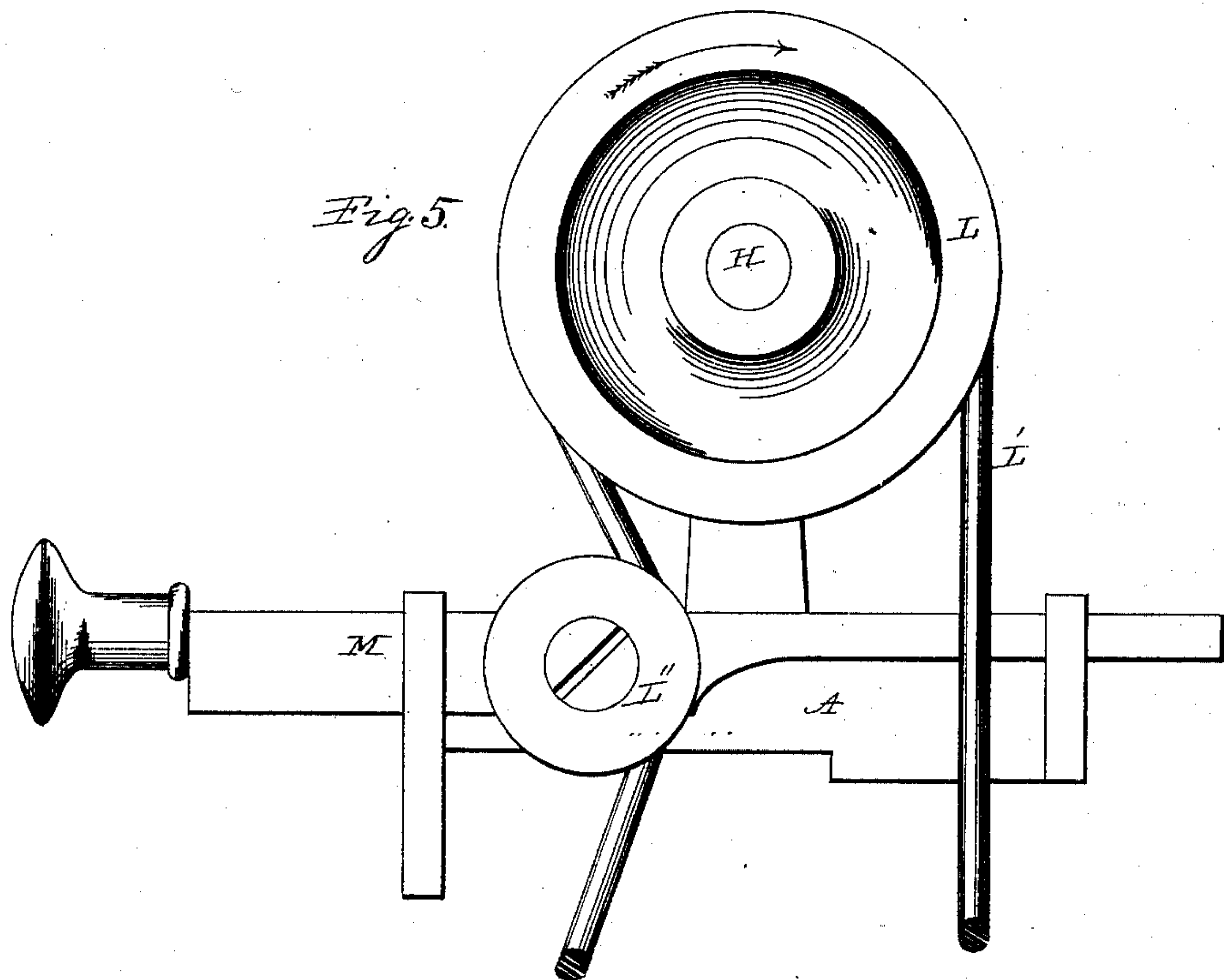
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Patented Dec. 6, 1887.



Witnesses,
F. M. Behel
A. O. Behel

INVENTOR
Alfred Nelson.
Per Jacob Behel
Atty.

(No Model.)

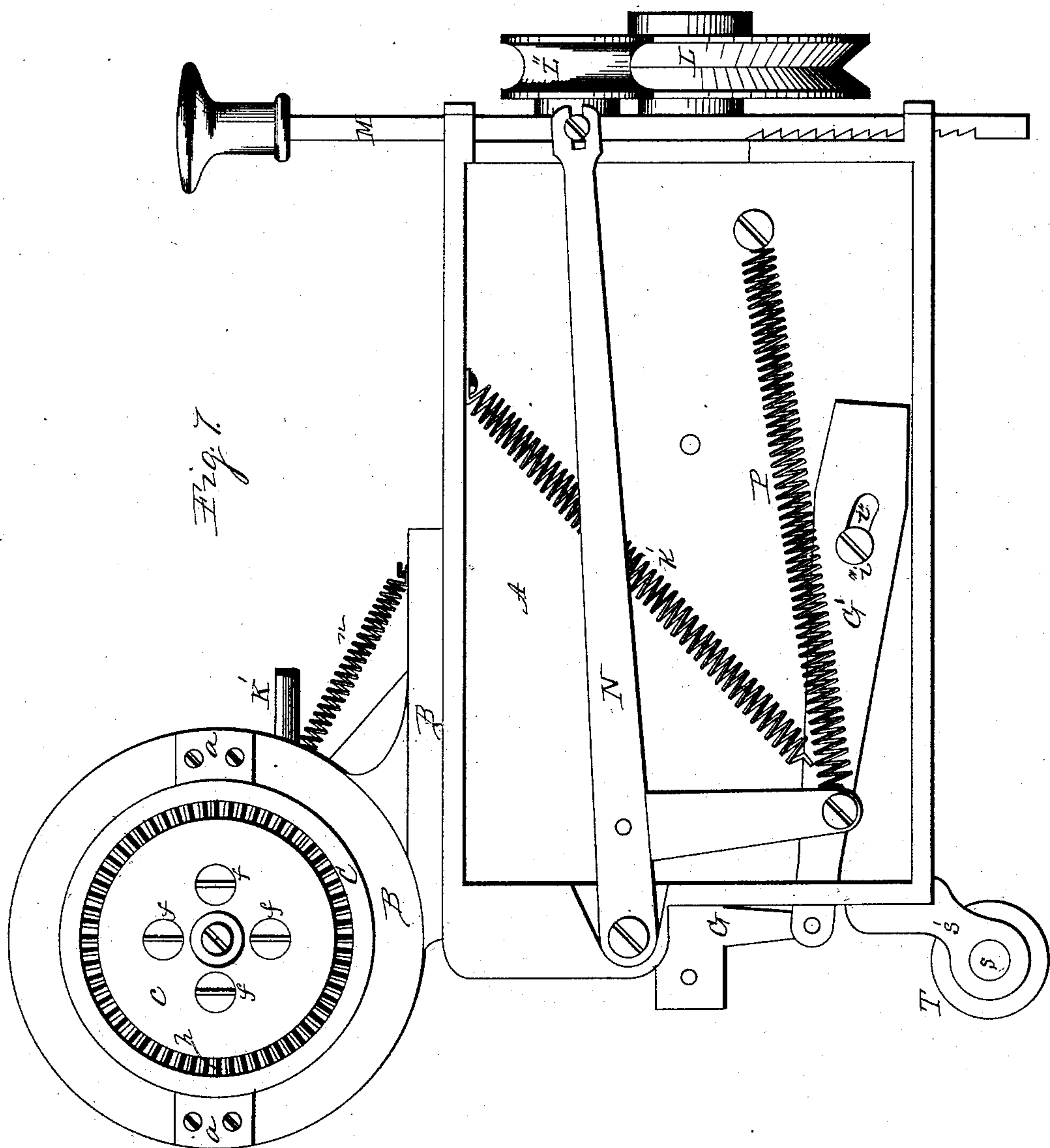
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Witnesses.
J. A. Behel
A. O. Behel

Inventor.
Alfred Nelson.
Per Jacob Behel, Atty.

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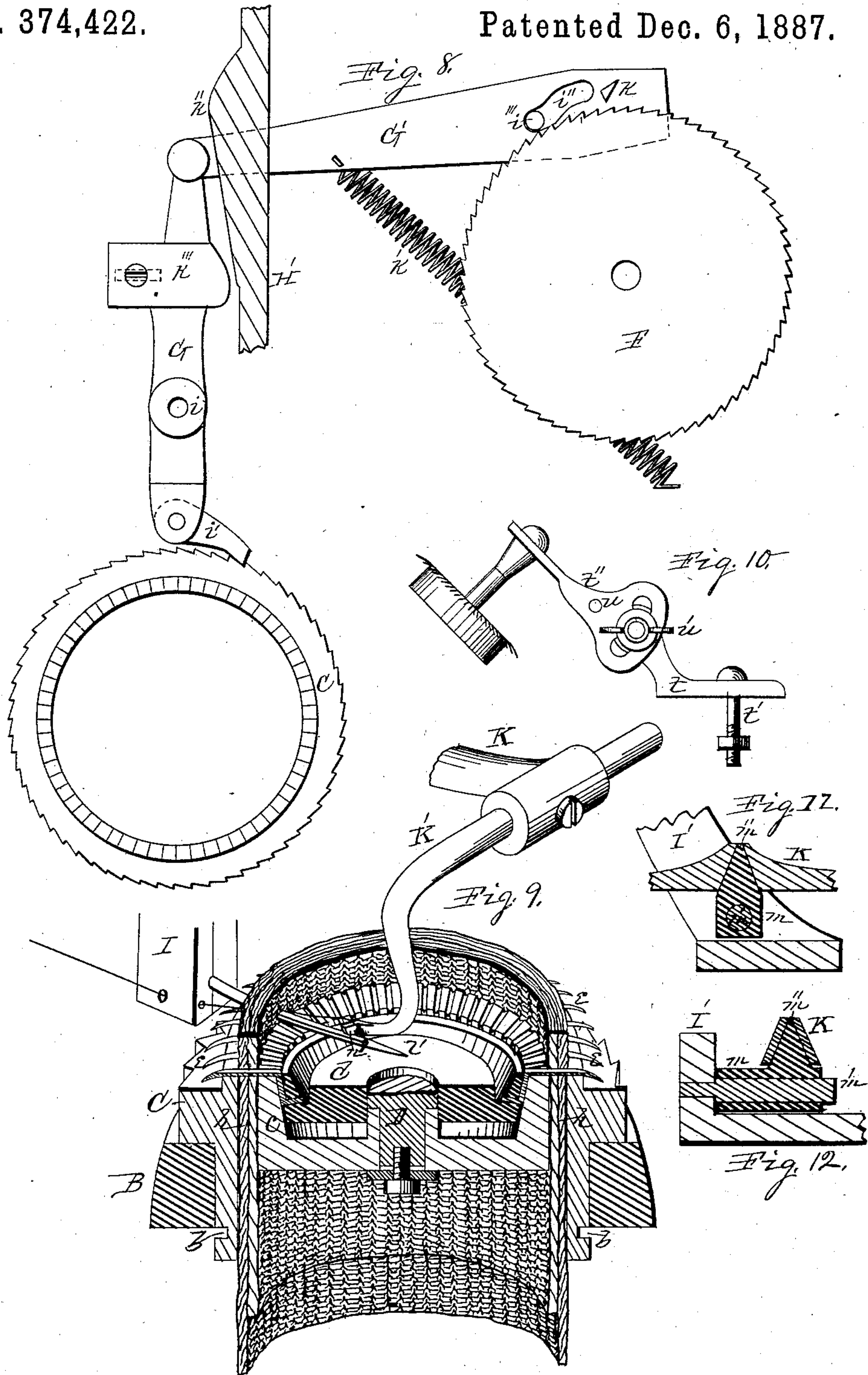
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A. O. Behel

Inventor
Alfred Nelson
Per. Jacob Behel
Atty.

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FIG. 13.

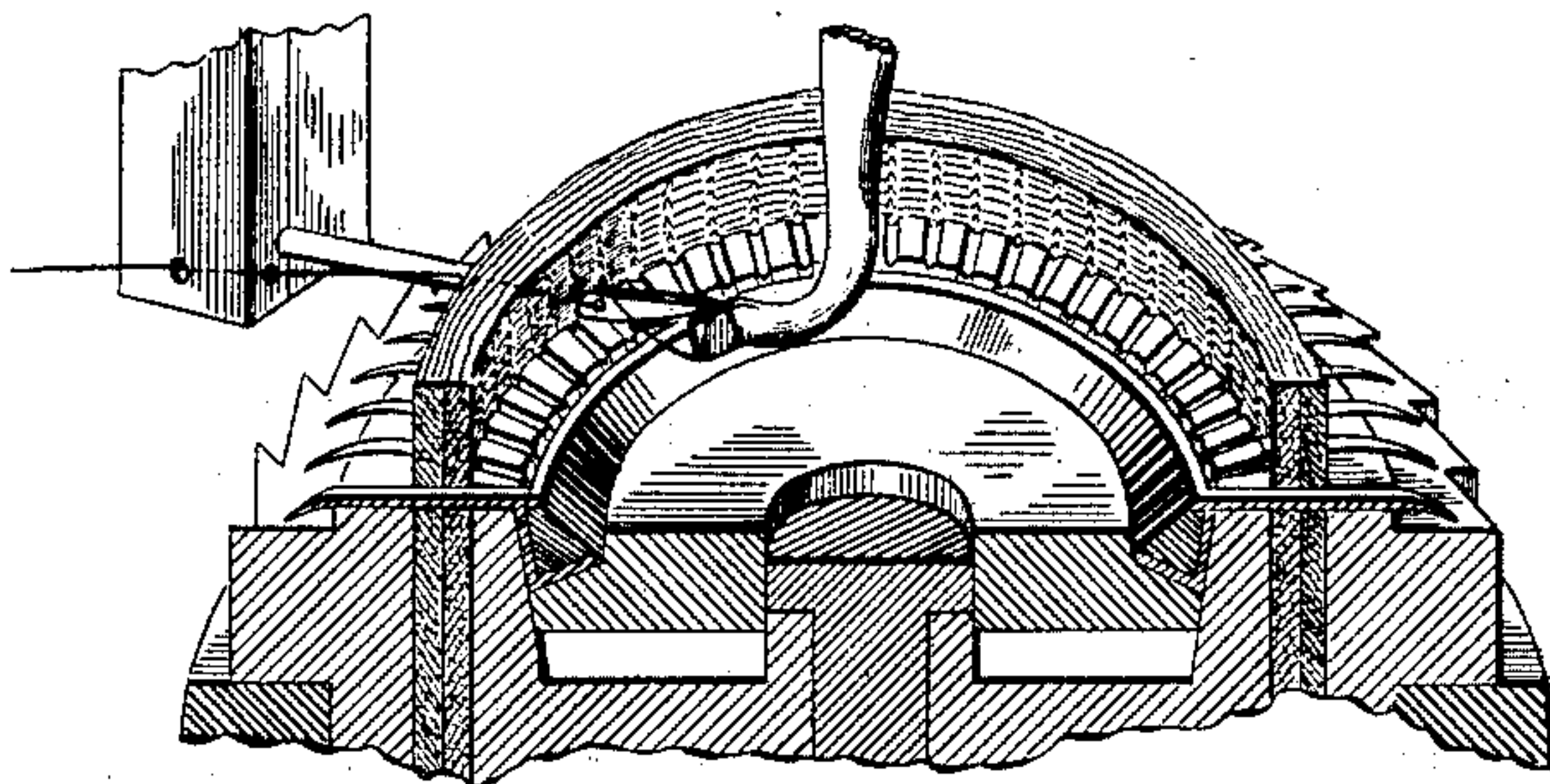


FIG. 14.

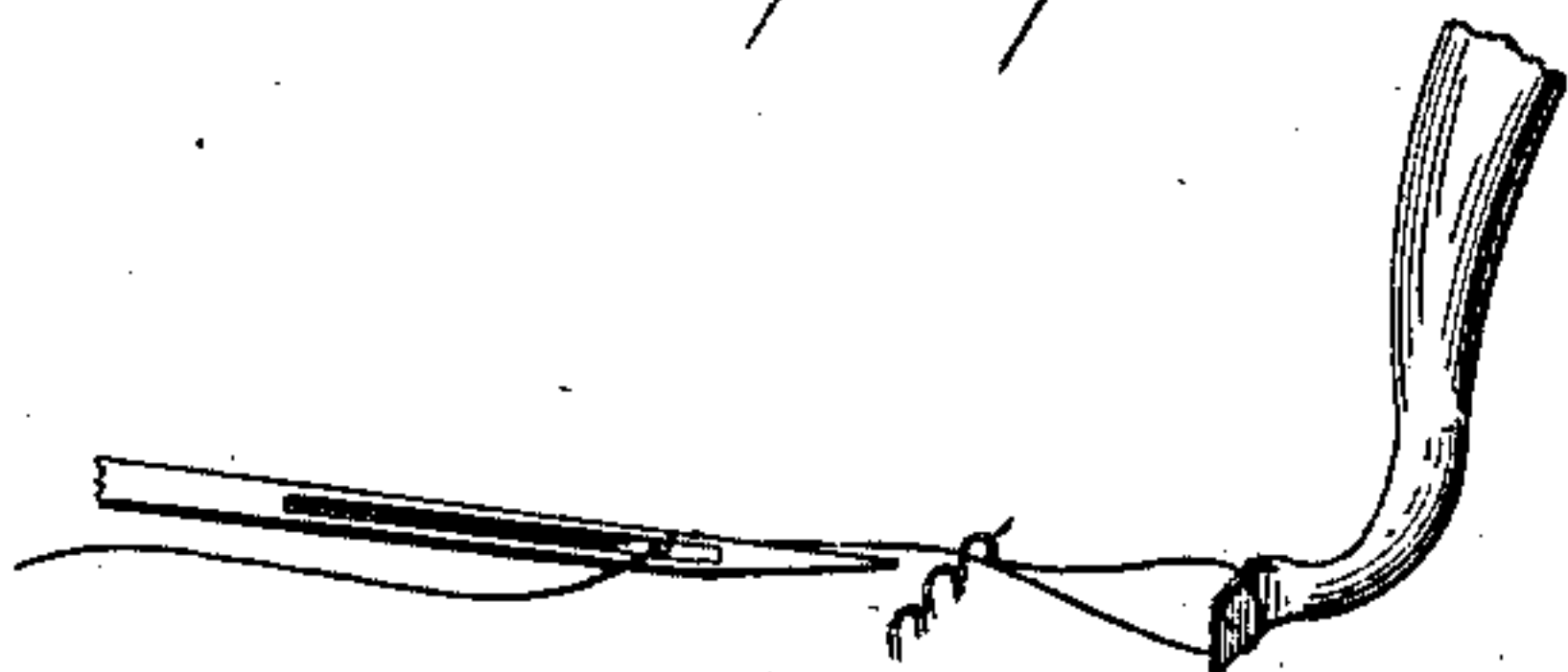


FIG. 15.

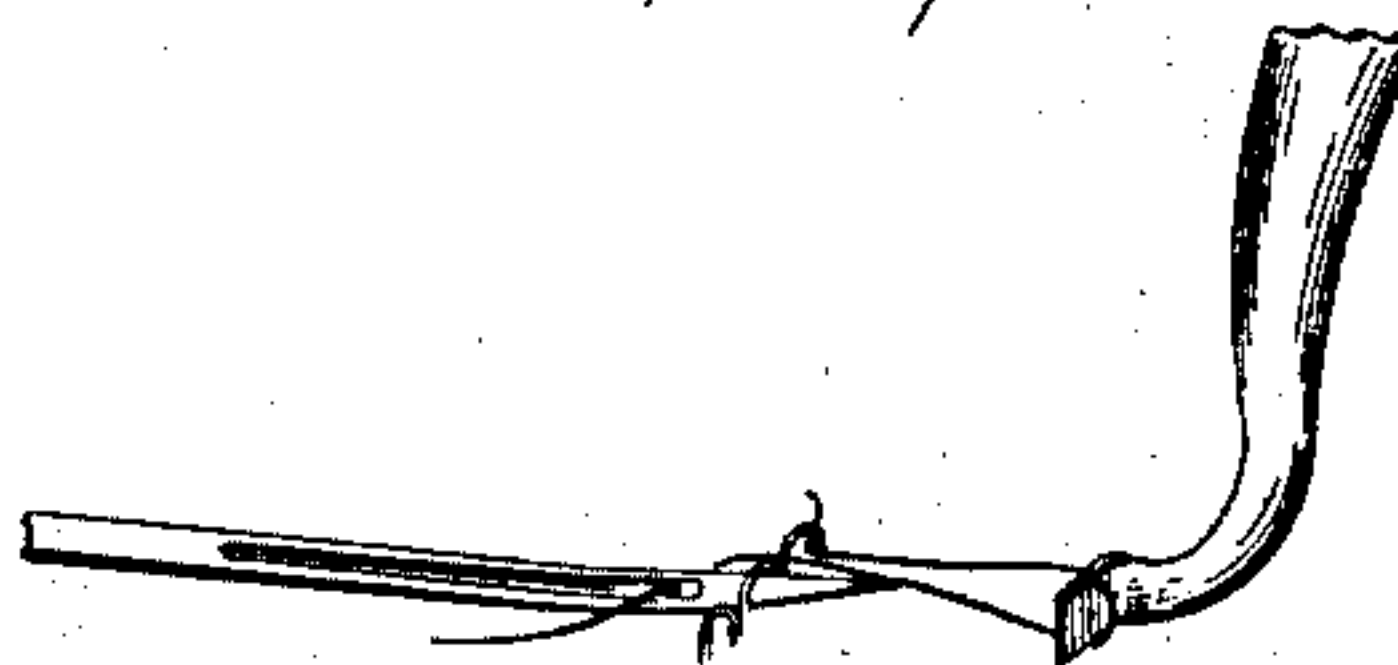


FIG. 16.

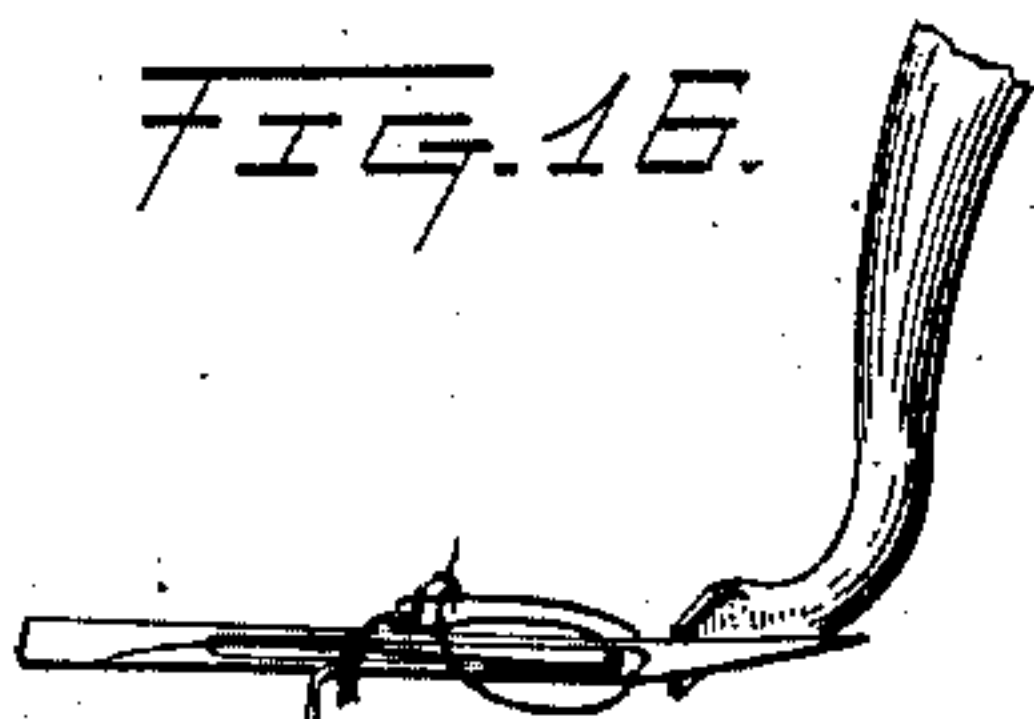


FIG. 17.

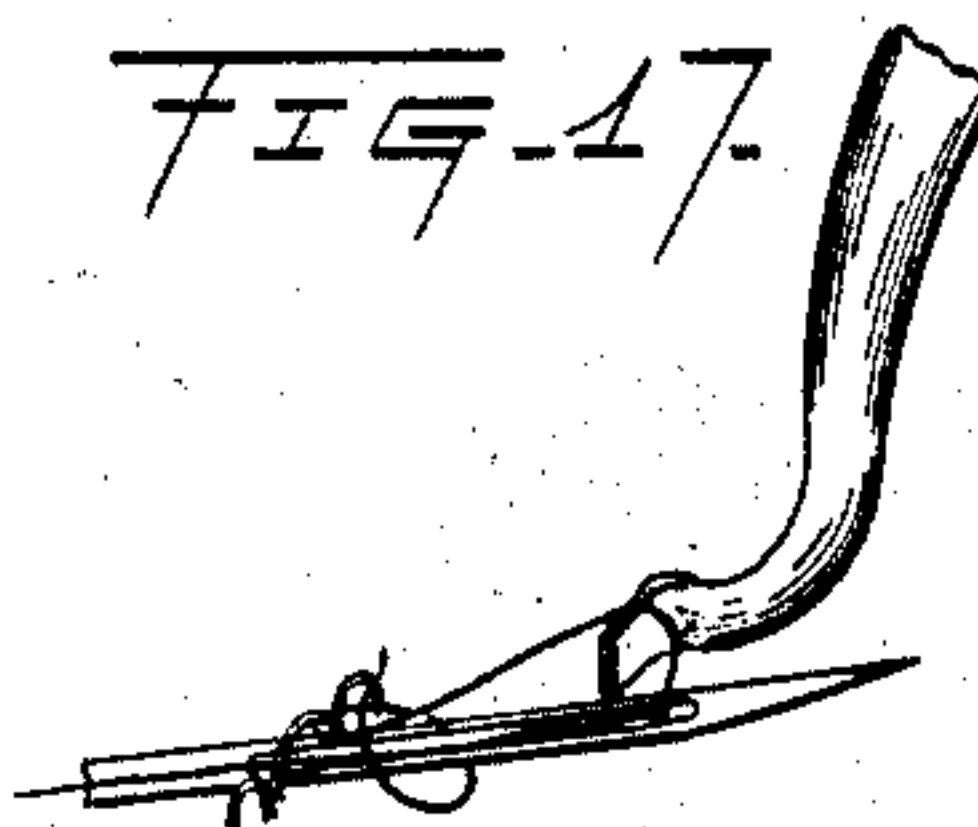


FIG. 18.

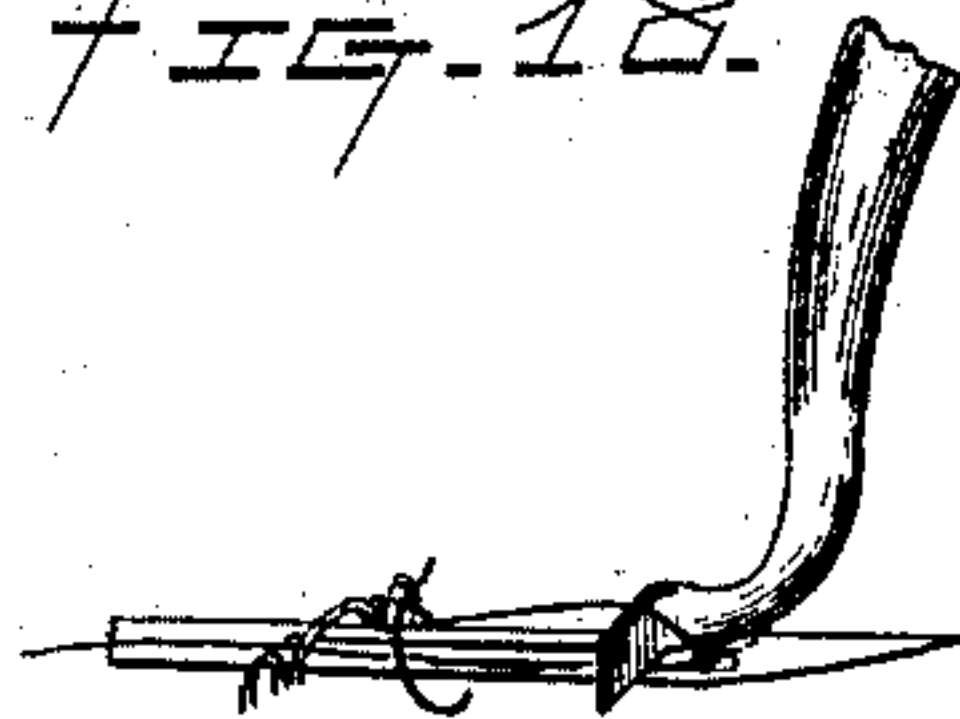


FIG. 19.



Witnesses:

L. G. Conner
A. S. Leathin.

Inventor:

Alfred Nelson
per Benj. R. Leathin

UNITED STATES PATENT OFFICE.

ALFRED NELSON, OF ROCKFORD, ILLINOIS.

MACHINE FOR SEWING LOOPED FABRICS.

SPECIFICATION forming part of Letters Patent No. 374,422, dated December 6, 1887.

Application filed July 20, 1885. Serial No. 172,081. (No model.)

To all whom it may concern:

Be it known that I, ALFRED NELSON, a citizen of the United States, residing in the city of Rockford, in the county of Winnebago and State of Illinois, have invented a new and useful Machine for Sewing Looped Fabrics, of which the following is a specification.

This invention relates to machines for uniting knit fabrics. Its object is to unite the edges of knit fabrics; and it consists in the matters hereinafter described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a front elevation, partly in vertical section, on dotted line 1 on Fig. 1. Fig. 3 is an end elevation with the needle in its forward position. Fig. 4 is also an end elevation with the needle in its rearward position. Fig. 5 is an elevation of the belt end of the machine. Fig. 6 is a transverse vertical section on dotted line 2 on Fig. 1. Fig. 7 is an under face view. Fig. 8 is a plan of the feeding mechanism. Fig. 9 is an isometrical representation in vertical section on dotted line 3 on Fig. 1, with the knit fabrics in place. Fig. 10 is a side elevation of the needle-head holder. Fig. 11 is a vertical central section on dotted line 5 on Fig. 1, and Fig. 12 is a vertical central section on dotted line 4 on Fig. 1. Fig. 13 is a central section on line *z z*, Fig. 1, lower parts being omitted, and showing the needle and looper in the position they assume as the former is about to remove the loop from the latter. Figs. 14 to 18, inclusive, represent several successive positions in order of the needle and looper; and Fig. 19 represents a section of the needle, showing the eye and the groove extending back from the same, in which the thread ordinarily lies.

The working parts of my improved machine are supported on a rectangular base, A, recessed on its under face to receive portions of the operating parts. A supporting-bracket, B, is fixed to the left-hand end of the front edge of the base, projecting in the plane thereof forward, and its forward-projecting portion is bored in annular or ring form. A ratchet-ring support, C, to the pin-supporting head is fitted to rotate in the supporting-bracket B, and is held in place by means of keepers *a*, which enter an annular groove, *b*, formed in the depending end of the ratchet-

ring support, and are fixed to the under face of the supporting-bracket. The upper inner edge of the ratchet-ring support is provided with radial grooves at equal intervals, corresponding in number to the number of work-supporting needles (or pins) to be employed in the pin-supporting head and forming seats therefor.

The pin-supporting head is composed, essentially, of an outer disk portion, *c*, and an inner disk portion, *d*. The inner disk, *d*, is grooved on its periphery in the plane of its axis at proper equal intervals to receive the center shank portion of the pins, and it is bored radially in each of its peripheral grooves to receive the inner shank end of the pins. The work-supporting pins *e* are of the angular bent form shown, having the inner end of their shank portion inserted in the radial holes in the inner disk and their center shank portion resting in the peripheral grooves thereof, and the pins proper, grooved on their upper faces, extend radially outward from the upper face of the disk, having their pointed outer ends slightly curving downward. The outer disk portion, *c*, is recessed on its upper face in cup form, of such dimensions as to receive the inner disk in a manner to grip and hold the pins firmly, and its upper edge is grooved radially at proper equal intervals to receive the radial arms of the pins to give them equal uniform position relatively with each other. Screws *f* are passed through the outer disk and are screw-threaded into the inner disk, and serve to fix the disks firmly to hold the pins in place in a manner to permit their separation to remove injured pins and insert new ones. A center stem, D, rises from the upper face of the disks, and its upper end portion is provided with an annular groove, *g*, for a purpose to be shown hereinafter.

The pin-supporting head complete is placed in the ratchet-ring support, with the pins resting in the radial grooves formed in its upper edge, and a spring-bar, E, pivotally supported on the base, having its free end turned onto the upper end of the central stud, D, serves to hold the pin-supporting head in place in a removable manner; and if from any cause a pin or pins are bent out of line downward the force of the holding spring, in connection with the ratchet-ring support, serves to realign them in working position. The relative diameter of the ratchet-ring support and needle-

head are such as to leave an annular space, *h*, between them to receive the fabrics to be united.

A gage-wheel, *F*, having its periphery fitted in saw-tooth-ratchet form, is supported on the base to rotate on a stud-journal, *h'*, rising therefrom. A spiral spring, *h''*, surrounds the stud-journal *h'*, having one of its ends fixed thereto and the other end thereof fixed to the gage-wheel in such a manner that its spring action tends to carry the wheel in the direction of its inclined teeth. A spring-actuated detent, *F'*, pivoted to the base in position thereon to engage the teeth of the gage-wheel, serves to hold the wheel against the action of the spring *h''*. A pawl-lever, *G*, is pivotally connected at *i* to the base, and its free forward end is provided with a pivoted spring-actuated pawl, *i'*, to engage the teeth of the ratchet-ring support, which teeth correspond in number to the number of work-supporting needles employed.

A pawl-bar, *G'*, is pivotally connected at one end to the rear end of the lever *G* to vibrate therewith, and its inner end is provided with a curved slot, *i''*, to receive a stud-pin, *i'''*, to control the lateral movements of its inner end. The pawl-bar *G'* is provided with a tappet-pawl, *k*, rising therefrom in position to engage the teeth of the gage-wheel in its outward endwise movement to carry the wheel the space of a tooth at each outward stroke. A spring, *k'*, connects the pawl-bar with the base diagonally inward and operates to retract the bar and the lever *G*, with which it connects, to retract the pawls that engage the ratchet-ring support and the gage-wheel.

A shaft, *H*, is supported to revolve in bearings rising from the base, and a cam-wheel, *H'*, is fixed to one of its projecting ends to revolve therewith. The peripheral edge of the cam-wheel *H'* is provided on its outer face with a side enlargement, *k''*, forming a cam to engage a tappet-head, *k'''*, fixed to the pawl-lever, to cause it to vibrate, to impart an intermittent movement to the pin-supporting head and to the gage-wheel.

The tappet-head *k'''* is made adjustable in its connection with the lever by means of a screw-bolt and elongated slot, as indicated in Fig. 8, or in any well-known manner, to regulate the throw of the lever, to impart a greater or less movement to the ratchet-ring and to the gage-wheel.

A needle-bar, *I*, of bell-crank form, is pivoted at its angle-point to a bracket-support, *I'*, rising from the base, and one arm thereof is fitted to travel in a cam-groove, *l*, formed in the outer face of the cam-wheel *H'*, eccentric to its axis of rotation, to impart an oscillatory movement to the free arm of the needle-bar.

An eye-pointed needle, *l'*, with thread-groove in its outer face, is adjustably fixed in the free end of the needle-arm to oscillate therewith, and in its oscillations will move endwise in the grooved upper surface of the work-supporting pins fixed in the needle-head.

In each revolution of the cam-wheel *H'* the side cam, *k''*, will engage the tappet-head *k'''* and vibrate the lever to which it is fixed, and by means of the pawls connected with the lever and with the pawl-bar will impart an intermittent movement to the gage-wheel and to the ratchet-ring support, which will carry with it the pin-supporting head a distance equal to the space between its pin-centers to place one of its pins in the path of the eye-pointed needle. During the period of rest in the gage-wheel and pin-supporting head the pointed needle, by means of its connection with the cam-wheel, will be made to move forward and rearward in the grooved upper surface of the work-supporting pins.

The fulcrum-support *m* of the looper-carrying lever *K* is supported to oscillate on a stud-journal, *m'*, projecting laterally from the bracket-support of the needle-bar; and this fulcrum-support *m* is provided with a conic-formed bearing, *m''*, rising from its upper face, forming the fulcrum on which the looper-carrying lever *K* oscillates horizontally, and which, in connection with the oscillatory movement of the fulcrum-support, permits a vertical and horizontal oscillatory movement of the lever mounted thereon.

The looper-carrying lever *K* is detachable in its connection with its conic fulcrum, and its rear end engages a trackway, *m'''*, produced on the inner face of the cam-wheel *H'*, of a conformation to impart the required movement to the looper *K'*, supported in the free forward end of the lever. A spring, *n*, connects the forward end of the lever with the base, and, having an oblique action, operates to hold the rear end of the lever to the cam-trackway *m'''* on the inner face of the cam-wheel and hold the lever on its conic fulcrum in a manner to be readily lifted therefrom and replaced.

The arm of the looper *K'* is placed in the free end of its carrying-lever, and is made adjustable in its connection therewith by means of a set-screw to cause its hook end *n'* to lift the thread from the inner face of the needle, carry it upward and outward to form the loop in the withdrawal or rearward movement of the needle, and hold it in position to receive the needle on its return or forward movement.

A driving-sheave, *L*, to receive a driving-belt, *L'*, is fixed on the projecting end of the shaft *H*, and a tightening-sheave, *L''*, is supported to revolve on a stud-journal projecting from a slide-bar, *M*, supported to move endwise in guides fixed to the base. A bell-crank lever, *N*, placed on the under face of the base, is pivoted at one end thereto, and its slotted free end has a free connection with the under edge of the slide-bar. A spring, *P*, connects the short arm of the bell-crank lever with the base and operates to carry the slide-bar forward when liberated.

The inner face upper edge of the slide-bar is provided with a tappet enlargement, *o*, which, in its forward-movement, will engage the free arm of the spring-actuated detent *F'* to disen-

gage its pawl end from the gage-wheel. The rear end portion of the slide-bar M is provided on its inner face with ratchet-teeth to receive a detent.

5 A detent, R, having its outer end fitted to engage the ratchet-teeth of the slide-bar, is capable of an endwise-sliding movement in its connection with the base, and a spring, *p*, connected with the slide-detent and with the base, tends to hold it engaged with the slide-bar. 10 The inclined sides of the detent and of the teeth in the slide-bar permit a rearward movement of the bar, and the engagement of their perpendicular sides prevent its return until liberated. 15 The inner end of the slide-detent is provided with a hook-arm, *p'*, which overlaps the upper face of the gage-wheel in position to impinge a stop, *p''*, fixed to the upper face of the wheel. This stop *p''*, in the movement of the wheel when carried by the tappet-pawl *k*, will engage the hook-arm *p'* of the slide-detent and disengage it from the slide-bar and permit said slide-bolt to move forward by the action of the spring *P*, assisted by the action 25 of the driving-belt on the tightening-sheave, or by the independent action of either the spring or the belt. This forward movement of the slide-bar by means of its tappet enlargement *o* will disengage the spring-actuated detent *F'*, when the gage-wheel will be carried back by the action of the spring *h''*, connecting it with its stud journal support until the stop *p''* engages the inner side of the hook-arm of the slide-detent to stop the movement of the wheel. 35 The stop mechanism above described, including the driving and movable pulleys, gage-ring, ratchet-ring, and intermediate parts, is not herein claimed, broadly, or independently of the sewing-machine proper, as it is made the subject of a separate application filed October 7, 1886, and numbered 215,595.

A spool, T, to contain the yarn employed to connect the fabrics, is supported on a spindle, *s*, rising from a foot-bracket, *s'*, fixed to the base. From the spool T the thread is passed 45 through the eye *s''* in the needle-arm and thence through the eye of the needle.

For the purpose of supporting the needle-head in a convenient manner to put the fabric in place thereon, I have constructed a bracket consisting of a foot portion, *t*, provided with a bolt, *t'*, to fix it in place on a table or in other convenient position, and a head-supporting portion, *t''*, centrally slotted at its upper end 55 to receive the grooved upper end of the central stud, D, of the pin-supporting head.

The head-supporting portion *t''* is pivotally connected at *u* to the foot portion *t*, and by means of its segment-slot and thumb screw 60 connection with the foot portion is made adjustable to place the pin-supporting head supported therein at a suitable angle.

In use the fabrics to be united or joined to each other are placed on the work-supporting pins in the consecutive order of the loops or 65 stitches of which the fabric is formed, either in the selvage stitches or at any point in the

fabric desired, but in such a manner that the fabrics to be joined will depend from the pins. The pin-supporting head with the work in place thereon is then placed in the ratchet-ring support, with the fabrics depending therefrom, and is held in place by means of the pivoted holding-spring placed on the center stud of the needle-head. The thread from the spool 70 is then passed through the eye in the needle-bar and through the eye of the needle. The slide-bar carrying the tightening-sheave is then shoved rearward to cause the driving-belt to embrace the driven sheave to impart 75 motion to the operating parts and cause the needle to move forward in the grooved upper face of the work-supporting pins through the loop or stitch of the fabrics supported thereon; and in the return movement of the needle the 80 looper will lift the thread from the inner face of the needle, carry it upward and outward over the needle, form and hold the loop to receive the needle in its next forward movement, and then in its downward and inward movement will withdraw from the loop, delivering 85 it to the needle, which will be withdrawn therefrom on its next rearward movement. After the withdrawal of the eye-pointed needle, the work-supporting head and the gage-wheel will both be carried forward one space, 90 placing the next work-supporting pin in the track of the eye-pointed needle to repeat the operation just described to produce a second stitch. This operation will be repeated until, 95 by the movement of the gage-wheel, the slide-bar is liberated to stop the machine and to permit the gage-wheel to return to engage the stop-arm of the slide-pawl.

In Fig. 14 are diagrammatically represented 105 the positions of the looper and needle after the latter has been withdrawn from a loop or stitch supported on a work-supporting pin, and also from a newly-formed loop previously taken from the looper by the moving needle, as will be explained. These supported stitches are 110 shown as broken away as to their lower part and connecting-stitches, and the work-supporting pins are omitted. This withdrawal of the needle in its extreme rearward movement 115 leaves a thread in the supported loop and in the newly-formed loop, (shown in Figs. 16, 17, and 18,) and this thread extends around the looper back through the said loop to the loop or stitch last formed and cast off from the eye-pointed needle. 120

Fig. 15 represents the parts after the next work-supporting pin (not shown) and the loop supported thereon has been brought into the path of the returning needle and the said 125 needle has entered said loop. The next position of the needle, or the one which it assumes just before receiving a loop from the looper, may be seen in Fig. 13.

Fig. 16 exhibits the loop after the looper 130 has been withdrawn by an inward (or backward) and downward movement and the needle still farther advanced to receive said loop.

Fig. 17 represents the extreme forward po-

sition of the needle and the position assumed by the looper when it has risen from that represented in Fig. 16 and engaged the thread preparatory to the formation of a new loop.

Fig. 18 represents the looper advanced outward or to the front of the needle to securely hold the loop while the needle is withdrawn to the position indicated in Fig. 14; but during this movement the looper is lowered, so that the returning forward movement of the needle will bring its point above the looper, as indicated in Fig. 13.

It will be understood that every time the needle moves forward it carries a doubled thread through a loop of the supported fabric and through a newly-formed loop received from the looper, and that this doubled thread is held by the looper while the needle returns in its backward movement, preparatory to carrying the thread into the next loop of the fabric.

It is of course obvious that the work might be thrust upon the supporting-pins without particular care in respect to the arrangement of the loops upon such pins and the machine operated with a useful effect.

The relative number of the teeth in the ratchet-ring support and in the gage-wheel are such that the joining of the fabrics shall overlap a suitable number of stitches to prevent raveling. After the joining of the fabrics, the joining-thread is broken, the holding-spring removed, the looper-carrying lever, with looper fixed therein, is disengaged from its fulcrum-support, and the pin-supporting head with the joined fabrics thereon is removed from the machine, and the fabrics are then stripped from the work-supporting pins, and if the fabrics have been joined in their selvage edges the work will be completed when stripped from the pins. If the fabrics have been joined at any other point than the selvage, the surplusage of the fabrics is raveled, leaving them joined complete.

In this construction of machine I prefer to employ a sufficient number of pin-supporting heads and place the fabrics thereon to meet the capacity of the machine.

In order to adapt my improved machine to work varying in the number of stitches, a series of pin-supporting heads varying in the number of their pins to correspond to the number of stitches in the various fabrics and ratchet-supporting rings corresponding to the pin-supporting heads, may be employed.

In the employment of pin-supporting heads containing a less number of pins than the teeth in the gage-wheel require, an additional stop, *u''*, preferably of screw-stud form, is made adjustable in its connection with the gage-wheel to the number of teeth therein corresponding to the number of pins in the head employed.

I am aware that heretofore several of the matters hereinbefore described have been used in various combinations. For example, the looper has been constructed and arranged to

move in different planes or in a direction resulting from the operation of mechanism tending to revolve it around each of two axes. Such matters are not herein claimed, except substantially as hereinafter pointed out. My construction in this respect is simple and convenient. The looper-carrying arm can be readily placed upon and removed from its conical bearing, upon which it is ordinarily held by the spring, which also insures contact between the rear end of the arm and the face of the cam-wheel. The conical bearing embraced in the combination is desirable, for the reason that it is not easily injured by wearing.

I am aware that a cross-head carrying a pawl to operate a ratchet-wheel has been affixed to a shaft and a somewhat complex mechanism provided for moving said shaft endwise, whereby the pawl was caused to actuate the wheel, and that the throw of the pawl-carrying lever or cross head was varied by means of an adjustable screw, and claim is not herein made, broadly, to means for adjusting the throw of the pawl-carrying lever in organizations of the same general nature as that herein set forth.

I am also aware that looper-arms have been pivoted and that a shuttle-lever has been supported by a double-cone bearing adjustably held by means of a pendent bolt and jam-nuts, and that an adjustable sleeve tapered in form has been employed in connection with a journal. Such constructions are not of my invention; but my claim is limited to a construction hereinafter pointed out and embracing a conical bearing whereby the looper-arm is not only adapted to be readily removed or replaced, being securely held without a nut or fastening device other than the spring which holds it in engagement with the cam-wheel, but will always when in place rest closely upon its seat or pivot, notwithstanding the wear of the bearing. Ordinary pivot-supports are defective in that when the parts become worn the wear cannot be compensated for except by renewal or by a readjustment of parts. Such adjustable parts are rendered unnecessary by my improvement.

I am also aware that pin supporting heads have been made removable, and I do not broadly claim such feature. The means which I employ to hold the head in place are simple and easily operated to allow removal. They also serve to maintain the alignment of the work-supporting pins, which function is secured by a novel construction.

I claim as my invention—

1. In a machine for sewing looped fabrics, the combination of stitch-forming mechanism, a supporting-head for work-supporting pins, consisting of an inner and outer disk, the inner disk being fitted to receive work-supporting pins and the outer disk grooved on its upper edge and recessed to receive the inner disk, means for securing the disks together to clamp and hold the pins, and mechanism to rotate the head, substantially as set forth.

2. The combination, with the removable

pin-supporting head, ratchet-ring, and its support, of a stud in the axis of the head and a spring bearing upon the stud and holding the head to its seat on the ring, substantially as set forth, whereby the alignment of the pins is ordinarily maintained and the occasional removal of the head permitted.

3. The combination of driving mechanism, a ratchet-ring, a pin-supporting head and stitch-forming mechanism, a gage-wheel, mechanism for moving the gage-wheel synchronously with the pin-supporting head, a slide-bar or releasing device to arrest the driving mechanism, provided with an enlargement for releasing a detent from the gage-wheel, and said detent, substantially as specified.

4. The combination of driving mechanism, a ratchet-ring, a pin-supporting head and stitch-forming mechanism, a gage-wheel, mechanism for moving the gage-wheel synchronously with the pin-supporting head, a slide-bar or releasing device to arrest the driving mechanism, provided with an enlargement for releasing a detent from the gage-wheel, said detent, and a spring adapted to return the gage-wheel to its initial position, substantially as specified.

5. The combination of driving mechanism, a pin-supporting head, stitch-forming mechanism, a gage-wheel, mechanism to move the gage-wheel synchronously with the pin-supporting head, a spring tending to revolve the gage-wheel to its initial position, a detent normally opposing the tendency of the spring, a stop or projection on the gage-wheel, and mechanism set in operation by the stop to release the detent and allow the spring to act, substantially as set forth.

6. The combination of the stitch-forming mechanism, a gage-wheel, mechanism for moving the gage-wheel forward intermittently and synchronously with the stitch-forming mechanism, a spring tending to move the wheel to its initial position, a stop to arrest the wheel at such position, a detent, and mechanism for disconnecting the driving mechanism from the source of power, substantially as set forth, whereby the wheel can be adjusted to be moved by a predetermined number of teeth and then restored to its initial position.

7. The combination of the driving-shaft, the cam-wheel carried by said shaft, a pivoted pawl-bar provided with a tappet, a pawl-lever connected to the pivoted bar, a ratchet-wheel, a pin-supporting head, and a gage-wheel, all constructed and arranged substantially as shown, whereby the ratchet and gage wheels may be synchronously moved.

8. The combination of the driving-shaft, the cam-wheel carried by said shaft, a pivoted pawl-bar provided with an adjustable tappet, a pawl-lever connected to the pivoted bar, a ratchet-wheel, a pin-supporting head, and a gage-wheel, all constructed and arranged substantially as shown, whereby the ratchet and gage wheels may be synchronously moved and the throw of the pawl-bar varied.

9. The combination of the ratchet-ring and pin-supporting head, the gage-wheel, mechanism for moving the gage-wheel synchronously with the pin-supporting head, a slide-bar to arrest the driving mechanism, a movable detent for said bar, and a stop on the gage-wheel engaging with said detent and releasing the slide-bar, substantially as set forth.

10. The combination of the ratchet-ring and pin-supporting head, the gage-wheel, mechanism for moving the gage-wheel synchronously with the pin-supporting head, a slide-bar to arrest the driving mechanism, a movable detent for said bar, and an adjustable stop on the gage-wheel engaging with said detent and releasing the slide-bar, substantially as set forth.

11. The combination of a cam-wheel, oscillating needle, a lever carrying a looper, said lever having a bearing upon a conical pivot or support, which latter is supported and made revoluble about an independent axis or journal, and a spring to hold the lever upon the conical fulcrum or pivot and against the wheel, substantially as set forth.

12. In a machine for joining looped fabrics, the combination of the looper-carrying lever, the conical fulcrum or pivot entering a similarly-shaped bearing in the under side of the lever, the latter resting removably upon and automatically adjusting itself to its bearing, being supported both in vertical and lateral directions by the inclined surface of the pivot, and mechanism for operating the lever and looper, substantially as set forth.

13. The combination of the driving mechanism and main shaft, the cam-wheel 17 on said shaft, having cams upon both faces, one of said cams contacting with the needle-operating lever and the other with the looper-operating lever, the needle and its lever, the looper and its lever, and the pin-supporting head located immediately below the looper and needle, substantially as set forth.

14. The combination of the removable pin-supporting head, its grooved stud, and the head-supporting bracket provided with a slotted extension, t^2 , engaging the groove of the stud, substantially as set forth.

15. The combination of the removable pin-supporting head, a stud or stem secured to the pin-supporting head, a supporting-ring to receive the head, and a spring pressing upon the stud to hold the head removably in place and serving to realign any pins that may be accidentally bent, substantially as set forth.

16. The combination of the removable pin-supporting head, a stud or stem secured to the pin-supporting head, a supporting-ring to receive the head, and a pivoted spring pressing upon the stud to hold the head removably in place and serving to realign any pins that may be accidentally bent, substantially as set forth.

ALFRED NELSON.

Witnesses:

JACOB BEHEL,
A. O. BEHEL.