

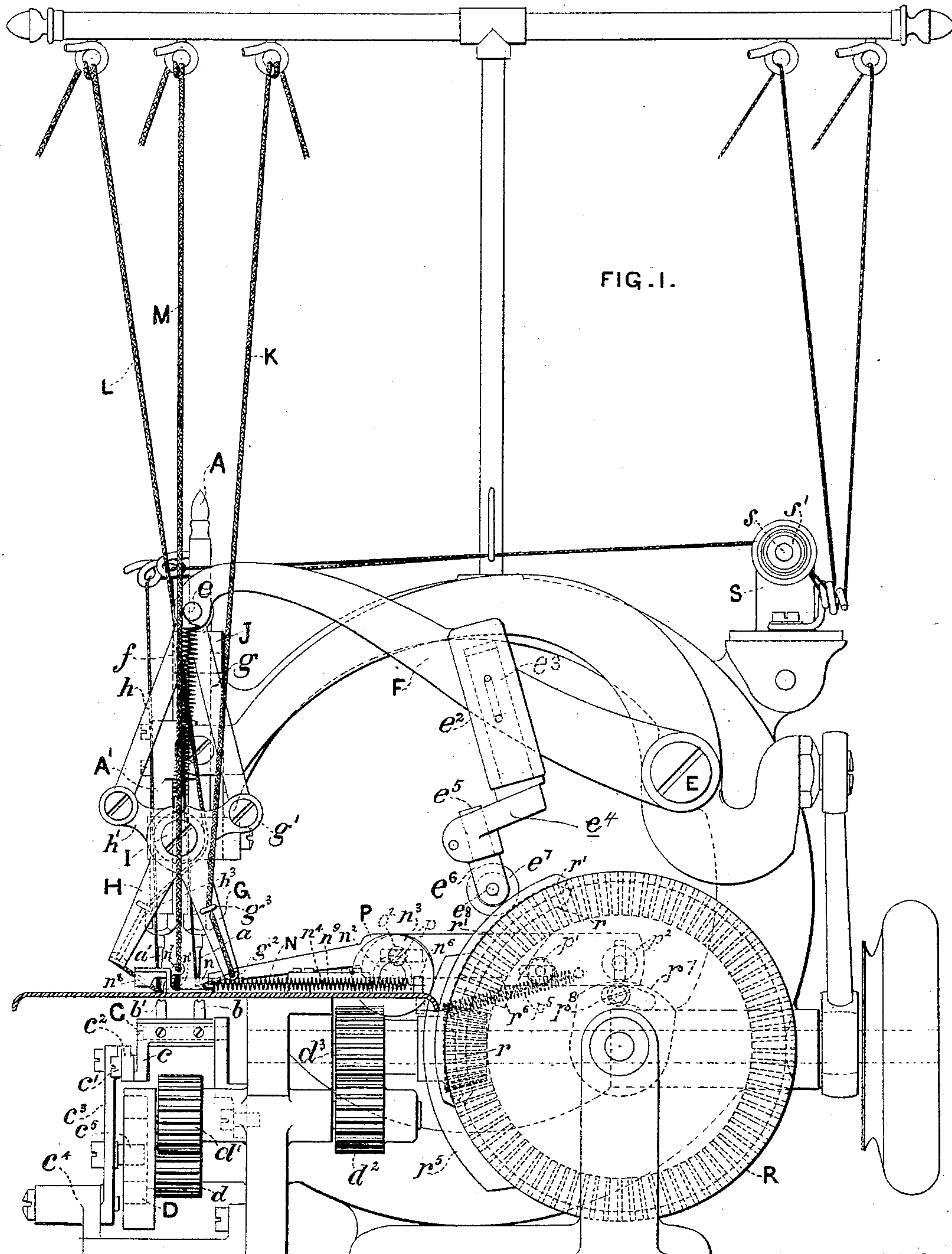
(Model.)

4 Sheets—Sheet 1.

J. C. GOODWIN.
SEWING AND EDGING MACHINE.

No. 450,793.

Patented Apr. 21, 1891.



WITNESSES:

R. A. Nash
J. F. Corson

INVENTOR:

Julius C. Goodwin
per Geo. H. Vauclant
Atty

(Model.)

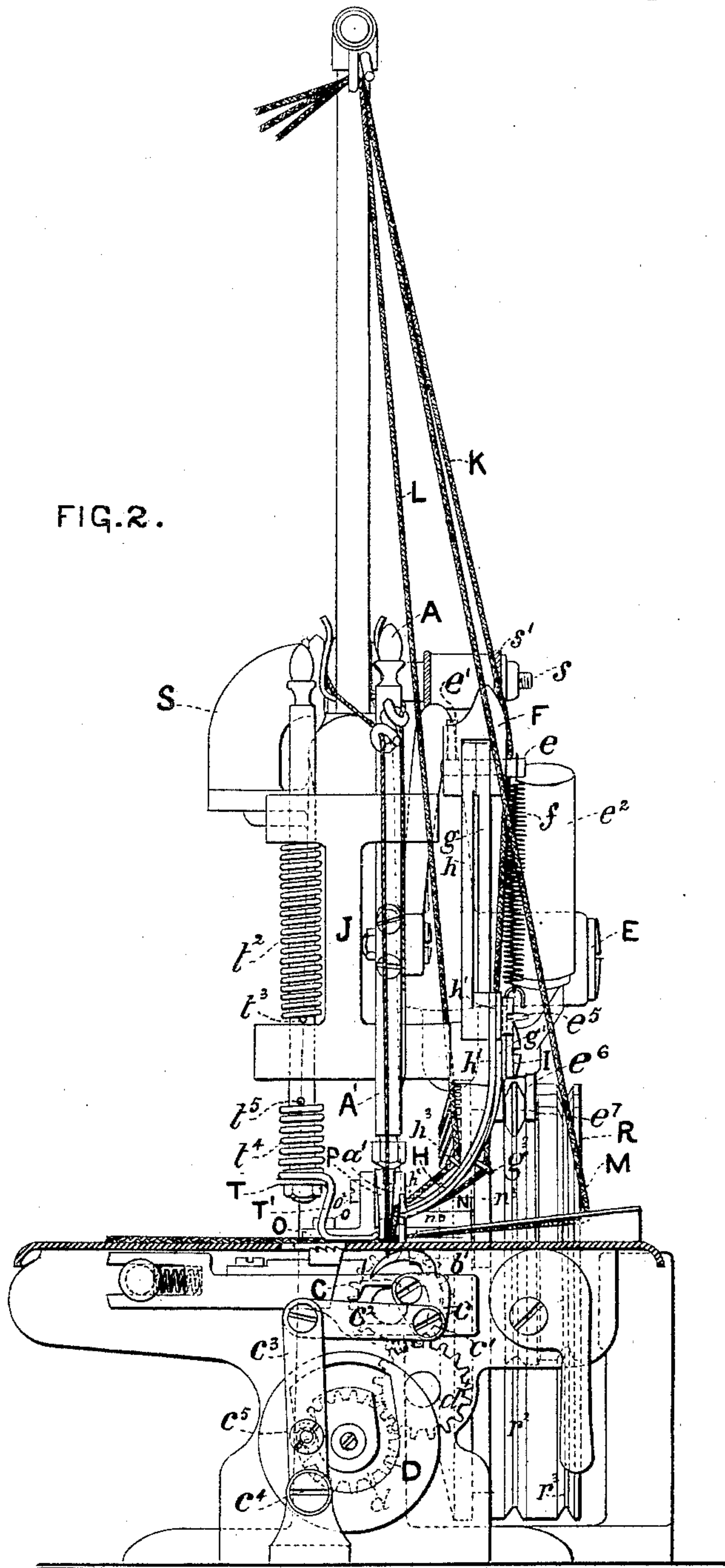
4 Sheets—Sheet 2.

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SEWING AND EDGING MACHINE.

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Patented Apr. 21, 1891.

FIG. 2.



WITNESSES:

R. A. West
J. F. Gordon

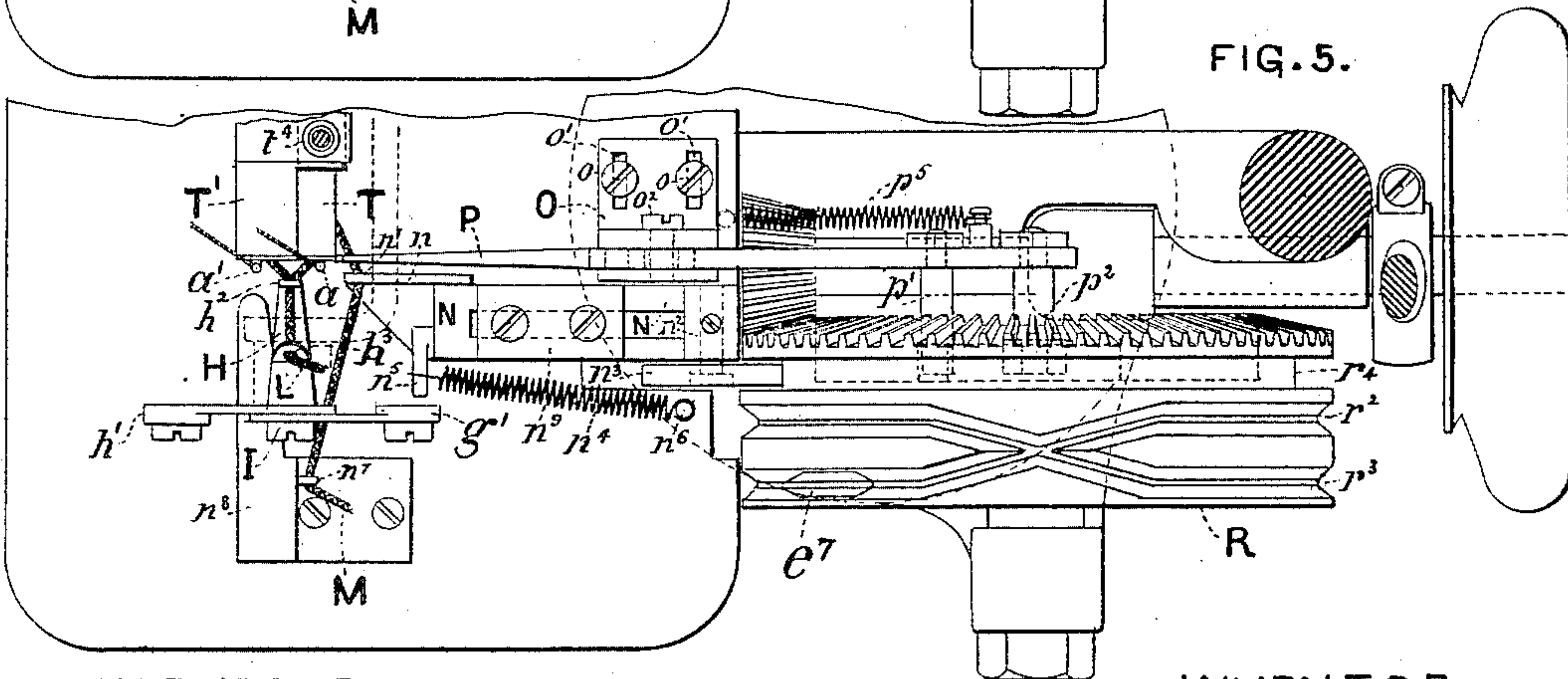
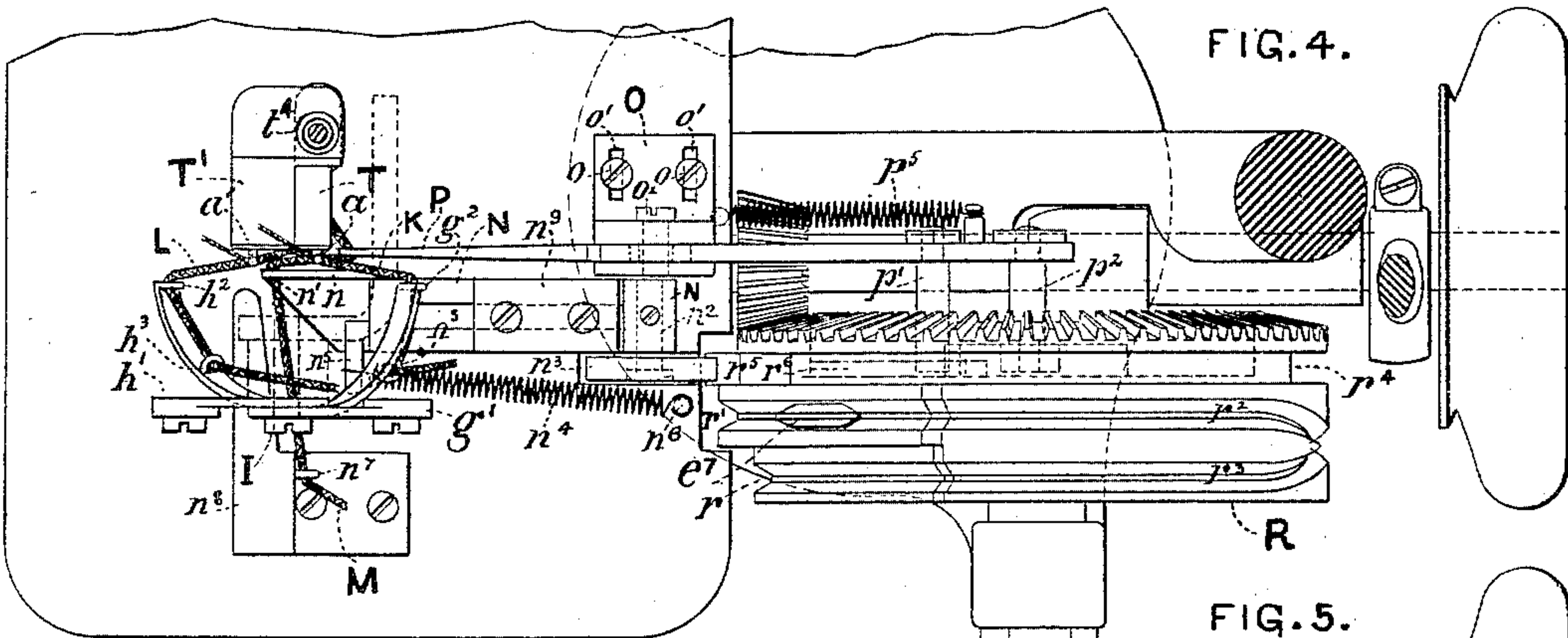
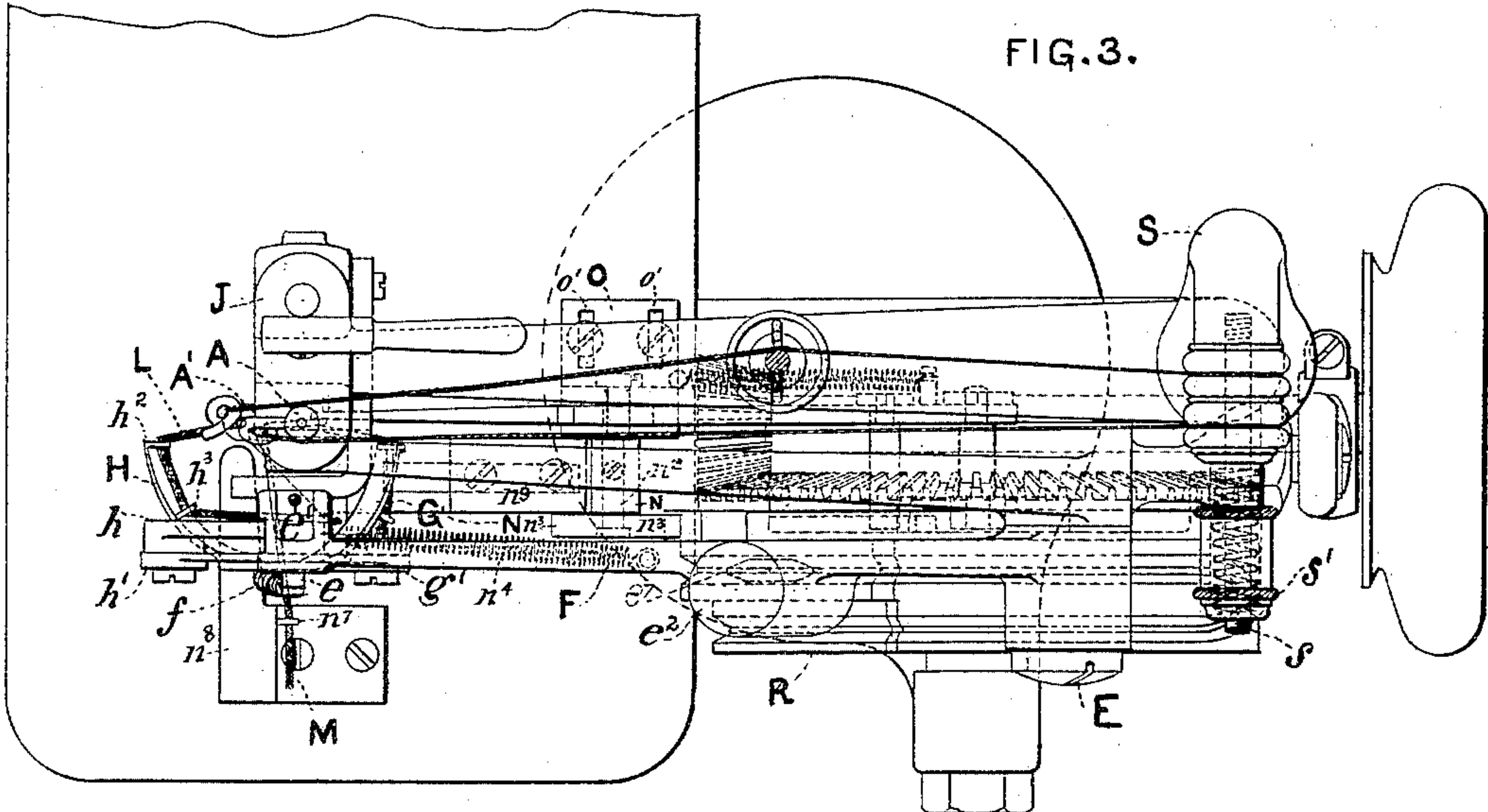
INVENTOR:

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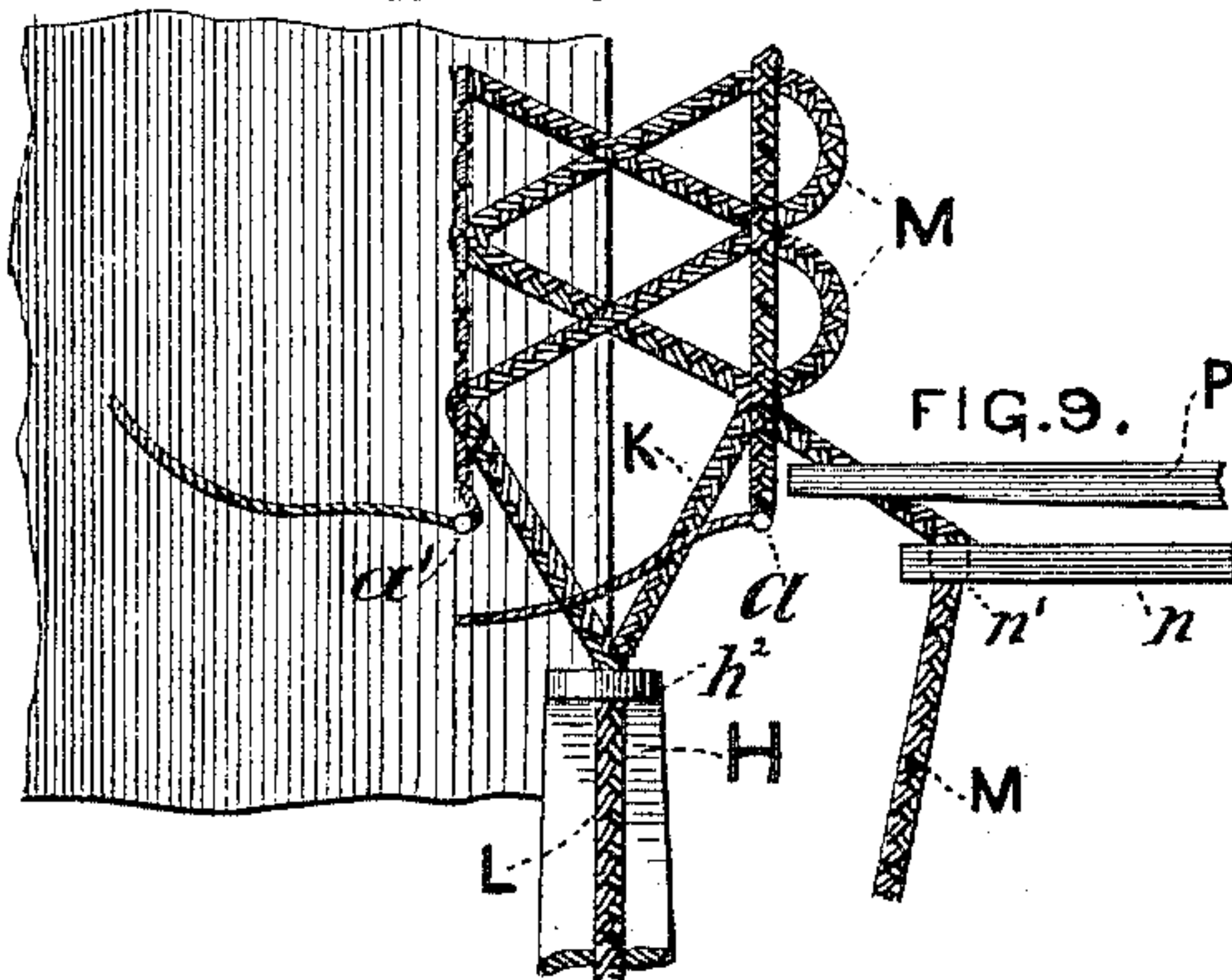
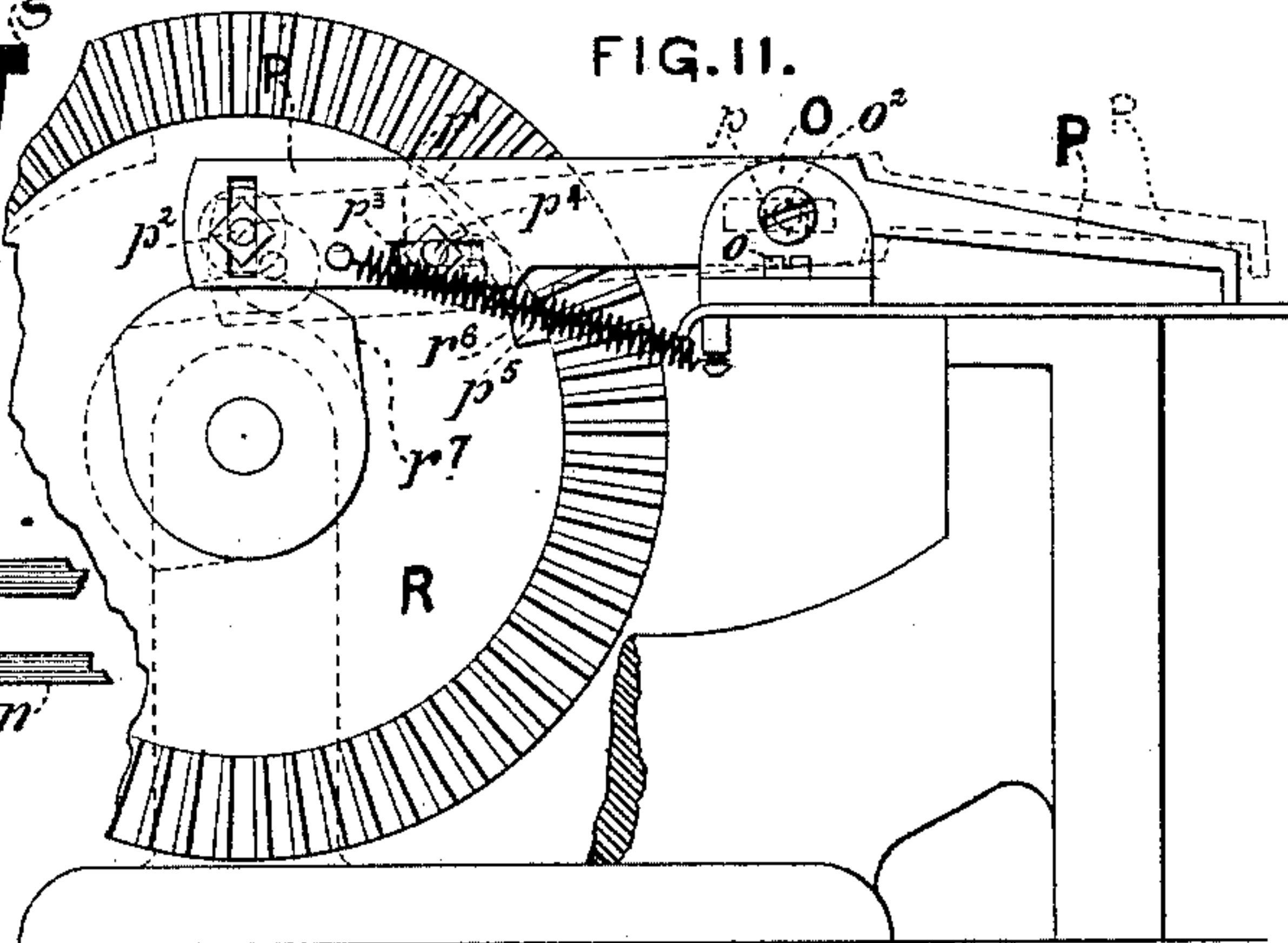
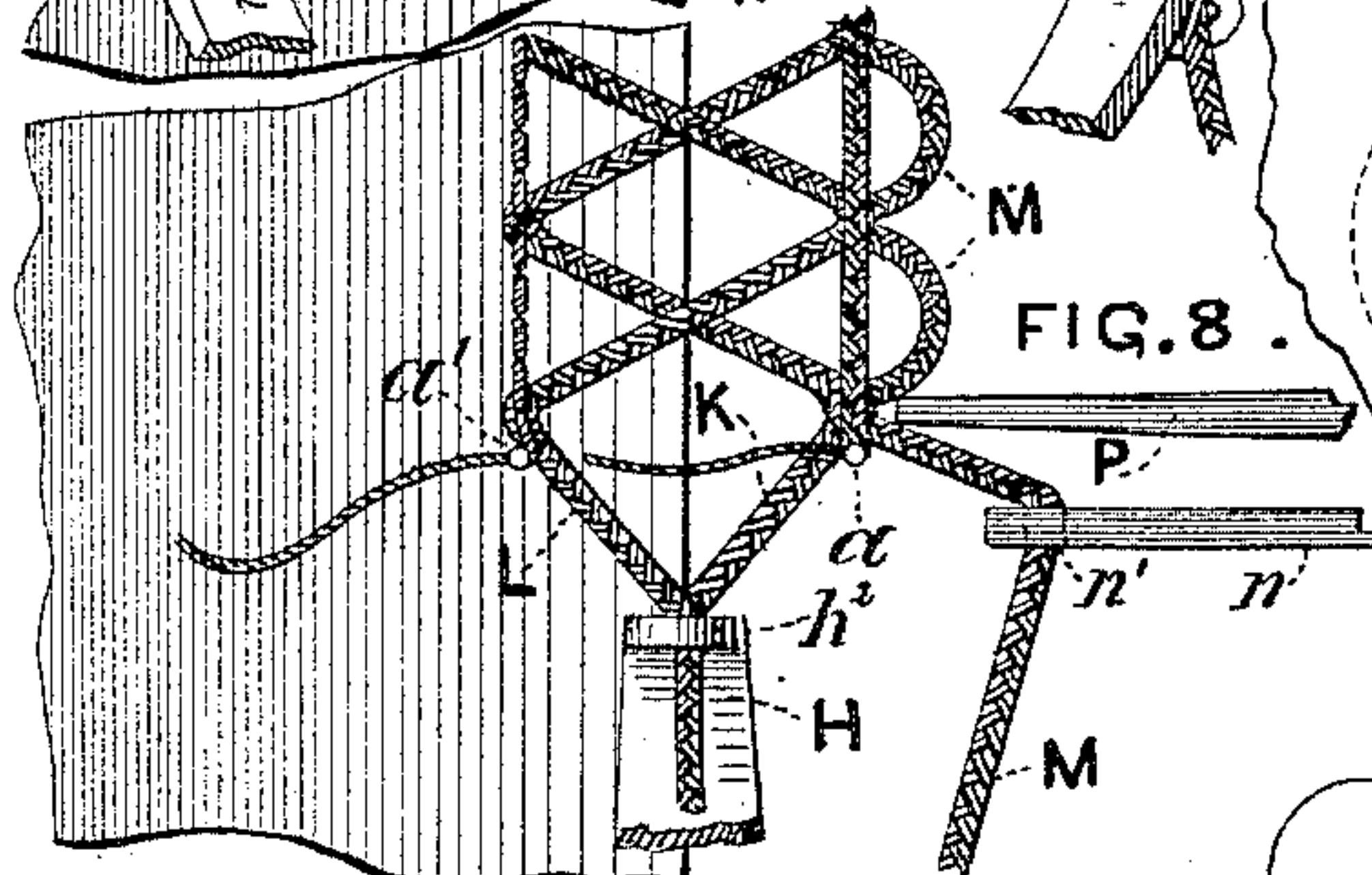
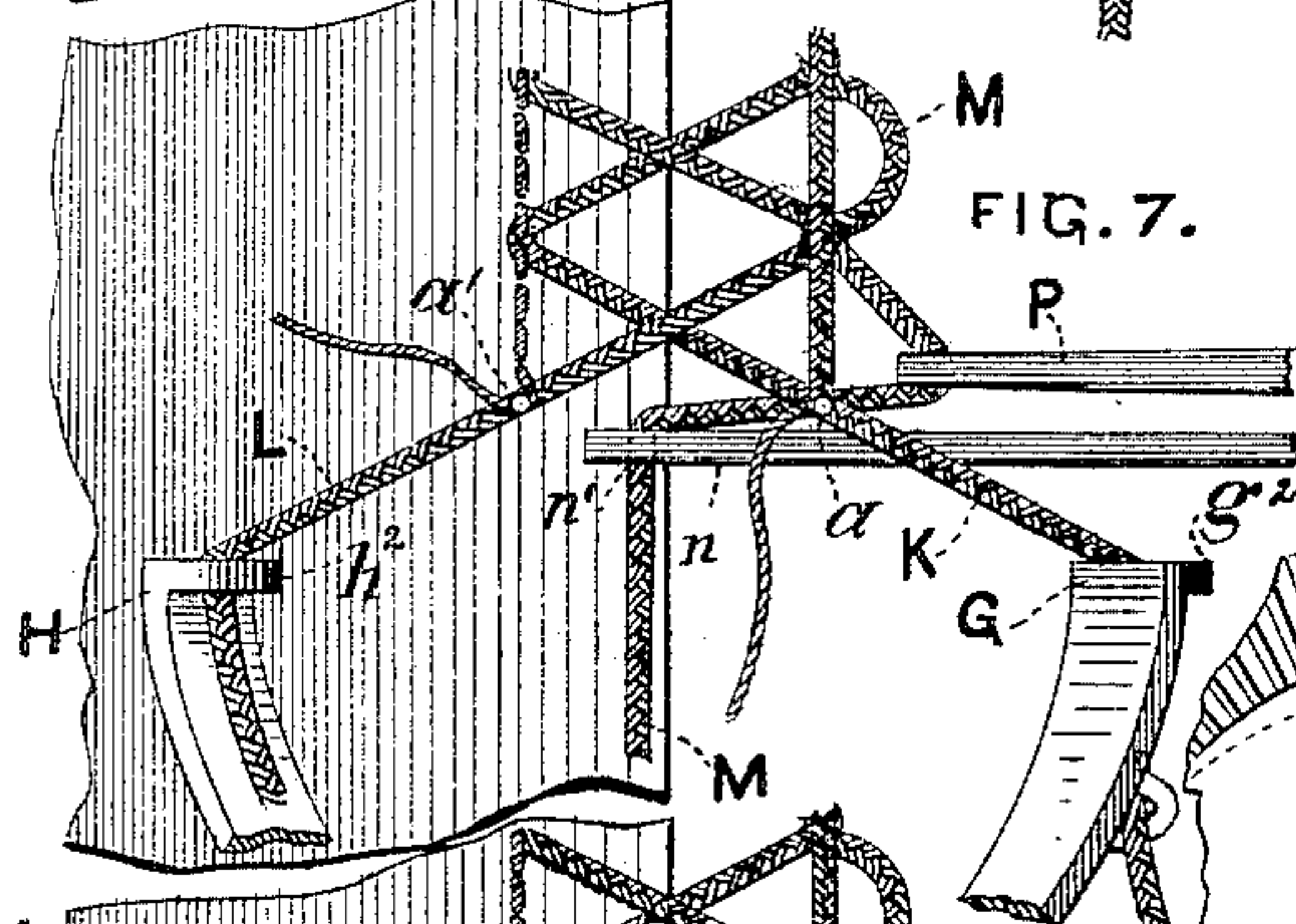
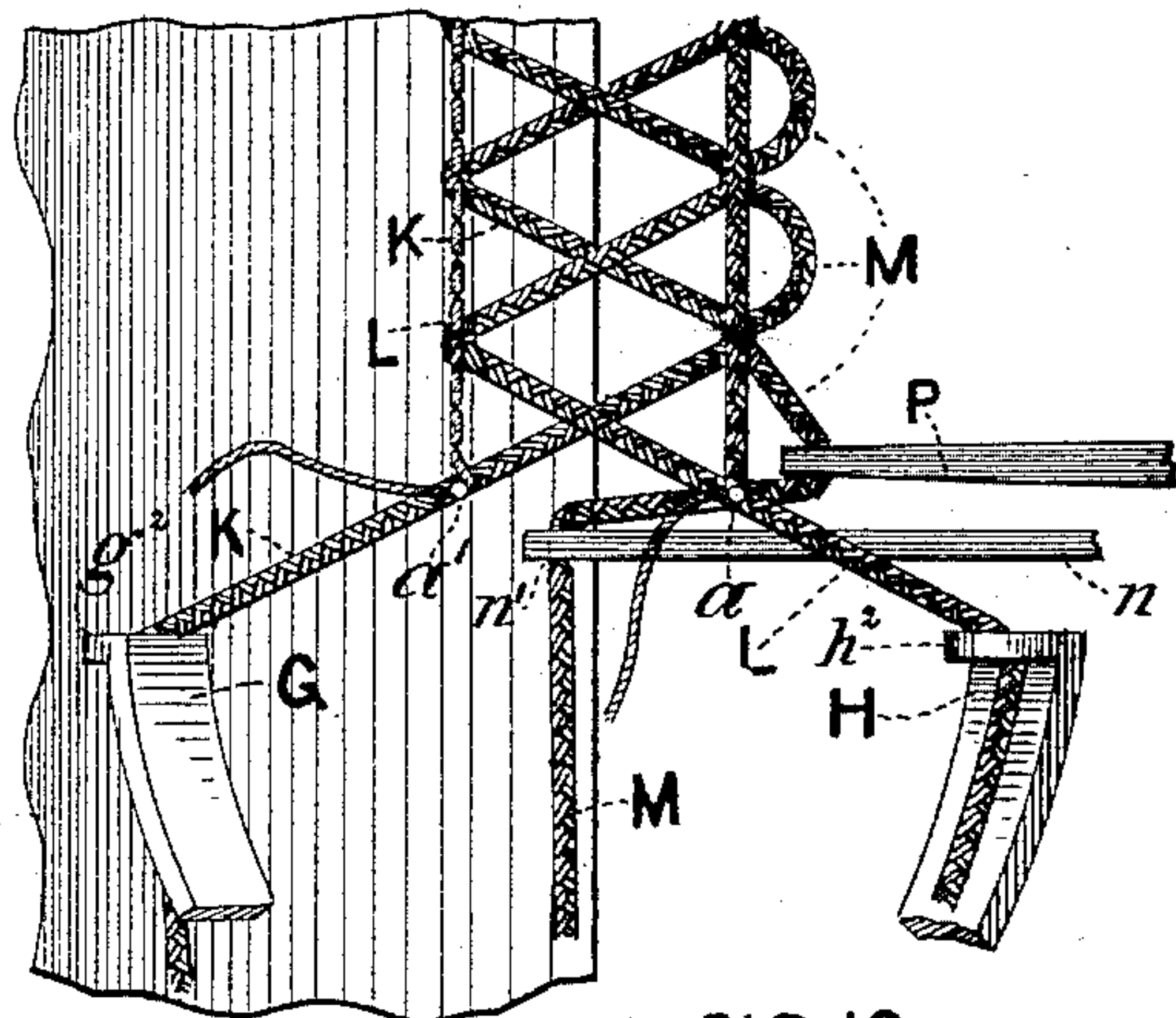
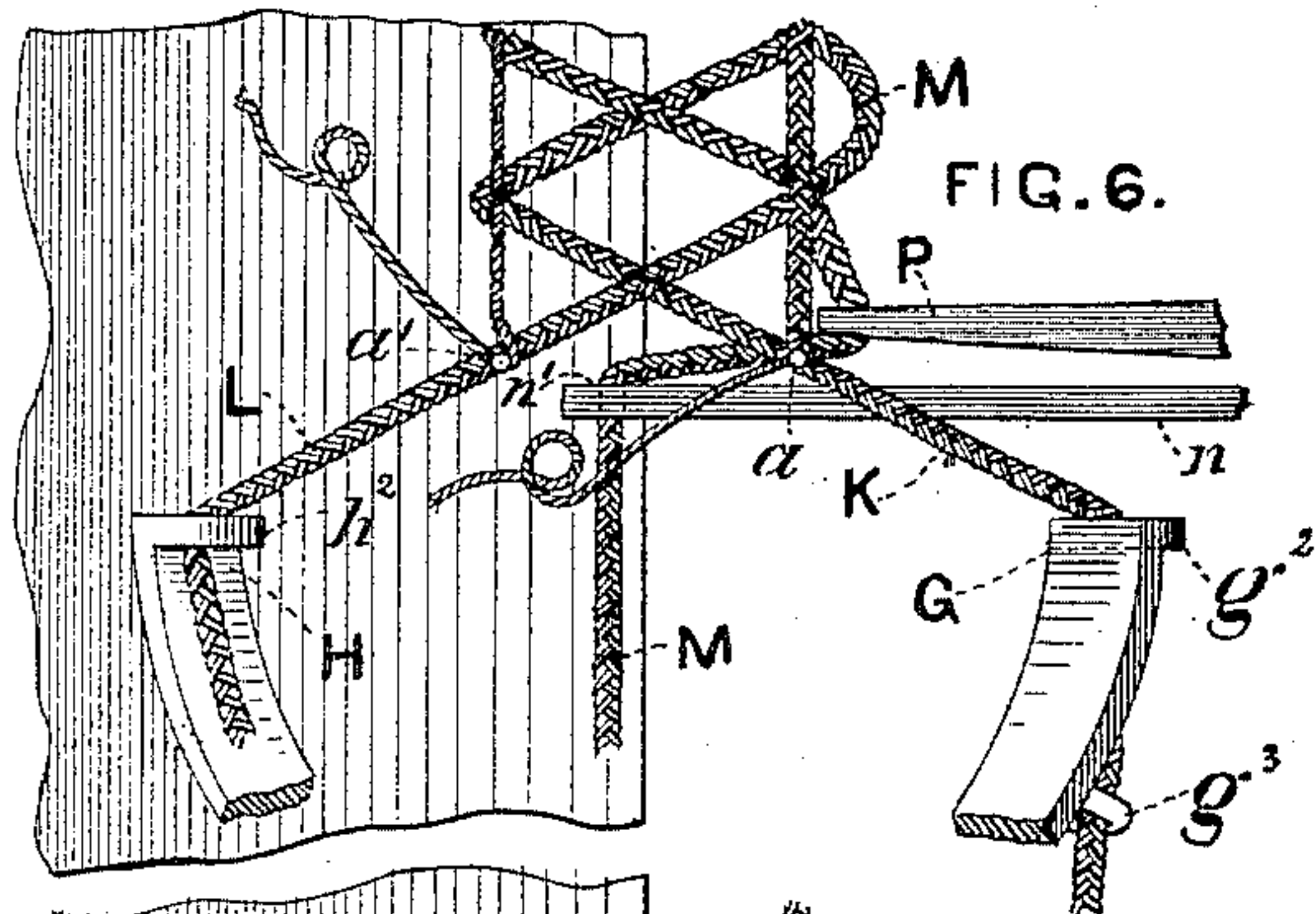
(Model.)

4 Sheets—Sheet 4.

J. C. GOODWIN.
SEWING AND EDGING MACHINE.

No. 450,793.

Patented Apr. 21, 1891.



WITNESSES:

R. A. Meach
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INVENTOR:

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UNITED STATES PATENT OFFICE.

JULIUS C. GOODWIN, OF PHILADELPHIA, PENNSYLVANIA.

SEWING AND EDGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 450,793, dated April 21, 1891.

Application filed September 10, 1889. Serial No. 323,573. (Model.)

To all whom it may concern:

Be it known that I, JULIUS C. GOODWIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in a Combined Sewing and Edging Machine, of which the following is a specification.

My invention relates to that class of sewing-machines employed for forming and simultaneously sewing on a festooned edging of ornamental design, as a finishing-trimming for the edges of garments or draperies, the chain-stitch of the machine forming part of said design while securing the same to the fabric. Heretofore machines of this character have been of extremely complicated structure, requiring great number of parts and consequent increase cost of manufacture, to say nothing of wear and tear and consumption of motive power. Furthermore, the product or edging produced has been defective, in the respect that the interlaced chain forming the design in lieu of being perforated by the sewing needle or needles, and thus being securely and permanently sewed to the fabric and to itself, has been merely held in place by a series of loops formed by the sewing-needle over the chain, and thus rendering the latter liable to disarrangement under the ordinary conditions of wear and to be completely disorganized under the rougher usage of the laundry. This defect applies more particularly to the exterior festoon edge hereinafter described. Such machines, furthermore, from their peculiar structure, present great difficulty in the threading of the chain or cord to be used in the design, the eyes intended for its reception being difficult of access and rendering the operation of threading them tedious and consuming much unnecessary time.

The object of my invention is to provide a combined sewing and edging machine of cheap and durable construction, presenting great simplification of structure and producing an immutable design integrally perfect in itself, whether sewed onto a fabric or simply run through the machine independently of a fabric foundation, the several threads and chains or cords being automatically as-

sembled in such wise and time that they shall be traversed by the descending needle or needles and their respective thread or threads, thus constituting with the chain formed by the latter an edging-trimming permanently bound together upon the fabric, to which it is secured during the process of its formation, or if not directly sewed upon a fabric foundation to be wound up upon bobbins for purposes of transportation and sale, or to be subsequently employed after the manner of ordinary edging or trimming.

My invention therefore consists, primarily, in a machine comprising a pair of spreading-levers provided at their free extremities with eyes for the reception of the chain or cord for spreading and crossing the said chain or cord in the formation of the design, and connected by means of connecting-links to an operating-arm pivotal upon the same stud as the needle-arm and vibrating in a plane parallel to the same, said operating-arm also carrying a doubly-pivoted cam-follower.

The invention further consists, in combination with the above, of a carriage sliding upon the cloth-plate carrying an eye for the reception and guiding of the festoon-forming chain or cord, acting in conjunction with a festoon-looping finger laterally adjustable upon the cloth-plate and secured to the same.

Furthermore, the invention includes mechanism for the operation of the spreaders, festoon-carriage, and festoon-looping finger, consisting of a compound cam and bevel gear meshing with a bevel-pinion upon the main driving-shaft of the machine, all as herein more fully set forth.

The nature of my invention and improvements and the manner in which they are to be carried out will be understood, reference being had to the accompanying drawings, in which—

Figures 1, 2, and 3 are side and front elevations and plan view, respectively, of a sewing and edging machine embodying my improvements. Fig. 4 is a plan view of the same, partially in section and some of the parts removed for the sake of clearness, and showing the position of the parts with the spreaders extended in one of their positions. Fig. 5 is a similar view showing the relative positions of

parts with the spreaders assembled together. Figs. 6 to 10, inclusive, are diagrammatic plan views, on an enlarged scale, illustrating the *modus operandi* of the formation of the edging. Fig. 11 is a rear view showing the operation of the festoon-expanding finger.

Upon the front side of a needle-bar A of an ordinary single-thread chain-stitch sewing-machine I fasten rigidly an additional needle-bar A', identical in structure at its lower extremity with the needle-bar A, and carrying an eye-pointed needle a', identically similar to an eye-pointed needle a upon the needle-bar A, and separated from the latter any reasonable distance, say one-half inch, more or less, according to the width of the trimming or edging which it is designed to produce. These two needles a a' act in conjunction with two vertically-oscillating hooks b b', respectively, oscillating isochronously with the former to form two parallel chains of the ordinary single-thread chain-stitch. These parts, being well understood and old, require no further description here.

The two oscillating hooks b b' are mounted upon the same rock-shaft C, which carries at its outer extremity a crank c and crank-pin c', connected to a lever of the third order c³ by means of the connecting-rod or link c². The lever c³ is pivoted upon an extension of the pedestal of the machine at c⁴, and carries a follower c⁵, which engages with the cam D, and is vibrated by the rotation of the latter, thereby imparting oscillations to the hooks b b' through the lever c³, connecting-rod c², crank c, and rock-shaft C. I make no claim, however, in this application for this particular mechanism for driving the hooks, this being simply a desirable construction.

The cam D, carrying the pinion d, derives its motion from the main shaft of the machine through the pinions d' d² d³, all of equal pitch and number of teeth. Upon the same stud E that carries the needle-arm or upon an extension thereof I also journal what I term the "operating-arm" F, which extends from the pivotal point E, parallel to said needle-arm, to a median plane passing between the two needle-bars A and A'. About midway between the pivotal point E and its free extremity the operating-arm F carries a socket c² for the reception of the spindle e³ of a bracket e⁴, which rotates freely in said socket, and which in turn carries a split socket for the reception of the spindle e⁵ of a secondary free rotating U-shaped bracket e⁶, within whose arms rotates in a vertical plane the cam-follower e⁷ upon a pin e⁸, which traverses the arms of the U-shaped bracket e⁶. The follower, which I term an "automatic cam-follower," runs in the exterior grooves of a compound cam, to be hereinafter more fully described.

The free extremity of the operating-arm F is bifurcated to receive the upper ends of the independent spreading connecting-links g h, which are pivotally connected therewith

by a cross-pin e, passing through eyes in the upper extremity of said links g h and through the bifurcation of the operating-arm F, said pin e being secured in place by the set-screw e'. The lower extremities of the spreader connecting-links g h are pivotally connected to the short arms g' h' of the spreaders G H. The latter are pivoted upon a common central pin I, projecting from a bracket-extension of the head j of the machine, the sleeve of the spreader G forming a bearing for a the sleeve h² of the spreader H, while itself journaled upon the central pin I, above mentioned. The longitudinal axis of the pin I, if projected, would pass between and at an equal distance from the needle-bars A A'. The longer arms of the spreaders G and H are extended downward and inwardly curved, so as to bring their lower extremities in a plane adjacent to the needles a a'. The spreader G passes under the spreader H, the tip of the spreader G being bent downward vertically at right angles to the axis of rotation, so as to form a downwardly-projecting lip g², the tip of the spreader H being similarly bent upward, so as to form an upwardly-projecting lip h². These two lips or flanges are each provided with an eye for the threading of the chains or cords K L. The object of curving the spreaders inwardly and forming a downwardly-projecting lip upon the lower and an upwardly-projecting lip upon the upper of the spreaders G H, respectively, is to deliver the chain as near as possible to the vertical plane passing through the needles and enabling the spreaders to pull the chain in a direct line, thus obviating any slack in the same and compelling the needles to pass through the chain, and thus tying the cross-chain threads and the chain formed by the needles permanently together. This disposition also greatly facilitates the threading of the spreaders, which are furthermore provided with eyes or thread-guides g³ h³, respectively, the thread-guide g³ being on the outside and h³ on the inside of their respective spreaders for the reception and guidance of the chains K L, respectively. The spreaders have a free movement about the axis I in either direction within the limits of the stroke of the lever F, so that by the depression of the latter their position is reversed from that shown in Figs. 1, 3, and 4, wherein the lever F is shown in its extreme upward position, while when the latter is in a median position, or half its course, the spreaders are brought together in the center, as shown in Fig. 5. As the threads or chains K L are carried along with the spreader-levers, they can be delivered to either side of the needles, or at the center, as may be required, as and for the purpose to be hereinafter more fully set forth.

Upon the cloth-plate of the machine I provide a longitudinally-slotted sliding carriage N, sliding horizontally in a direction at right angles to the direction of the feed over a guide

n^9 , passing through the longitudinal slot and secured to the cloth-plate. The carriage N carries at its forward end an upturned flange n , provided at its point with an eye n' for the reception of the chain or cord M, which forms the festoon of the design. The travel of the carriage is equal about to the distance between the needles, the eye in its point being so located that it shall traverse from a point at the rear of the main needle a equal or about equal to one-half the distance between the two needles and continuing forward to a point about half-way between the said needles a a' in a line situated between the plane of vibration of the spreader-eyes and the said needles and adjacent to the cloth-plate.

Upon the rear end of the carriage N is mounted a horizontal stud n^2 at right angles to the direction of travel of the carriage and carrying a cam-follower n^3 , actuated by a cam to be hereinafter described. The carriage is returned to its starting-point after each impulse of the cam by the resiliency of a spring n^4 , fastened at one end to a projection n^5 upon the carriage, and at the other to a corresponding stud n^6 , rigidly projecting from the cloth-plate. I also provide an eye or guide n^7 upon the cloth-guide plate n^8 in a line with the main needle a and the direction of the feed for the reception and guidance of the festoon chain or cord M prior to its passage through the eye n' of the carriage N. The cloth-plate also supports upon its upper face a bracket O, secured by screws o o , passing through slots o' o' in the bracket, provided to allow of the lateral adjustment of the same. Swinging in this bracket is what I term the "festoon chain or cord looping finger" P, extending forward in an attenuated form to a point adjacent to and to the rear of the main needle a , and slightly to the left thereof, a distance to be determined by the adjustment of the bracket O. The forward extremity of the finger P is turned downward, forming a hook, the movement of which is compound—to wit, backward and forward along the top of the plate and also rising above the same—the movement in both cases being extremely limited and intermittent. At its pivotal point the finger P is slotted horizontally for the reception of a block p , which the horizontal pivotal pin o^2 passes freely through, being secured in the opposite side of the bracket O. The finger P extends backward from its pivotal point and carries at or near its rear end two cam-followers p' p^2 , extending laterally and impinging upon two cams, which operate the retraction and elevation of the finger P, as hereinafter more fully described. The position of these cam-followers is susceptible of adjustment, the follower p' in a horizontal direction by means of a longitudinal slot p^3 in the finger P, through which the threaded end of the cam-follower stem p^4 passes, and is secured to the said finger by means of a shoulder provided on the same on one side and a nut on the other. The position of the

cam-follower p' determines within certain limits the dimensions of the loop of the festoon. The cam-follower p^2 is similarly secured at or near the rear extremity of the festoon-finger, the adjustment in this case, however, being vertical instead of horizontal. The reaction of the spring p^5 maintains the followers p' p^2 against the cams and returns the finger P to its former position after each succeeding vibration.

The movements of the chain-spreaders, the festoon-chain carrier, and festoon-chain looping-finger are all controlled and actuated by means of a compound cam and gear R, driven from the main shaft of the machine through a bevel-pinion upon the same and a bevel-gear cut on the inside face of the cam-body, the proportion of the number of teeth being as one to four—say twenty teeth on the pinion to eighty on the gear—so that the needles of the machine shall make four stitches to every rotation of the cams.

Upon the periphery of the main cam-body R two V-shaped grooves r^2 r^3 for the reception and guidance of the follower e^7 are cut all around parallel to each other for about three-fourths of a circle, when they converge and intersect each other, forming a switch, by whose action the follower e^7 is transferred from one groove to the other, the follower being able to execute the movement by means of its double articulation. At the end of another revolution the follower is switched back into the groove which it first occupied, and so on at each revolution it is transferred from one groove to the other alternately. The bottoms of the two grooves for about two hundred and seventy degrees of their curvature have equal radii, the switch above referred to being situated at any part of this interval, preferably in the center, but the outside groove for the remaining ninety degrees is depressed, as indicated per dotted lines at r , while for the same distance above the groove is raised, as at r' , Fig. 1, an equal height above the normal level of the two-hundred-and-seventy-degree arc. It follows that when the follower e^7 , connected to the arm F, is in the inside groove it is raised by the elevation of the groove or cam. Communicating this movement through the arm F to the spreading links g h , the spreaders are forced into the position indicated in Fig. 1. When, on the other hand, the follower is on the succeeding revolution switched into the outside groove, it follows the depression r , and allowing the arm F to fall the connecting-links g h push down the short arms of the spreaders to such an extent that the position of the spreaders is reversed, the spreader G taking the place of the spreader H, and vice versa. On the other hand, while the follower is on the arc of two hundred and seventy degrees, whether in the inside or in the outside groove, the level of this portion being midway between the elevation r' and the depression r , the position of the spreaders will be corre-

spondingly between the two extremes and will assume a central position, as indicated, Fig. 5.

It is clear that as the needles make four strokes to every single revolution of the cam one stitch will be taken while the spreaders are in an extended position and three while they are assembled. Parallel to that portion of the V-grooves on the two-hundred-and-seventy-degree arc, but going completely round the periphery of the compound cam, I cut an additional square groove r^4 for the reception of the follower n^3 upon the sliding carriage N. In this groove I set a projecting cam r^5 , extending over an arc of about ninety degrees, and so timed with reference to the cams r r' that it shall commence at or about the middle thereof and extend about forty-five degrees beyond the same. This cam operates the vibrations of the festoon-chain carrier, the carriage being returned to its first position by the retraction of a spring r^4 .

The inner face of the cam-body R is bored out cylindrically to make room for two additional cams, which control the action of the festoon-chain loop-carrying finger P. Upon the inside periphery of the chamber I construct an inwardly-projecting cam r^6 , so timed as to commence about twenty degrees beyond the spreader-cams r r' and extending thirty-five degrees, so as to terminate about ten degrees beyond the commencement of the festoon-chain-carrying cam r^5 . This cam actuates the adjustable cam-follower p' upon the rear extension of the finger P and imparts to the latter its longitudinal vibrations, whereby the length of the festoon-chain loop is regulated and rendered uniform. Upon the hub of the cam R and inside the countersunk chamber I mount the projecting cam r^7 , extending over an arc of about ninety degrees and so timed with reference to the retractile cam r^6 that their center of effectiveness shall be about the same, so that the time of the cam r^7 shall overlap that of the cam r^6 , both at the beginning and ending of the latter. This cam r^7 is adjustable upon the cam-body R by means of a slot and set-screw r^8 , which secures it to the cam-body. Its function is to hold down, by its contact with the cam-follower p^2 on the rear extremity of the finger P, the hook forming the other extremity of the same upon the cloth-plate while the said finger is being retracted, drawing out the amount of chain necessary for the formation of a festoon-loop, and holding the chain taut while the needle is descending and penetrating the same. The resiliency of the spring p^6 draws the finger P forward after passing the cam r^6 and also by reason of its downward direction causes the cam-follower p^2 to hug the cam at its lowest periphery, thus elevating or raising the hook of the finger from the plate and allowing it to pass out of the festoon-loop while the latter is being carried forward by the feed for three consecutive stitches.

As shown in the drawings, I have provided

a tension device for the threads of the sewing-needles. This, however, although of novel construction, so far as I am aware, is not claimed as a part of the present invention.

On the top of the frame of the machine and to the rear thereof I mount a stand S, showing a horizontally-projecting stud s parallel to the direction of the feed. The stud s receives a screw-cap. Upon the center stud I place two pairs of washers of glass or other suitable material, preferably separating one pair from the other by washers of felt. Outside of the exterior glass-washer I slip a metallic washer, against which abuts a coiled spring protected at both ends by means of a perforated thimble, through which perforation the stud passes, and outside of the spring a nut s' compresses the spring to any degree of tension required, the object of placing both sets of washers on the same stud and compressing them by the same spring being to obtain absolute uniformity and equality of tension upon both the needle-threads, thereby obtaining perfect regularity in the two chains, in the absence of which the product would be rough and uneven, the chains being of unequal thickness. I have also illustrated in the drawings a very desirable construction of presser-foot for use in connection with a machine of this character. This, however, is not claimed as a part of the present invention. As shown, it consists of a double presser-foot T T', the inner foot T being held down upon the festoon-edging by the action of the compressing-spring t^2 abutting against the pin t^3 of the presser-bar, and the outer foot T' being pressed down upon the combined fabric and edging by the action of the spring t^4 reacting against the pin t^5 , passing through the presser-bar for an abutment. This arrangement secures equality of pressure over the entire feed-plate, the double foot adjusting itself automatically to irregularities of thickness in the product, and the material being, in consequence, fed with the same speed, both on the outer and inner edge of the trimming, thus maintaining and contributing to the regularity of the design.

The operation of my sewing and edging machine is substantially as follows: The necessary adjustments having previously been made—namely, the lateral position of the festoon finger-bracket upon the cloth-plate and the distance of the cam-followers p' p^2 , together with the angular position of the cam r^7 , having been determined and permanently secured accordingly. The various eyes in the operating parts of the machine—to wit, the eyes in the spreaders and in the festoon-carrier and the eyes of the sewing-needles, the first three being threaded with chain or cord, but preferably with chain, similar to that which is made by the sewing-machine itself, said chain being previously made upon the machine in sufficient quantity and wound upon three separate bobbins, one for the festoon and the others for the cross-chains forming

the body of the design. The needles are threaded each with a single thread—preferably for the sake of uniformity—of the same grade as that from which the three chains have been made, although this is not imperative, as a thread of a different thickness or tint may be employed as well, if desired. These adjustments and preliminaries being complied with, the material to be bound or edged is fed in the direction of the feed, being guided against the guide-plate n^8 , and starting with the machine in the position shown in Figs. 1, 2, 3, and 6, in which the spreader G is to the right and the spreader H is to the left of and the festoon-carrier is in front of the needles, looking at them from the side, Fig. 1, and on a center line between the two, which is its extreme outer position when forced out by the action of the cam r^5 , while the finger P, pressing upon the cloth-plate, has commenced its retrograde movement under the impulse of the cam r^6 . The sewing-needles at this point are just about penetrating the fabric, Fig. 6. The shaft of the machine, making a quarter of a revolution, imparts to the cam R a one-sixteenth revolution, which causes the festoon-finger to draw out the festoon-loop to its fullest extent and sends the needles through the chain and material. (See Fig. 7.) The position of the other parts remaining unchanged, an additional quarter turn of the main shaft, and a consequent one-sixteenth turn of the cam R, releases the finger P, which flies back close to the needle a , while the cam-follower p^2 , also reacting toward the center of rotation, carries the rear end of the finger P downward, with a corresponding elevation of the forward hook-shaped extremity, so as to permit the latter to pass over the chain-forming loop. Three-quarters of a revolution of the main shaft, making in all one full revolution of the latter, completes one stitch and carries the material forward one stroke of the feed, while releasing the festoon-thread carrier, which shoots back to its rearmost position, the follower n^3 hugging the bottom of the groove r^4 on the cam R. In the same manner the follower e^7 of the arm F descends into the groove r^2 , the bottom of which holds a middle place between the cams r r' , allowing the arm F, under the tension of the spring f , to push down the arms g' h' , bringing the spreaders G H together in the center, Fig. 8. The driving-shaft has now made a complete revolution, making one stitch and fastening the end of the chain K to the fabric and the festoon-chain M and the chain L with one link of a chain formed by the stitch together, while the cam has only effected one-quarter of a revolution. An additional revolution completes an additional stitch, Fig. 9, while the other parts remain unchanged. A further one-half a revolution brings the intersection of the V-shaped grooves r^2 r^3 under the follower e^7 , switching the latter from the groove r^2 to the groove r^3 . An additional revolu-

tion and a half completes the four revolutions of the driving-shaft and one complete revolution of the cam R, the position of the parts relatively to each other being the same, with the exception that the follower e^7 is now in the outside groove r^3 , and consequently in the depressed part of said groove r , so as to allow the arm F to fall still farther and carry the spreaders G H beyond the central point, thus reversing their position from that which they held at the beginning. The effect of this action is to carry the chain K over the right and the chain L to the left of the needles, Fig. 10. The following four revolutions of the mainshaft are accompanied by the same results, save that the follower e^7 , in coming to the intersection, is by reason of its direction again switched over to the inner V-shaped groove, and consequently strikes the elevated cam r' , which again reverses the position of the spreaders and carries the chains over one another to the place that they occupied at the start, and so on indefinitely, forming a crossed effect for the body of the design, with a looped festoon exterior edge, the whole not simply incorporated, one within the other, so as to slip loosely, as it were, in loops formed by the different chains and liable to be pulled out completely from the end, but absolutely sewed together link within link in such wise as to be incapable of being disorganized without absolute solution of continuity; or the edging can be run through the machine without any fabric foundation whatever, forming a permanent binding, capable of being wound up in the usual form for purposes of sale and transportation.

I am aware that sewing-machines have been constructed having two needles making two parallel rows of stitches and having, furthermore, vibrating thread or chain carrying arms swinging to either side of the said needles; and I am likewise aware that a so-called "binding," in some respects analogous to mine, has been made upon such a machine. I am also aware that the general appearance and design of the said binding or edging is old and has been known in the trade for many years. I therefore do not claim, broadly, such arrangement of parts or design; but

What I do claim as my invention, and desire to secure by Letters Patent, is as follows, to wit:

1. In a combined sewing and edging machine, the combination, with two vertically-vibrating chain-forming eye-pointed needles, of a pair of oscillating spreading-levers inwardly curved to oscillate in close juxtaposition to the needles, said levers having vertical flanges formed at their tips, said flanges being provided with thread-eyes, a horizontally-sliding plate or carriage for carrying the festoon-forming cord, and means for forming the festoon-loop.

2. In a combined sewing and edging machine, the combination, with two vertically-vibrating chain-forming eye-pointed needles,

a pair of eye-carrying spreaders oscillating to either side of said needles, and a rectilinearly-sliding eye-carrying plate for carrying the festoon-forming cord, of a festoon-loop-retaining finger, and means for operating said sliding plate and festoon-loop-retaining finger.

3. In a combined sewing and edging machine, the combination, with two vertically-vibrating chain-forming eye-pointed needles, a pair of eye-carrying spreaders oscillating to either side of said needles, and a rectilinearly-sliding eye-carrying plate for carrying the festoon-forming cord, of a festoon-loop-retaining finger supported independently of the sliding plate, and means for operating said sliding plate and festoon-loop-retaining finger, substantially as described.

4. In a combined sewing and edging machine, the combination, with two vertically-vibrating chain-forming eye-pointed needles, a pair of eye-carrying spreaders oscillating to either side of said needles, and a rectilinearly-sliding eye-carrying plate or carriage, of a longitudinally-oscillating and vertically-swinging festoon-loop-retaining finger, and means for sliding said plate or carriage and for oscillating and swinging said festoon-loop-retaining finger.

5. In a combined sewing and edging machine, the combination of two chain-forming eye-pointed needles, a pair of inwardly-curved eye-carrying spreading-levers oscillating to either side of said needles in close juxtaposition thereto, a horizontally-sliding eye-carrying plate or carriage, a longitudinally-oscillating and vertically-swinging festoon-loop-retaining finger, the main shaft, connections between the same and the needle-arm for vibrating said needles, a compound cam operated from the main shaft of the machine, connections between said cam and the thread-carrying levers for oscillating the same, additional connections between said cam and the sliding plate or carriage, and festoon-loop-retaining finger for sliding said plate or carriage and oscillating and swinging the festoon-loop-retaining finger, the parts being so timed that the needles pass through the chains forming the design, permanently sewing the inner chain to the fabric and the outer and festoon chains together at their meeting points, substantially as described.

6. In a combined sewing and edging machine, the combination of two chain-forming eye-pointed needles with means for vibrating the same, a pair of inwardly-curved eye-carrying spreading-levers oscillating to either side of said needles in close juxtaposition thereto, a vibrating arm F, connecting links between the spreading-levers and the vibrating arm, a bracket secured upon said

vibrating arm, a roller supported upon the lower end thereof, a cam operated from the main shaft of the machine, adapted to engage with said roller and thereby vibrate the arm, a horizontally-sliding eye-carrying plate or carriage N, a longitudinally-oscillating and vertically-swinging festoon-loop-retaining finger, and connections between said cam and the plate and finger for operating the same.

7. The combination, in a combined sewing and edging machine having two vertically-vibrating needles and oscillating hooks for making two parallel rows of chain-stitching, of two inwardly curved and flanged and eye-tipped vibrating levers G H, the eye-pointed rectilinearly-sliding plate or carriage N, carrying a cam-follower n^3 and having a spring n^4 , the festoon-oscillating and longitudinally-vibrating looping-finger carrying on its rear extremity the adjustable cam-followers p' p^2 , with the compound cam R, and means for rotating the same.

8. In a combined sewing and edging machine, the combination of two vertically-vibrating needles and their respective oscillating hooks for making the chain-stitch, the incurved eye-pointed and flange-spreading levers G H, their connecting-links, vibrating bar, jointed follower, the spring, the sliding eye-pointed festoon-carriage carrying a cam-follower and returning spring, the festoon-loop-forming finger carrying two adjustable cam-followers and having a longitudinally-vibrating and a pivotally-oscillating movement, with the compound cam and gear R, consisting of a hollowed disk carrying a bevel-gear on its inner face and having intersecting V-shaped grooves on its periphery forming a switch, said grooves being the one depressed and the other elevated above their normal common level or depth, as described, and for the purpose set forth, and having a square groove cut peripherally around the entire circumference for the reception of the sliding-carriage cam-follower, said groove being filled part of its circumference with a projecting cam for actuating said sliding-carriage cam-follower, said compound cam R also having within its countersunk and hollowed part two cams r^6 r^4 for retracting and depressing the festoon-forming finger P, and being driven from a bevel-pinion upon the driving-shaft of the machine, meshing with teeth cut upon the inside face of the cam, the number of teeth upon the cam being a multiple of the number of teeth upon the pinion.

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Witnesses:

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