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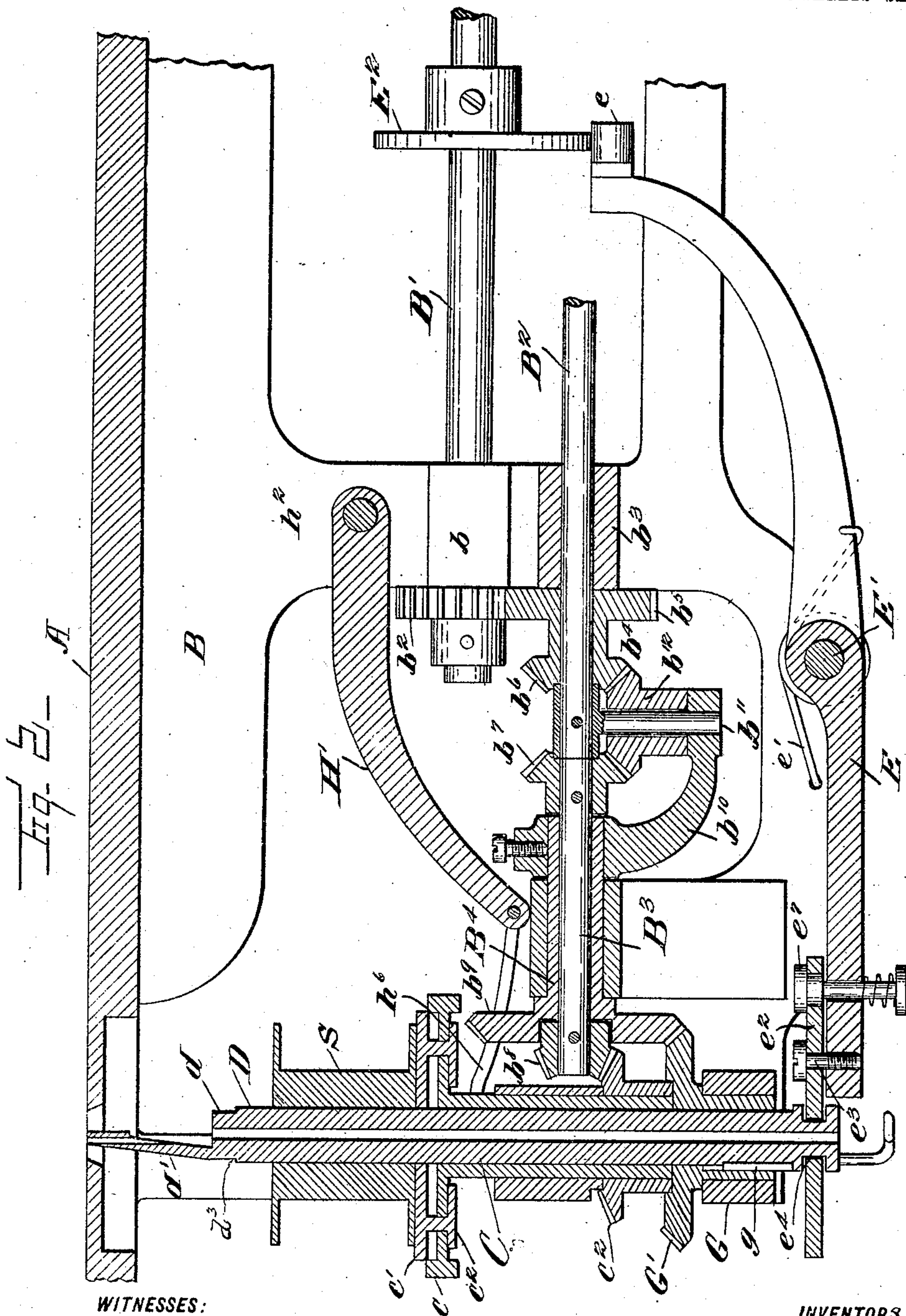
PATENTED FEB. 5, 1907.

A. BURGESS & J. G. & M. O. REHFUSS.

EMBROIDERING MACHINE.

APPLICATION FILED DEC. 14, 1903.

6 SHEETS—SHEET 2.



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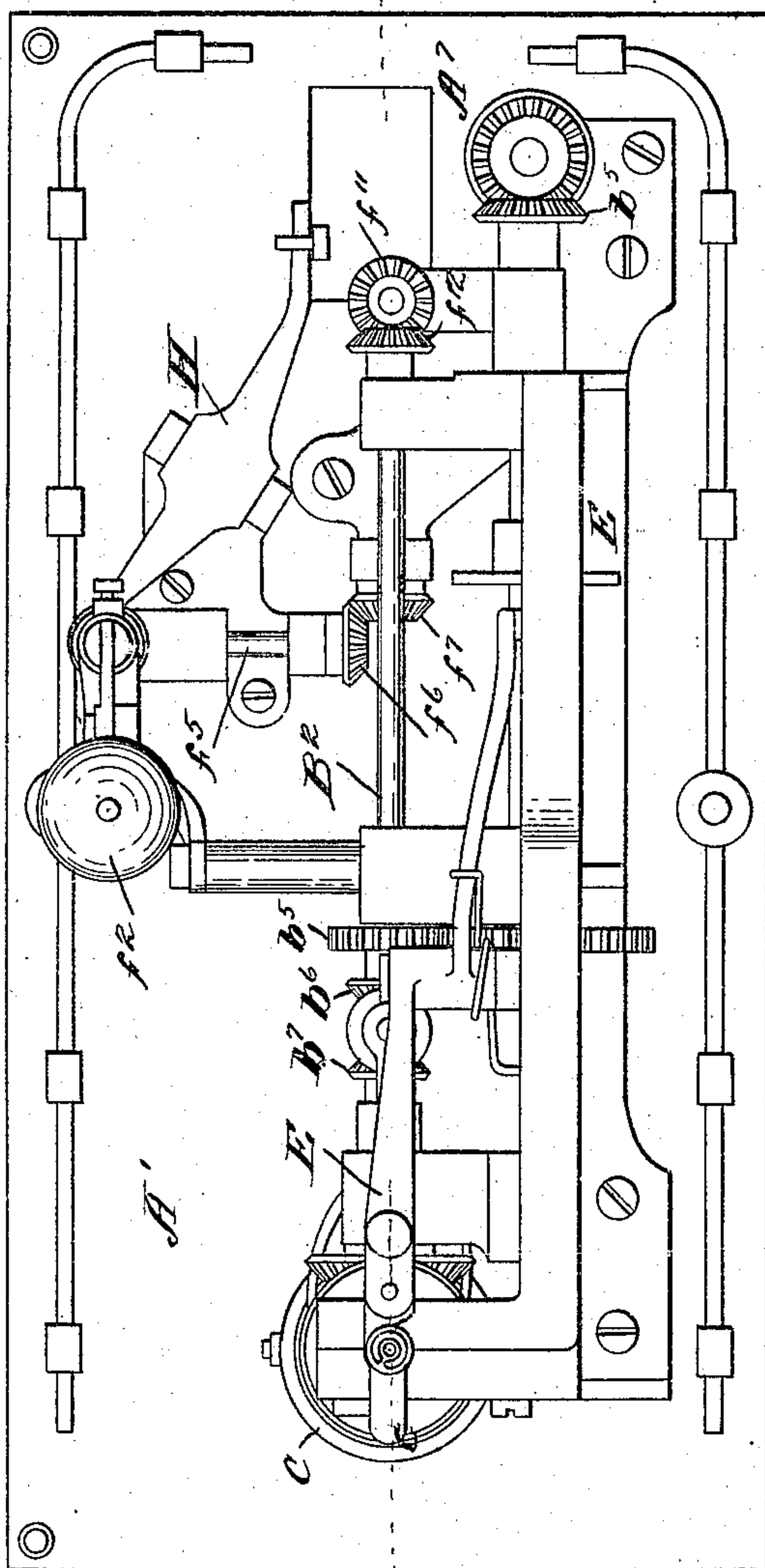
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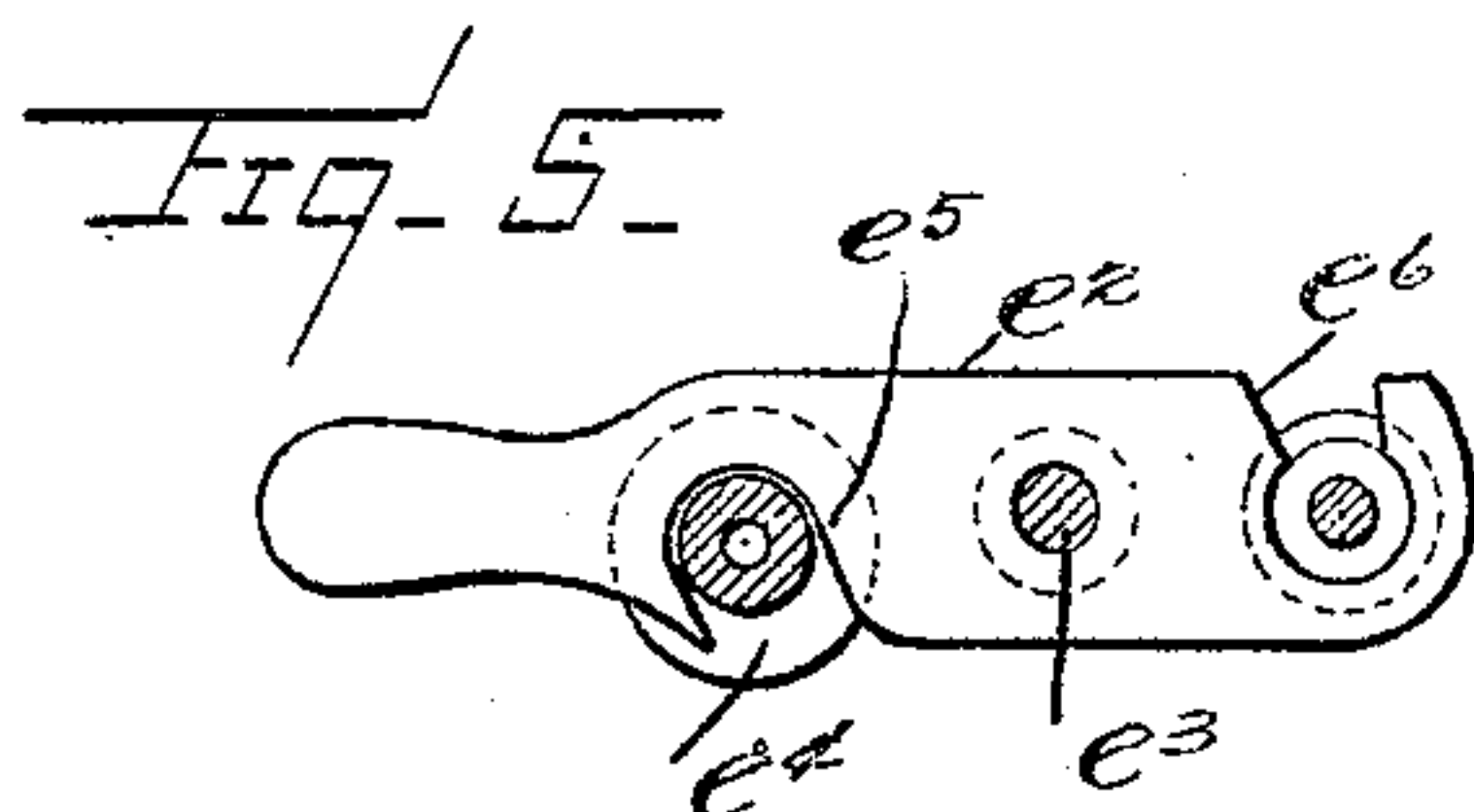
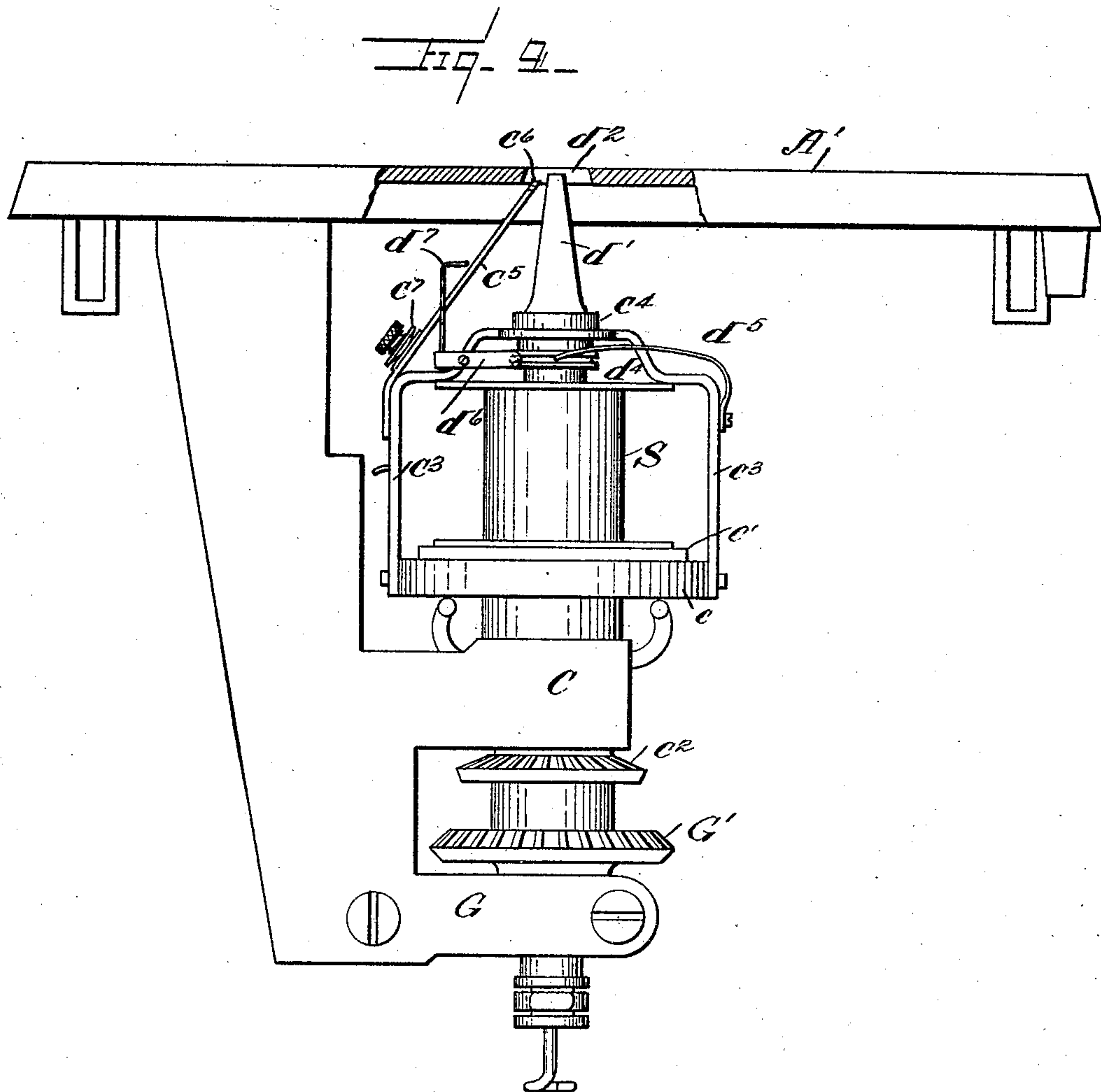
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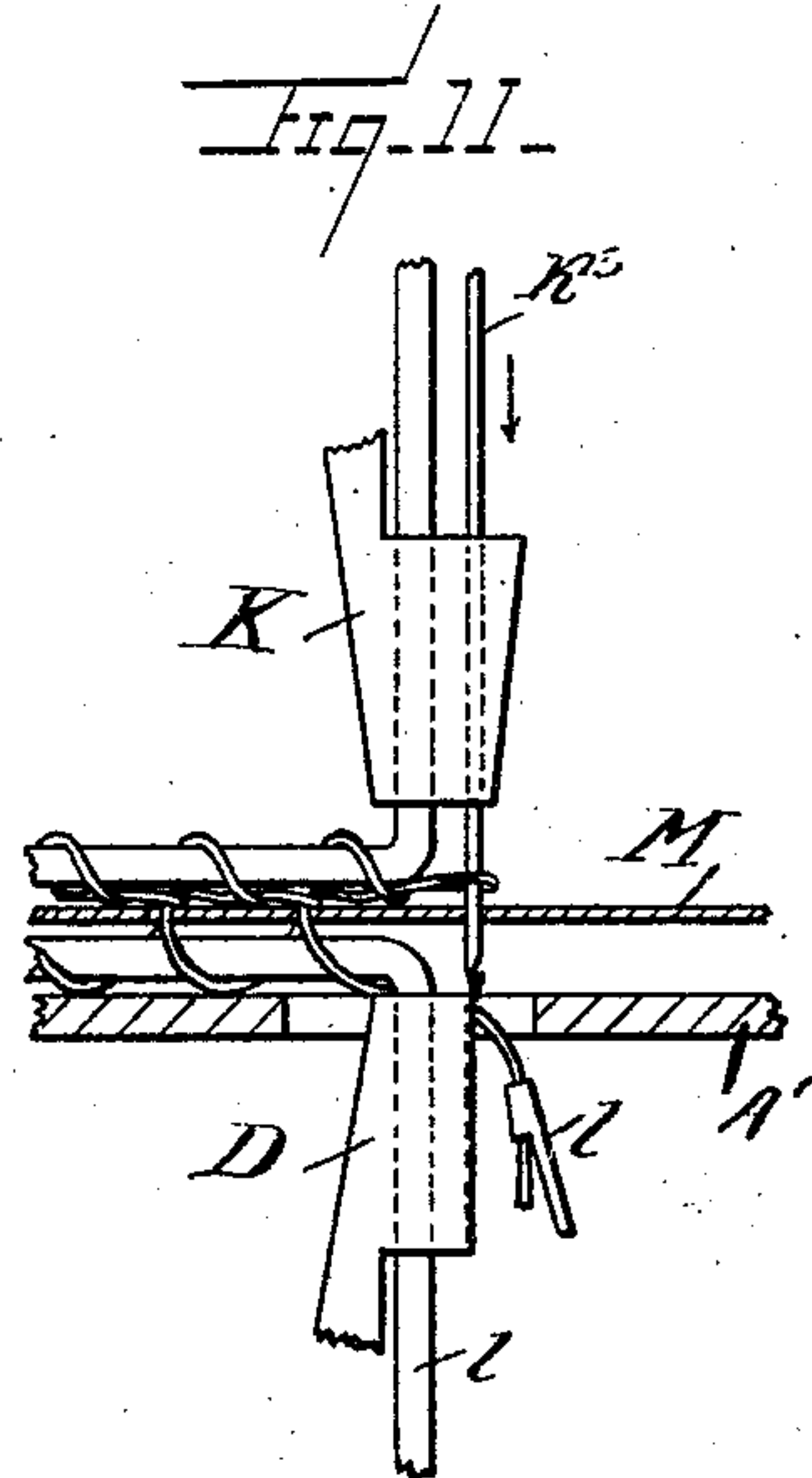
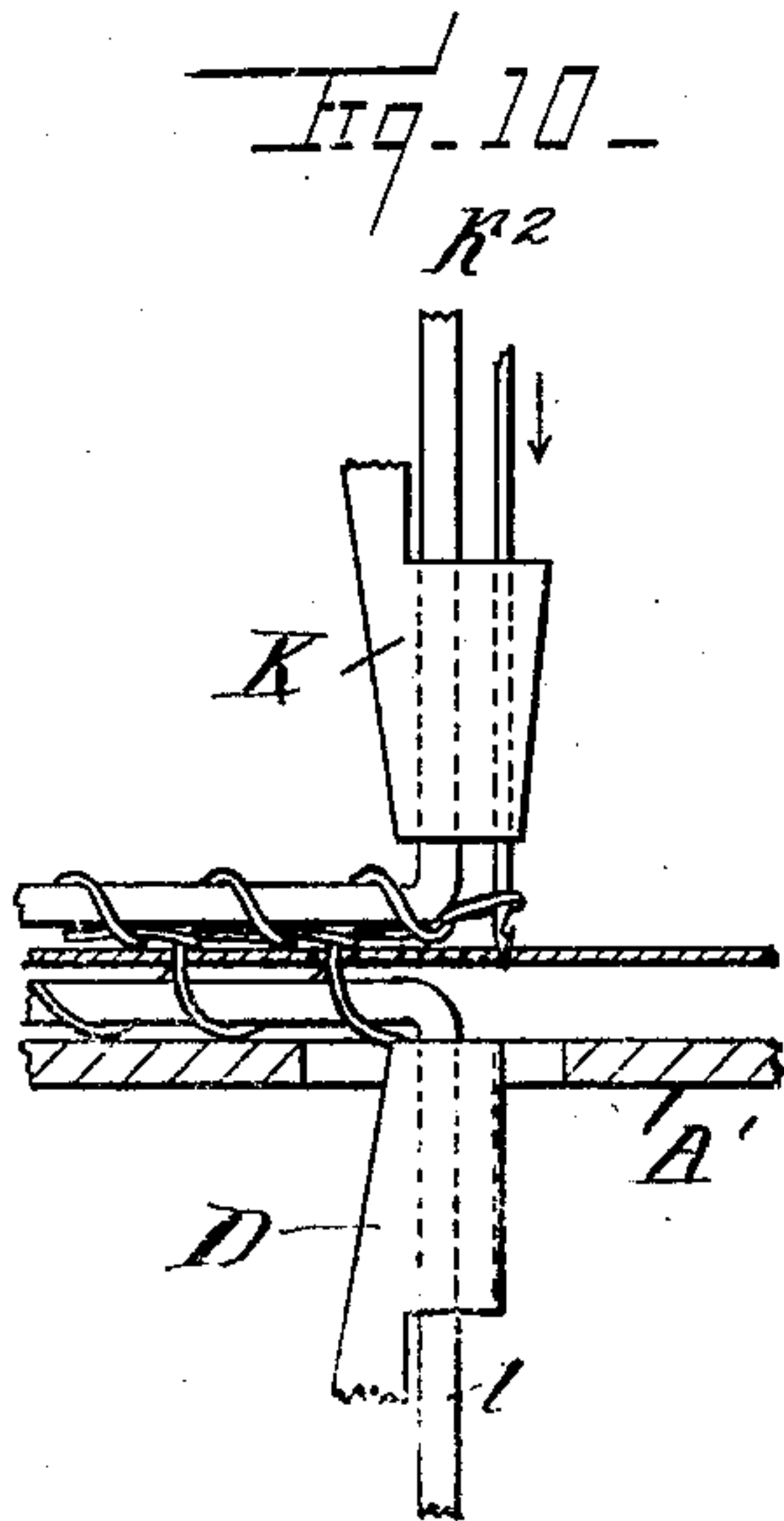
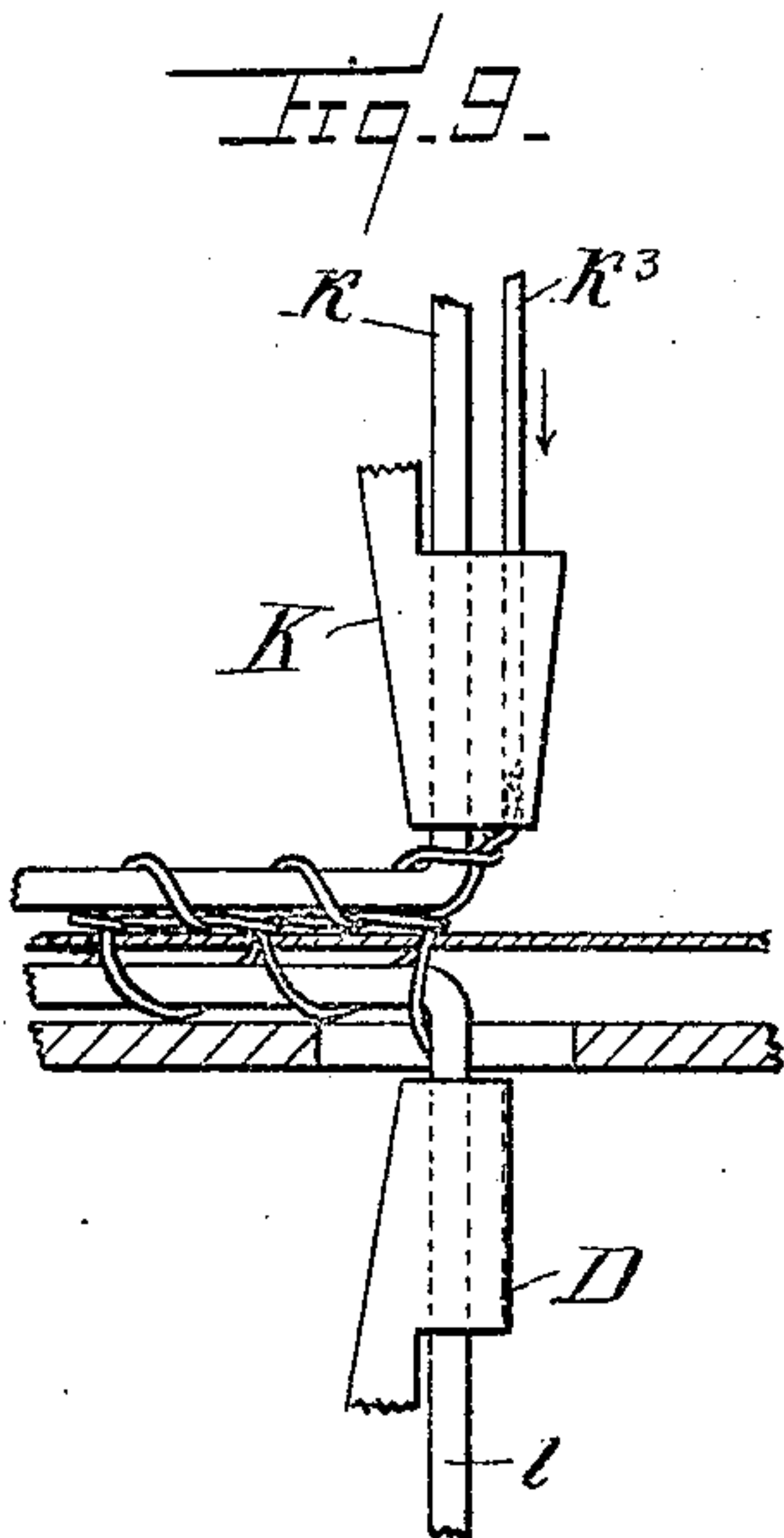
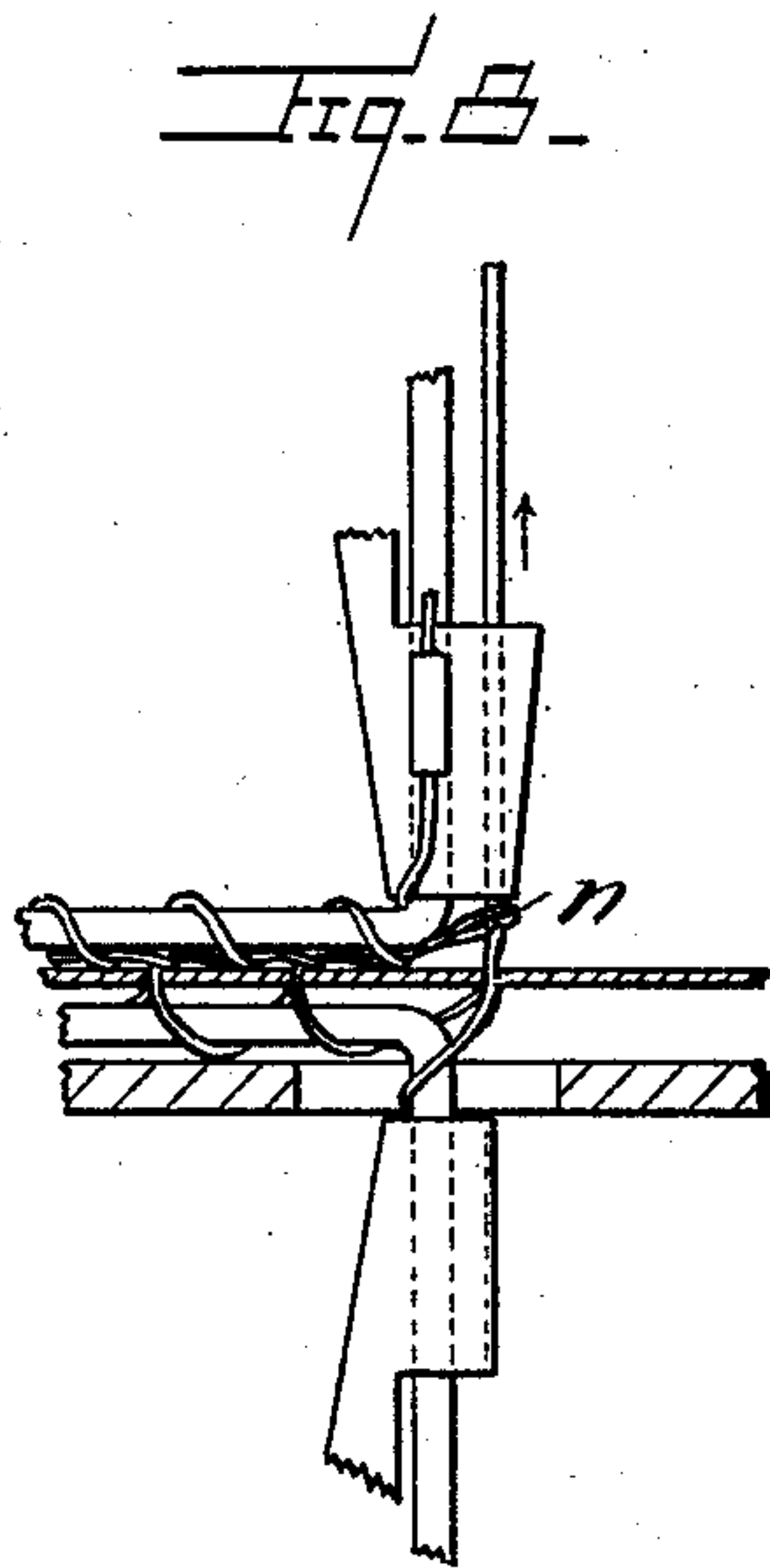
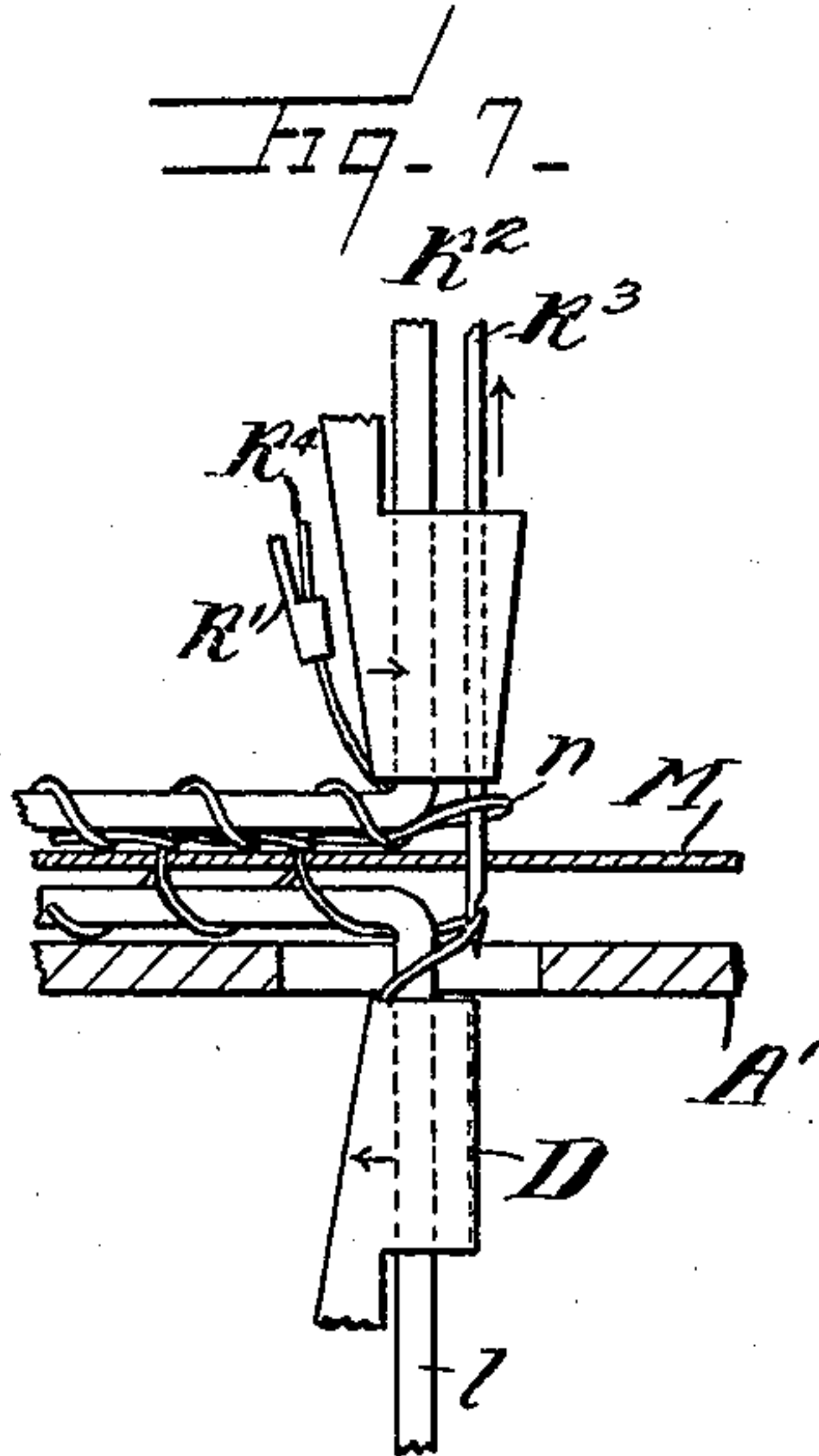
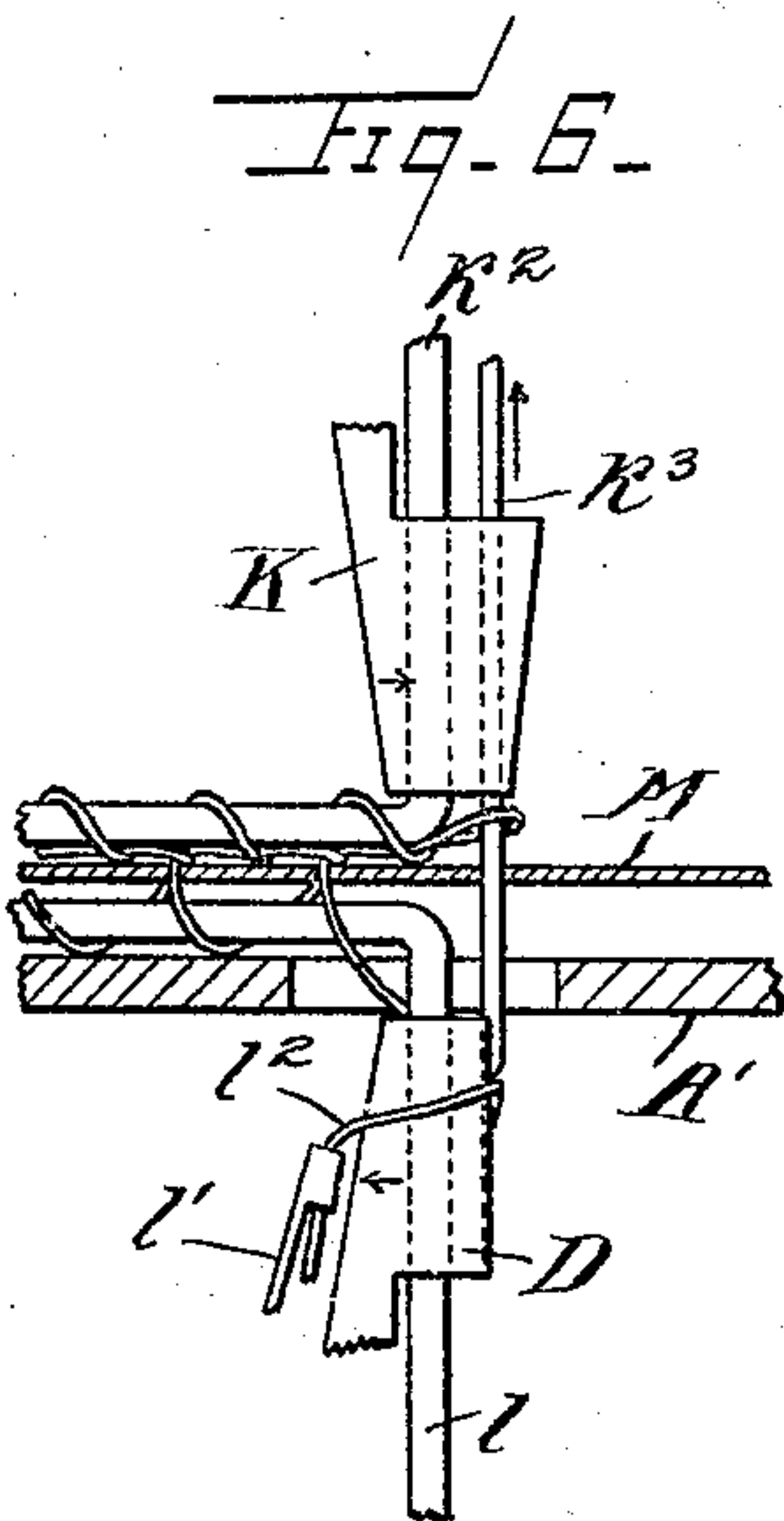
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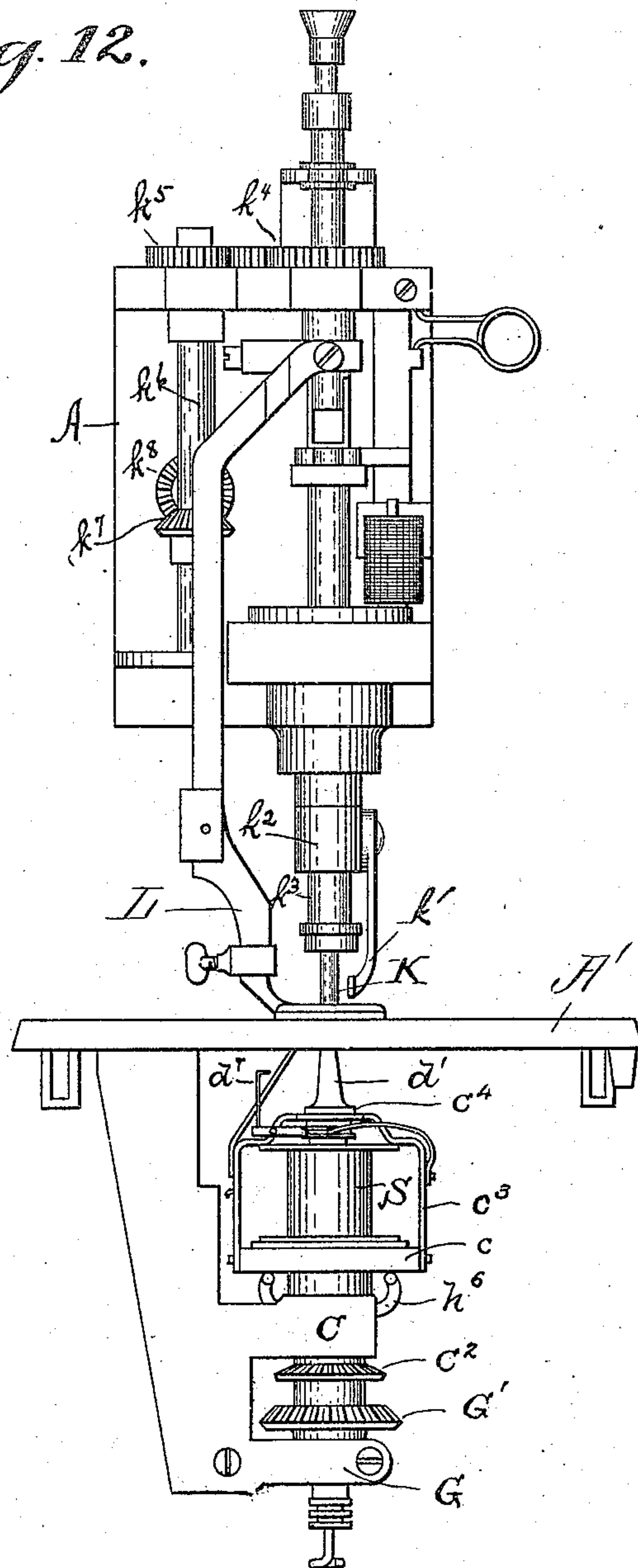
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EMBROIDERING MACHINE.

APPLICATION FILED DEC. 14, 1903.

6 SHEETS—SHEET 6.

Fig. 12.



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UNITED STATES PATENT OFFICE.

ARTHUR BURGESS, JOHN GEORGE REHFUSS, AND MARTIN OSCAR REHFUSS,
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EMBROIDERING-MACHINE.

No. 842,854.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed December 14, 1903. Serial No. 185,091.

To all whom it may concern:

Be it known that we, ARTHUR BURGESS, a subject of the King of Great Britain, and JOHN GEORGE REHFUSS and MARTIN OSCAR REHFUSS, both citizens of the United States, and all residing in the city of Philadelphia, State of Pennsylvania, have jointly invented certain new and useful Improvements in Embroidering-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to embroidering-machines of the general type described in United States Letters Patent to Antoine Bonnaz, No. 83,910, dated November 10, 1868, as modified by the improvements described in subsequent United States Letters Patent granted to Emile Cornely, No. 228,445, dated June 8, 1880, and No. 345,886, dated July 20, 1886. In the Bonnaz machine an embroidered pattern or design was simultaneously formed upon and secured to the body fabric by mechanism which produced an embroidery-stitch, a well-known universal-feed motion, therein referred to, being employed to cause the body fabric to be fed in any direction required to conform with the design required. In the aforesaid Cornely improvements on that type of machine the patentee supplied a separate embroidering cord or thread and formed a chain-stitch to hold it upon the body fabric, mechanism being provided to first throw the sewing-thread around the embroidering-thread by means of an oscillating arm and then carrying this tying-in thread down through the body fabric and forming a true chain-stitch with it by means of a second thread under the bed-plate of the machine, the two being looped to form the stitch, that arrangement of the mechanism and the tying-in and stitching formed thereby being shown in the later of said two Cornely patents. That type of machine, however, was capable only of applying embroidering cord or braid on but one side of the cloth or fabric.

Our invention has for its object the provision of means in a machine of the general type of the Cornely machine, the distinctive function of which is to enable the machine to apply and secure to both sides of the body

fabric simultaneously a like embroidering-braid in like pattern or design on each side and in register—in other words, to produce a cord-embroidered fabric reversible because alike on both sides. To effect that function and result, we have employed the Cornely nipple tube or horn to feed forward the embroidering-cord and the oscillating thread-carrier to throw the thread around the embroidering-cord; but we wholly avoid the formation of any “stitch.” In short, we provide mechanism which supplies an upper embroidering-cord, like mechanism which supplies a lower embroidering-cord, like mechanism which throws the respective upper and lower threads around the respective braiding-cords, and a hook-needle which on its upward movement through the body fabric draws with it the lower tying-in thread, loops it with the upper tying-in thread, and deposits the loop under the upper embroidering-cord, thus dispensing wholly with a separate stitch and stitch-thread, and further, utilizing the upper and lower threads (after each has been caused to pass around its adjacent embroidering-cord) to unite said opposite surface cords not only to each other through the body fabric, but to simultaneously unite both to the fabric itself by looping the two together on one side thereof.

To accomplish these functions and results, our invention consists of the mechanisms and their combination and arrangement in an organized machine, as will hereinafter be fully described.

Figure 1 is a side elevation of a machine, showing one form of the invention, parts being broken away to clearly disclose devices beyond. Fig. 2 is an enlarged central section of a part of the mechanism below the bed-plate of the machine on line *x*, Fig. 3. Fig. 3 is an under plan view of the mechanism below the bed-plate of the machine looking in the direction of the arrow *y*, Fig. 1. Fig. 4 is an enlarged end view of the parts below the bed-plate looking in the direction of arrow *z*, Fig. 1, some of the parts being omitted to avoid complication. Fig. 5 is a detail of the latch. Figs. 6, 7, 8, 9, 10, and 11 are diagrammatic views showing the successive steps in the operation of tying the cord or braid to the upper and lower surfaces

of the fabric. Fig. 12 is an end elevation of the machine looking in the direction of the arrow 10, Fig. 1.

Referring to the drawings, A designates generally the mechanism above the bed-plate A' of the machines, which mechanism is or may be of any of the usual or preferred types disclosed, for instance, by the patents hereinbefore called to attention except as hereinafter described.

Supported in suitable bearings in the upper part of the device is the main driving-shaft A², driven by the usual driving-pulleys A³, as in the patents referred to, and having secured thereto the worm A⁴, which meshes with a worm-wheel A⁵, carried by the shaft A⁶, which is provided with a bevel-gear A⁷ below the bed-plate A'.

Carried in suitable bearings *b b* of the bracket B, projecting from the under surface of the bed-plate, is the transmitting-shaft B', having at one end the bevel-gear *b'* and at the opposite end the pinion *b²*. Likewise supported in suitable bearings *b² b³*, formed in bracket B, is the parallel shaft B², having loosely mounted thereon the sleeve *b⁴*, carrying bevel-gear *b⁶* and pinion *b⁵*, the latter intermeshing with the pinion *b²*, whereby motion of the transmitting-shaft B' is imparted to the sleeve *b⁴*, as will be obvious.

Arranged in prolongation with shaft B² is the short shaft B³, having the bevel-gears *b⁷* and *b⁸* secured to rotate therewith, and surrounding the shaft B² is the sleeve B⁴, carrying at one end the large bevel-gear *b⁹* and having secured thereto, near its opposite end, the arm *b¹⁰*, as will best be seen from Fig. 2. The arm *b¹⁰* carries a stud *b¹¹*, the opposite end of which is secured to the parallel shaft B², and upon said stud is mounted the bevel-gear *b¹²*, free to rotate thereon.

Rotatably mounted in the bearing C is the sleeve C', carrying the disk or support *c*, a friction-plate *c'* being arranged to support a spool and having legs projecting through the disk and carrying a part *c²*, to be engaged by the friction-brake, to be hereinafter described. To the lower end of the sleeve C' is secured the bevel-gear C², meshing with the bevel-gear *b⁸* on the short shaft B³.

From the construction thus far described it will be seen that if motion is imparted to the shaft B' from the driving-shaft A² it will be transmitted through the described gearing connected to the bevel-gear C², the shaft B² at such times being stationary, and the spool S, carrying the tying-in thread, will be rotated to carry the thread contained thereon about the horn D, as will more fully appear.

Referring more particularly to Fig. 4, it will be noted that the disk *c* is provided with standards *c³ c³*, projecting upward therefrom, which, converging at their upper ends, form the collar *c⁴*, surrounding the upper end of the horn D. Secured to one of the stand-

ards *c³* is the thread-carrier *c⁵*, having an eye *c⁶* in the end thereof and carrying a tension device *c⁷*. From this it will be seen that as the spool S is rotated by the means described the yarn or thread from the eye *c⁶* of the carrier will be carried around the upper contracted part *d'* of the horn D, which normally stands with its upper end in close proximity to the eye *d²* in the work-plate, and the end hook-needle, as set forth in the patents referred to, being at such times below the eye *d²* in the work-plate, will have the tying-in thread wrapped or carried about it, and on the retreating movement of the hook-needle the loop of tying-in thread will be carried above the work-plate.

By reference to Fig. 2 it will be noted that the horn D has a central bore, and through this the cord or braid to be applied to the lower surface of the fabric is passed from any suitable source of supply, so that as the tying-in thread is carried about the upper end *d'* of the horn and around the hook-needle it is also carried about the cord or braid. As the cord or braid is secured to the lower surface of the fabric, it is desirable that the horn be raised somewhat to carry the cord or braid close to the surface of the fabric, and this may be done by any suitable mechanism, the form shown comprising a lifting-lever E, fulcrumed at E' and one end thereof carrying a roller *e* held in engagement with a cam E² on shaft B' by means of a suitable spring *e'*, the opposite end of the lever carrying a latch *e²*, pivoted at *e³*, the said latch being adapted to engage a recess *e⁴* in the lower end of the horn. From the detail view of the latch in Fig. 5 it will be seen that on either side of the pivot *e³* the latch is slotted, as at *e⁵ e⁶*, and that a locking-bolt *e⁷* secures the latch in engagement with the horn. As the horn thus rises and falls under the action of the cam E², lever E, and spring *e'* it is desirable that all slack of the tying-in thread be taken up. To this end the upper portion of the horn has a shoulder *d³*, Fig. 2, upon which rests the collar *d⁴*, Fig. 4, said collar being normally held seated on the shoulder *d³* by a spring *d⁵*, so that while it is free to rise with the horn it will also drop therewith by a yieldable motion. Pivoted to the standard *e³* is a take-up arm *d⁶*, carrying a wire eye *d⁷* at one end and having its opposite end in engagement with the collar *d⁴*, from which it will appear that as the thread passing to the eye *c⁶* of the carrier through the eye *d⁷* becomes slack during the rising-and-falling motion of the horn such slack will be taken up.

In the machines of the patents referred to hereinbefore it was necessary to change the position of the guide above the bed-plate when the design or pattern to be produced was changed in direction. Substantially the same or similar mechanism is employed in the present invention for the same purpose; but in addition thereto it has certain other

functions and structure that will now be described.

Rotatably mounted in the bracket-arm F, Fig. 1, is the shaft f , having secured thereto the handle-arm f' and handle f^2 , whereby said shaft may be turned as desired, such turning motion being transmitted by the bevel-gears $f^3 f^4$, shaft f^5 , gears f^6, f^7, f^8 , and f^9 to the vertical shaft f^{10} , Fig. 1, to the mechanism described in said patents for changing the position of the thread-guide. The mechanism above the bed-plate A' for effecting movement of the thread-guide may be the same as that in the patents or any suitable or preferred character and need not be further described herein. In the present invention, however, it is necessary to rotate or change the position of the horn D on its axis in accordance with the change in direction of the thread-guide, and this is secured by the following mechanism: The shaft f^{10} is extended below the bed-plate A' and carries at its lower portion a bevel-gear f^{11} , which meshes with gear f^{12} on the parallel shaft B², whereby motion of the handle-arm f' for changing the direction of the guide above the work-plate is communicated also to the parallel shaft B². Mounted to rotate in bearing G of bracket B is the bevel-gear G', meshing with bevel-gear b^9 on the sleeve B⁴, said gear G' being splined upon the horn D, as shown in Fig. 2, at g , so that while the horn is free to move longitudinally with respect to the gear G for the purpose already explained it is caused to partake of any rotary movement of the gear G.

Motion being given the handle-bar f' for changing the direction of the guide above the bed-plate parallel shaft B² is rotated and through stud b^{11} , arm b^{10} , sleeve B⁴, and gears b^9 and G the horn D is simultaneously rotated a like amount to maintain the proper relation between it and the guide above the work-plate, as will be obvious.

By reference to Fig. 1 it will be seen that the shaft f of the guide-changing mechanism has projecting through it the pin h , which at its lower end bears upon the small lever h' and at its upper end upon the end of the stopping and starting lever H, as in the patents referred to. In this device, however, it is desirable that when the machine is stopped all overrunning of the spool S, carrying the tying-in-thread, should be checked, and to this end a brake is used. The brake consists of a lever H', pivoted at h^2 to bracket B, one end h^3 of said brake-lever resting normally above the end of the stop-lever H and being forced upon the same by a spring h^4 . The other end of said lever is provided with friction-arms adapted to arrest the motion of the disk c and the spool S when the spring is at liberty to act.

While the above details of construction have been selected and described as em-

bodying one of the many forms by which the present invention may be carried out, it is to be understood that we do not intend to limit the invention in this respect, as details of arrangement and construction may be greatly varied within the scope thereof.

The operation of the invention may be described as follows with respect to Figs. 6 to 10, which successively illustrate the general relation of the upper and lower cords or braids, the positions assumed by the upper and lower thread-carriers, horns, and hook-needle during the process of tying the cord or braid to the upper and lower surfaces of the fabric. In said figures, K denotes the upper horn; k' , the upper thread-carrier; k^2 , the upper embroidering-braid; k^3 , the hook-needle; k^4 , the upper tying-in thread; D, the lower horn; l , the lower embroidering-braid; l' , the lower thread-carrier; l^2 , the lower tying-in thread, and M represents the fabric, to the opposite faces of which the embroidering-braids are to be secured. The universal-feed device is not disclosed in these figures to avoid complication. Starting with Fig. 6, the horn-needle is shown as having started upward with the lower tying-in thread engaged by its hook, the said tying-in thread having been passed around the needle and lower horn. As the needle ascends, Fig. 7, it takes the loop of the lower tying-in thread through the fabric M and, Fig. 8, through the loop n , previously formed by the upper thread-carrier k' , passing around the upper horn and upper braid, the parts being then in position at the end of the upward movement of the needle k^3 , as in Fig. 8. The feed now takes place, as indicated in Fig. 9, the upper thread-carrier moving about the upper braid and upper horn, and the needle descends successively, as in Figs. 9, 10, and 11, passing through the fabric and below the work-plate close to the upper end of the horn, whereupon the lower thread-carrier winds the lower tying-in thread about the lower horn and needle, as indicated, and the operation is repeated, the result being that the upper and lower tying-in threads are each carried around the embroidering-braid on its side of the fabric, and the said threads are then looped together by a loop passing through the fabric and binding both upper and lower braids to the faces thereof.

From the above it will appear that the engaging loops of the upper and lower tying-in threads are on one face of the fabric and will substantially lie beneath the embroidering-thread on that side, being thus by it concealed.

It has not been considered necessary to illustrate in detail the mechanism for operating the upper thread-carrier, the universal feed, and upper horn. Fig. 12 shows the arrangement and construction as being old

in the Cornely patent, No. 405,147, and wherein the part K represents the horn through which the embroidering-thread passes; k' the thread-carrier secured to the boss k^2 , which is secured to the sleeve k^3 , rotatable through the gears k^4 k^5 , the latter being secured to a stud-shaft k^6 and provided with a bevel-gear k^7 , meshing with a corresponding bevel-gear k^8 on a counter-shaft driven from the main driving-shaft of the machine, all as well understood in the art and in accordance with like parts in the Cornely patent referred to.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a machine for simultaneously securing embroidering-braids to the opposite faces of a fabric, in corresponding design or pattern, the combination with independent braid-supplying means above and below the bed-plate, and a universal feed above the bed-plate, of means to turn the braid-supplying device below the bed-plate to cause it to follow the direction of the universal feed, independent thread-supplying carriers above and below the bed-plate with means to cause each to wind its thread about its adjacent embroidering-braid, and means to draw one of said threads transversely through the fabric and unite it in a loop with the other of said tying-in threads on the opposite face of the fabric.

2. In a machine for simultaneously securing embroidering-braids to the opposite faces of a fabric in corresponding design or pattern—the combination of a horn above and a horn below the bed-plate for conducting an embroidering-braid to the opposite faces of a fabric, a thread-carrier above and a thread-carrier below the bed-plate for carrying tying-in threads about the respective embroidering-braids, means for interlooping the tying-in threads in a loop on one face of the fabric beneath the embroidering-braids, and means for periodically moving the horn below the bed-plate longitudinally of its axis.

3. In a machine for simultaneously securing embroidering-braids to the upper and lower faces of a fabric in corresponding design or pattern, the combination of a horn above and a horn below the bed-plate for conducting an embroidering-braid to each of the opposite faces of a fabric, a thread-carrier above and a thread-carrier below the bed-plate for carrying tying-in threads about the upper and lower embroidering-braids respectively, a universal feed for changing direction of feed as called for by the design or pattern, means for turning the lower horn to cause it to follow the direction of the universal feed, devices for periodically moving the lower horn longitudinally of its axis, and means for uniting the tying-in threads in a loop on one face of the fabric.

4. In a machine for simultaneously securing embroidering-braids to opposite faces of a fabric in corresponding design or pattern, the combination of a horn above and a horn below the bed-plate for conducting embroidering-braids to the opposite faces of a fabric, a thread-carrier above and a thread-carrier below the bed-plate for carrying tying-in threads about the upper and lower embroidering-braids respectively, a universal feed disposed above the bed-plate, means for turning the lower horn to follow the movement of the universal feed, a hook-needle disposed above the bed-plate and means for reciprocating said hook-needle to cause it to loop the tying-in threads together.

5. In a machine for simultaneously securing embroidering-braids to opposite faces of a fabric in corresponding design or pattern, the combination of a horn above and a horn below the bed-plate for conducting embroidering-braids to the opposite faces of a fabric, a thread-carrier above and a thread-carrier below the bed-plate for carrying tying-in threads about the upper and lower embroidering-braids respectively, a universal feed and hand-operative means for adjusting the universal feed, devices operatively connected to the said hand-operative means for turning the lower horn to follow the adjusting movement of the universal feed, and a hook-needle for looping the tying-in threads together.

6. In a machine of the character described, the combination of a horn above and a horn below the bed-plate of the machine for conducting embroidering-braids to the opposite faces of a fabric, a thread-carrier above and a thread-carrier below the bed-plate, means for causing said thread-carriers each to wind its thread about the embroidering-braid adjacent thereto a hook-needle for looping the threads of the carriers together, stopping and starting devices, and a brake automatically operative on stopping the machine to stop the lower thread-carrier.

7. In a machine for simultaneously securing embroidering-braids to opposite faces of a fabric in corresponding design, the combination with a braid-conducting horn above and another below the bed-plate, a universal feed above the bed-plate, means to cause the lower horn to follow the movements of said feed and deposit its braid to correspond with the pattern formed by the upper braid, a thread-carrier above and another below the bed-plate, means to cause each of said thread-carriers to wind its thread about the embroidering-braid adjacent thereto, means to tighten the pull of the lower tying-in thread on its adjacent embroidering-braid, and means to draw the lower tying-in thread upward through the body fabric, loop it with the upper thread, and deposit such loop beneath the upper embroidering-braid.

8. In a machine of the character described,

the combination of a braid-supplying horn, a thread-carrier, a universal feed and operative means therefor, disposed above the bed-plate, a braid-supplying horn and a thread-carrier, disposed below the bed-plate; means for operating the said carrier, comprising a transmitting-shaft, gearing connection between the said shaft and carrier, means for moving the lower horn in unison with the universal feed, comprising a parallel shaft and gearing connection between said shaft and lower horn; a hook-needle with means to cause it to loop the upper and lower threads

on one side of the fabric; and connecting and actuating gearing between said elements to drive them in unison of time and function.

In testimony whereof we have hereunto affixed our signatures this 2d day of November, A. D. 1903.

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