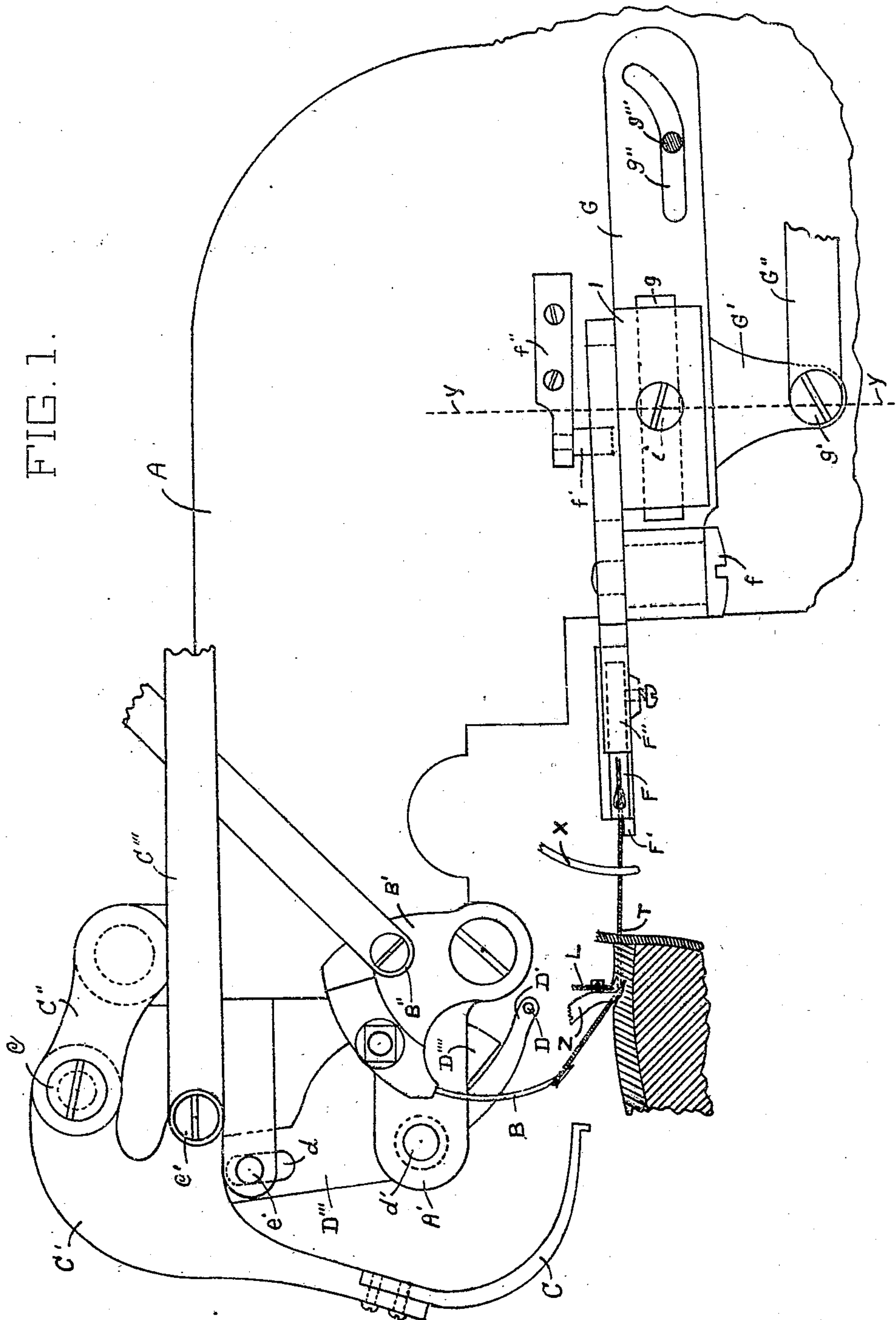


956,469.

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SHOE SEWING MACHINE.
APPLICATION FILED OCT. 2, 1905.

Patented Apr. 26, 1910.

4 SHEETS—SHEET 1.



WITNESSES.

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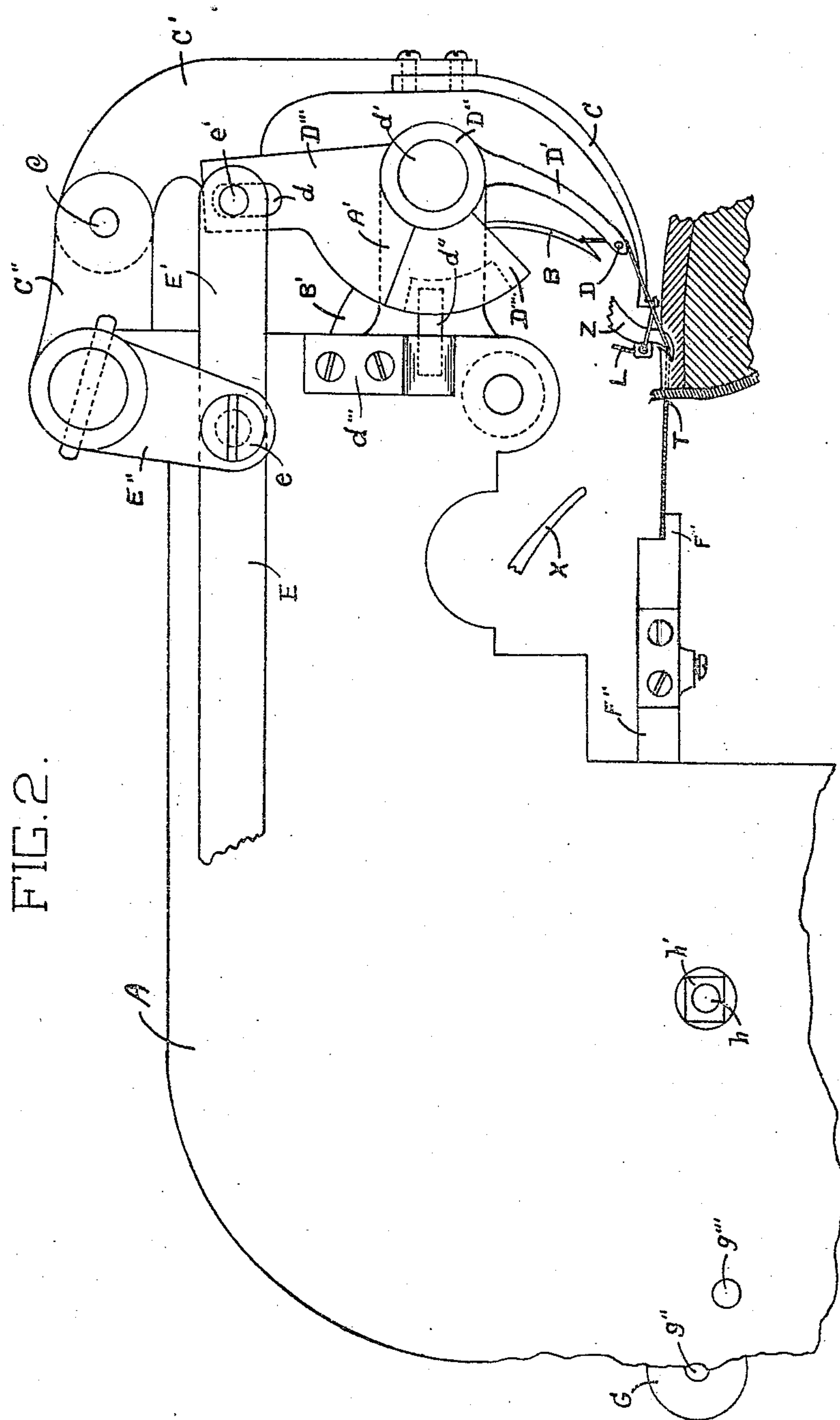


FIG. 2.

WITNESSES.
Charles S. Butters.
William H. Brown

INVENTOR.
Edwin E. Bean

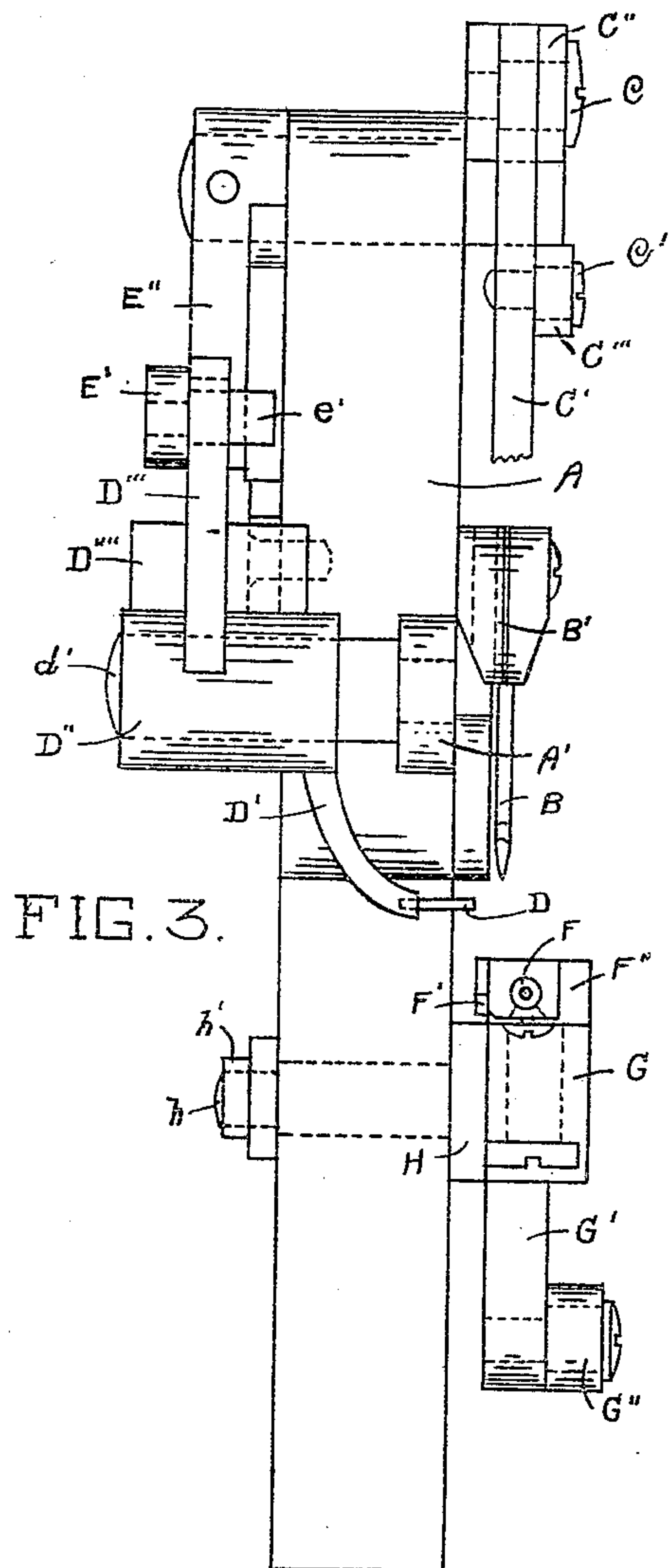


FIG. 3.

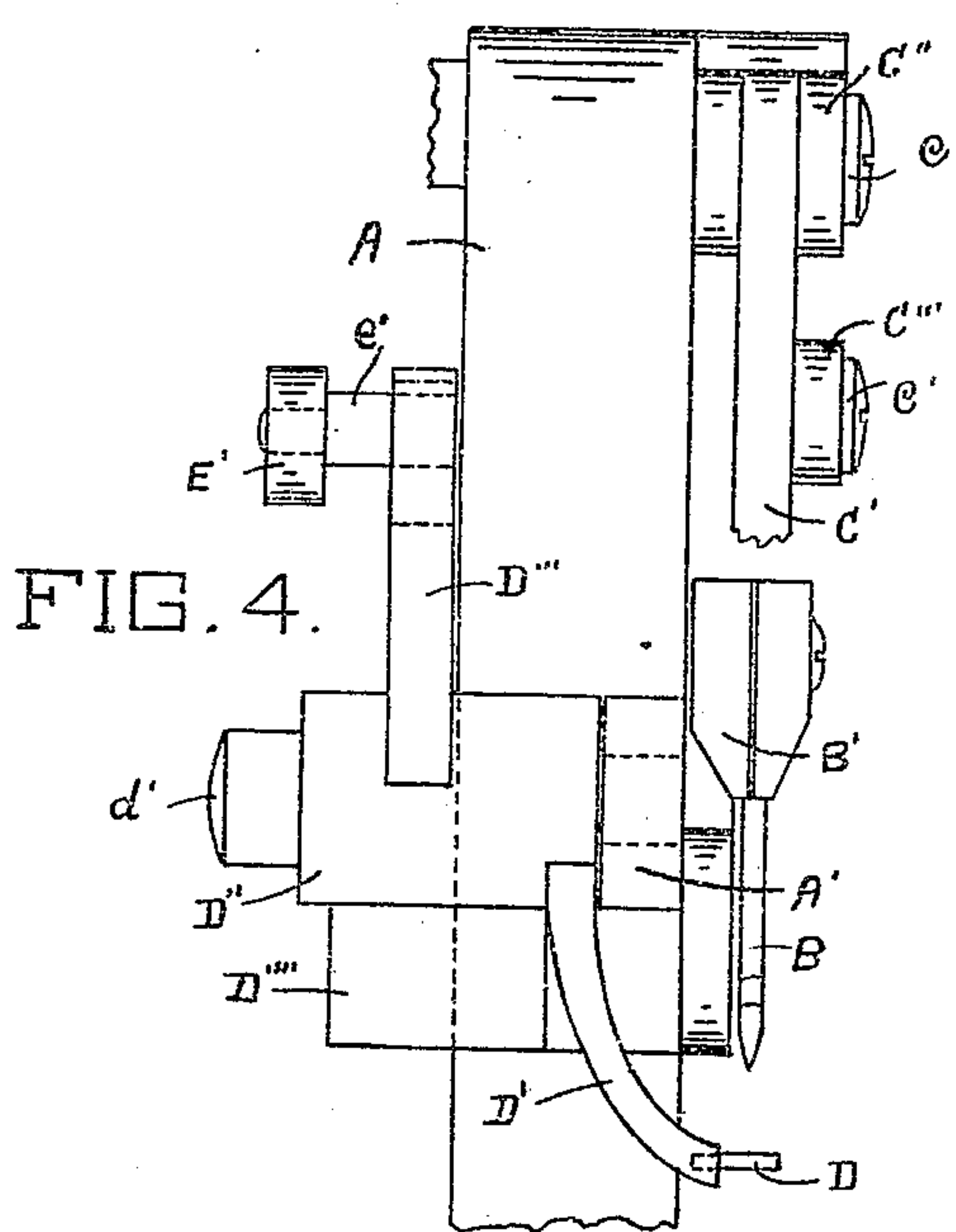


FIG. 4.

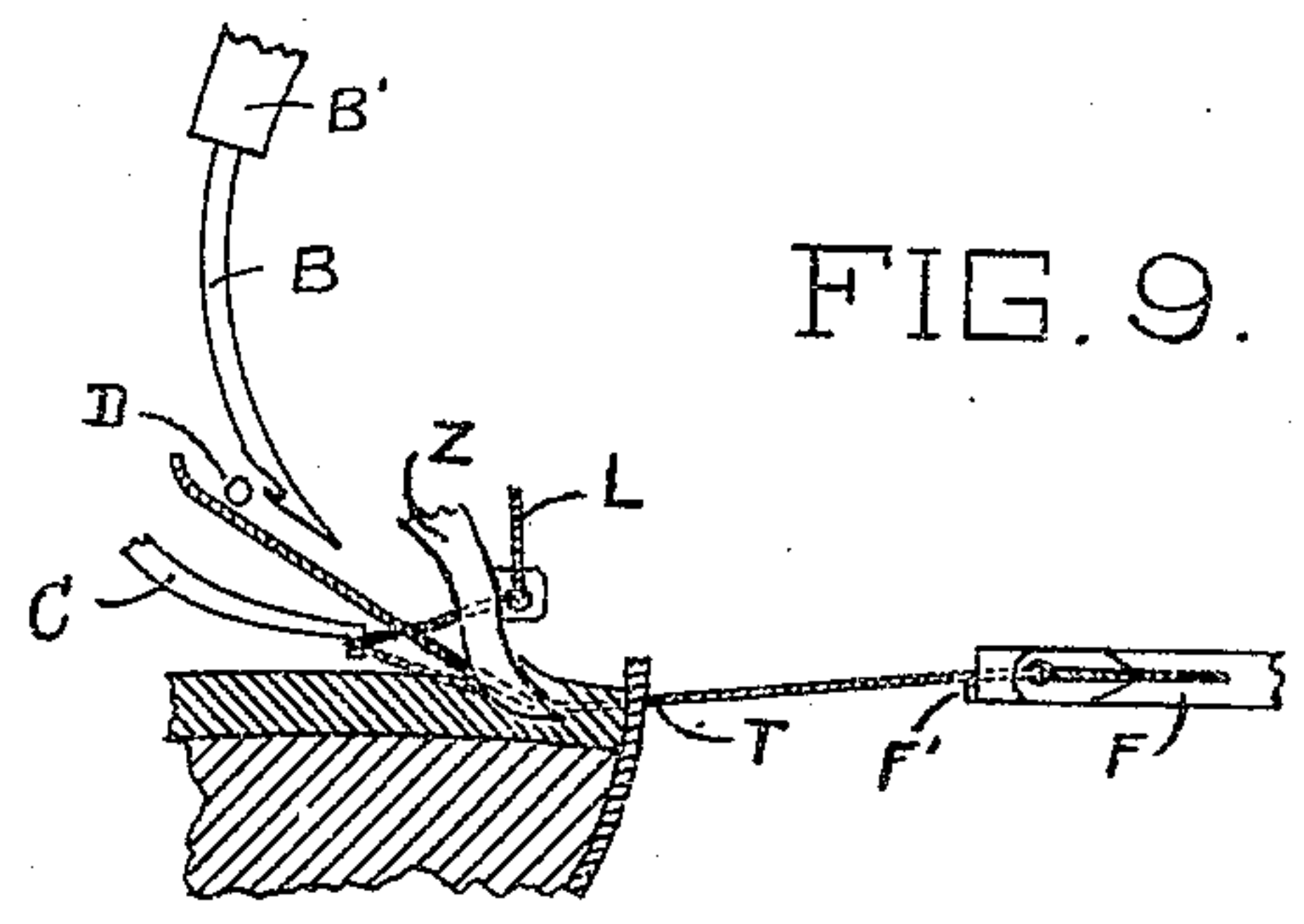


FIG. 9.

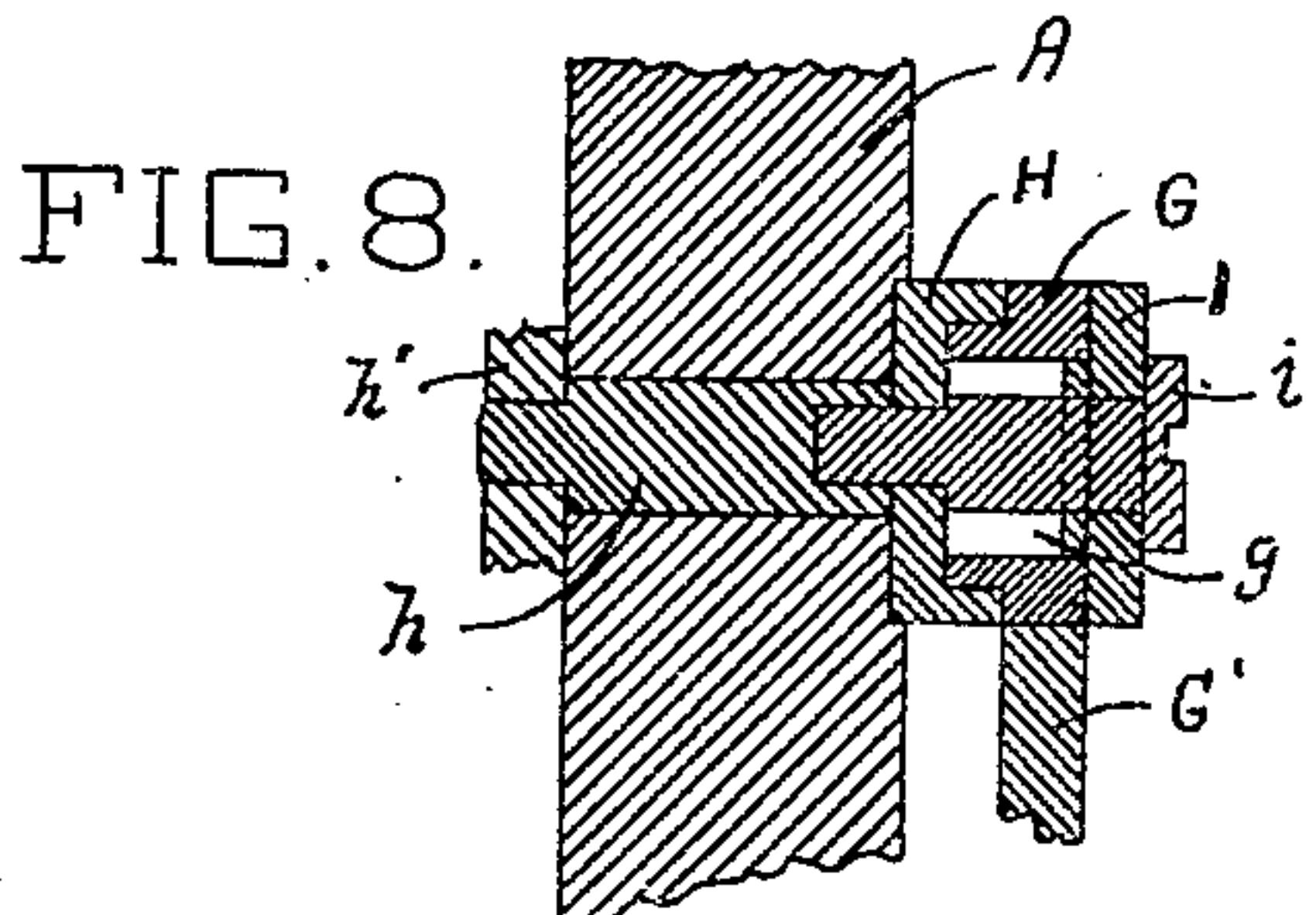


FIG. 8.

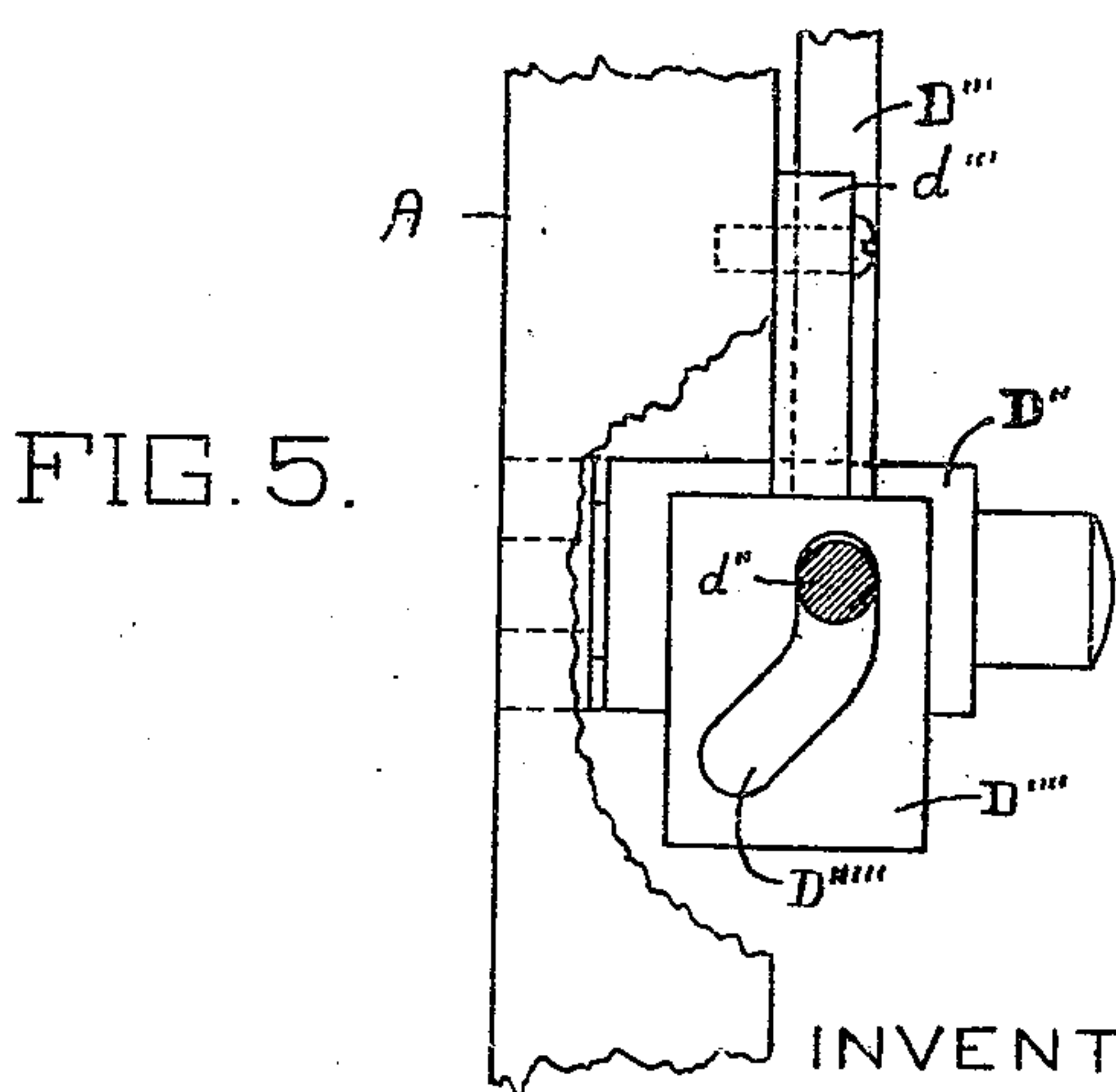


FIG. 5.

WITNESSES.
Charles S. Butters
William H. Brown

INVENTOR.
Edwin E. Bean

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4 SHEETS—SHEET 4.

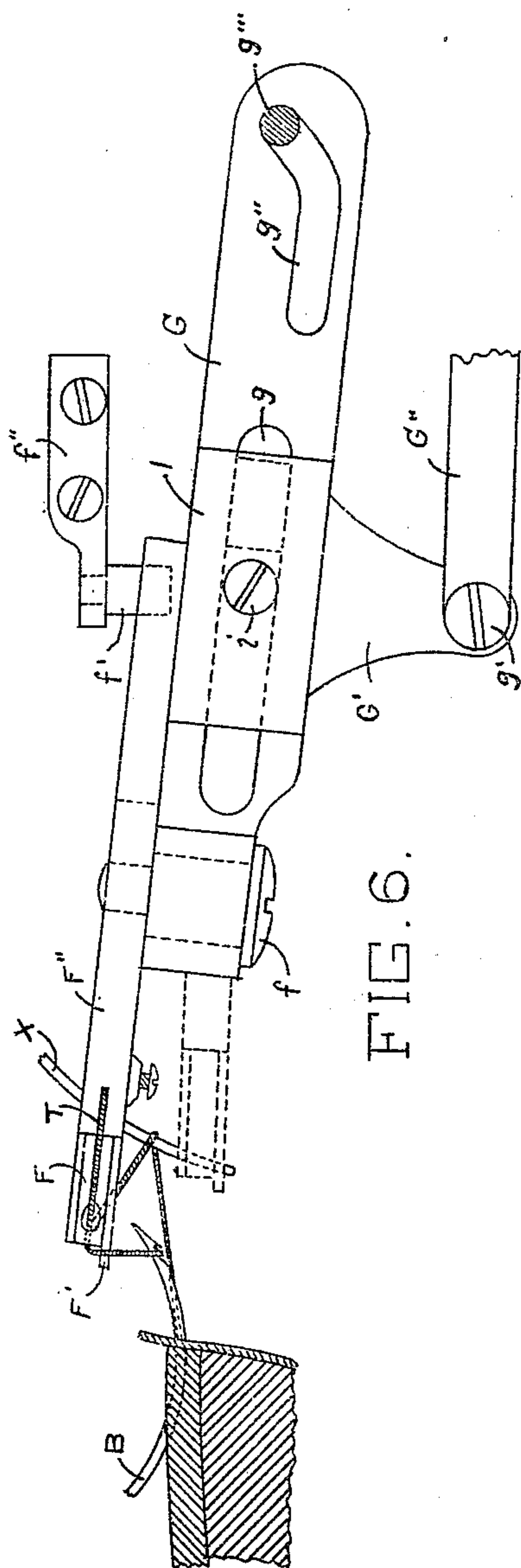


FIG. 6.

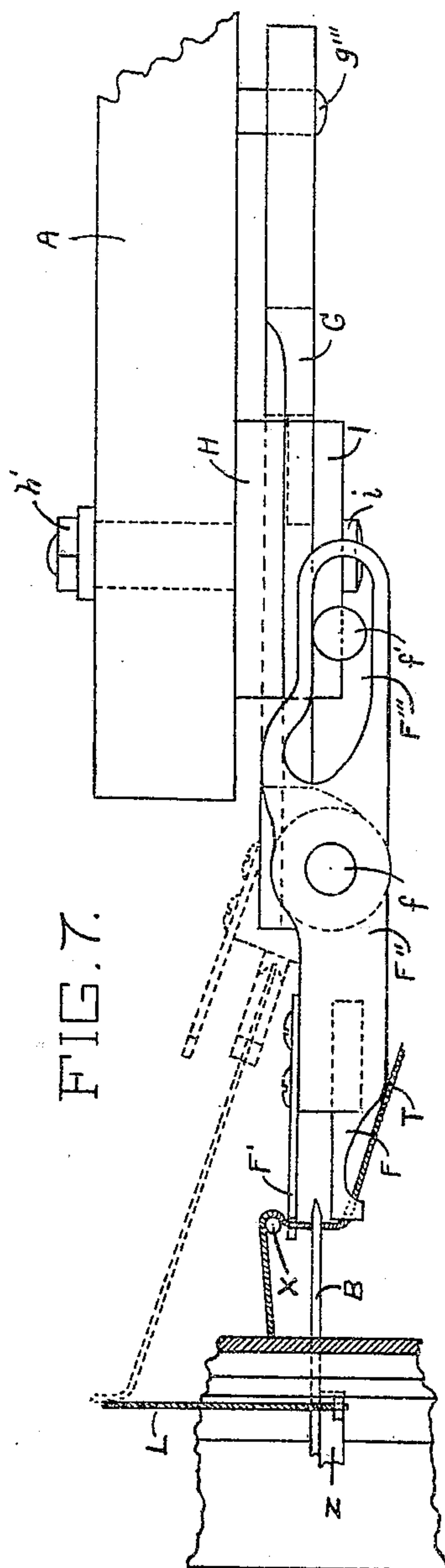


FIG. 7.

WITNESSES.
Charles S. Butters
William H. Brown

INVENTOR.
Edwin E. Bean

UNITED STATES PATENT OFFICE.

EDWIN E. BEAN, OF WARNER, NEW HAMPSHIRE.

SHOE-SEWING MACHINE.

956,469.

Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed October 2, 1905. Serial No. 280,900.

To all whom it may concern:

Be it known that I, EDWIN E. BEAN, of Warner, in the county of Merrimack and State of New Hampshire, have invented certain new and useful Improvements in Shoe-Sewing Machines, of which the following, taken in connection with the drawings now filed in this connection, is a specification.

My invention relates to improvements in that class of shoe sewing machines commonly known as "loop lock" machines, their stitches being formed with two threads by drawing a loop of one thread through the upper and sole of a shoe by means of a curved hook needle, and then passing a short loop of another thread through the first loop, and then drawing the first loop up tightly around the short loop, thereby joining the upper to the sole of a shoe by the combined threads.

The mechanisms and devices for performing the above operation by an organized machine are described in Letters Patent of the United States granted to me October 11, 1898, No. 612,150; January 15, 1901, No. 666,225; and April 15, 1902, No. 697,600, and they do not perform their functions satisfactorily as constructed, combined, and operated in the aforesaid machines, and the object of this my present invention is to remedy such defects and render the machines more practical and useful.

Having stated the object of my invention, I will now proceed to show how I have carried it out.

Referring to the drawings, Figure 1 represents a left hand side elevation of the upper part of the frame of a machine of this class, showing the needle thread guide, thread finger, looping hook, cast-off, thread measurer and channel guide in their respective positions when the machine is ready to start up to form a stitch. Fig. 2 is a right hand side elevation of the same, showing the changed position of the looping hook, cast-off, and thread measurer, also the relative positions of the two threads at the point where the needle has drawn its loop through the material to its fullest extent. Fig. 3 is a front end elevation of Fig. 1 showing the relative positions of the needle, cast-off, thread guide, and lifting finger, from a front view point, and Fig. 4 a front view of Fig. 2, showing the changed relative positions

of the needle and cast-off. Fig. 5 is a rear view of the devices for transmitting lateral movements to the cast-off. Fig. 6 is a left hand side view of the needle threading devices and mechanism, showing the thread guide and lifting finger in their highest positions, relative to the needle, after depositing the thread into the hook, the dotted lines showing them in their lowest positions when drawn backward to the position shown in Fig. 2. Fig. 7 is a plan view of Fig. 6, showing the relative positions of the needle, thread guide, and lifting finger, with the thread measurer, just prior to being carried upward to the position shown in Fig. 6. Fig. 8 is a cross section, taken on a vertical line *y* with the center of the pivoted guideway, showing details of the construction of the several parts at that point. Fig. 9 is a left hand side view of the needle, looping hook, cast-off, and threads, in their relative positions when the needle has been advanced past, and above the cast-off far enough to disengage its loop from its hook.

The fragmentary connecting rods *C''*, *B''* and *E* shown in Figs. 1, 2 and 6, are oscillated by cams (not shown) mounted in the usual way on a driving shaft, journaled in the frame of the machine, their connection with the connecting rods being fully set forth in my patent of January 15, 1901, No. 666,225, as are also the channel guide *Z* and thread measurer *X*, no further description of them in detail being deemed necessary in this connection.

The letter *T* represents the primary, or needle thread, and the letter *L* the locking, or secondary thread.

Referring to the drawings, Figs. 1 and 2 represent the upper forward part of the frame of a machine of this class, on which are mounted the several devices comprising my new invention, which comprises a curved hook needle *B* secured (in the usual manner) to a segment *B'* pivoted to the frame, and oscillated by a connecting rod *B''* in the usual manner.

The needle threading devices shown in detail in Figs. 6, 7, and 8 consist of a guide *F* (provided with a longitudinal hole in its forward end, and a recess cut into its outer side to admit the thread and allow it to pass out of said hole) which is socketed in the forward end of a laterally swinging arm *F''*, to the inner side of which is secured a

thread lifting finger F' , provided with a shoulder on its upper side, see Figs. 2, 6 and 7. The arm F'' , Figs. 6 and 7, is pivoted at its center to the forward end of a sliding bar G , by a screw f , its rear end being provided with a curved slot F''' , into which a loosely fitting pin f'' , secured to the frame by a bracket f''' , projects downwardly. The sliding bar G is tongued on its inner side into a grooved guideway H , and is held in place thereon by a cap piece I , through the center of which a retaining screw i passes and extends through a longitudinal slot g in the bar G , see Fig. 6, and is screwed into the center of the guideway H and its pivoted shaft h , see Fig. 8. The guideway H , Fig. 8, is provided with a short shaft h , projecting from its inner side, which is journaled in the frame, and held from moving laterally by a nut h' . The sliding bar G , Fig. 6, is also provided with a slot g'' , curved upward at its outer end, through which projects a loosely fitting fixed pin g''' secured in the frame A , and also has secured to it a downwardly projecting arm G' , to the lower end of which a connecting rod G'' is pivoted by a screw g' . The connecting rod G'' is oscillated longitudinally in the usual manner, and by its forward and backward movements, in conjunction with the action of the slots F''' g'' and guide pins f'' g''' , carries the thread guide F and lifting finger F' into the various positions shown in Figs. 1, 6 and 7. Fig. 7 shows the carrier F and finger F' in two different positions relative to the needle, the dotted lines showing them when drawn back to their fullest extent, with the thread T extended from its guide F into conjunction with the thread L , which has been passed through its guide Z , the loose ends of both threads being controlled, and held, in the position indicated by dotted lines, by the operator, previous to starting the machine to form the first stitch, and when the guide F and finger F' have been advanced to the position shown in full lines the thread T will be carried forward and bent around the thread measurer, and bent around the shoulder of the finger F' , extending at a right angle across the path of the needle, and when the guide and finger are still further advanced they will be carried forwardly and upwardly and deposit a strand of the thread T into the hook, substantially at a right angle with the needle, which then draws a loop of said thread back into the material, thereby securing the loose end of the thread T , the loose end of the thread L being secured when the first stitch has been completed, requiring no further aid from the operator in making succeeding stitches.

The looping hook C , Figs. 1, 2 and 9, which is normally located outside of the arc of the path of the needle, is secured to a pendent

arm C' , hinged at its upper end to a horizontal arm C'' , said arm on its inner side being provided with a short shaft see Figs. 1 and 3, which is journaled in the upper part of the frame, to the outer end of which a downwardly projecting arm E'' is secured, said arm being connected at its lower end to a connecting rod E by a pivot screw e . The connecting rod E , Fig. 2, is oscillated longitudinally in the usual manner and transmits a vertical movement to the looping hook, through their intermediate connecting devices. The connecting rod on being oscillated, transmits longitudinal movements to the arm C' and looping hook.

The cast-off and operating devices, Figs. 1, 2, 3 and 4, consists of a short finger D (preferably round in form) which is secured in the outer end of a curved depending arm D' , the upper end of which is integral with a hub D'' , which is journaled on a short shaft d' , on which it turns and slides longitudinally, the inner end of said shaft d' being firmly secured to a forwardly projecting arm A' forming part of the frame. Another arm D''' , also integral with the hub D'' , projects upward and is provided with a slot d , near its upper end, through which projects a round pin e' , the inner end of which is firmly secured to the extended end, E' , of the connecting rod E , the backward oscillation of which (in performing its other function of operating the looping hook) turns the hub D'' on the shaft d , and carries the cast-off D from its highest position as shown in Fig. 1, to its lowest position as in Fig. 2. The oscillation of the connecting rod E' also effects the transverse movements of the cast-off D , and carries it from its position shown in Figs. 1 and 3 to those shown in Figs. 2 and 4 in the following manner. The hub D'' , see Figs. 2, 3 and 5, has a projection D'''' , in the form of a segment, extending rearwardly, in the periphery of which a spiral groove D''''' , see Fig. 5, is provided, which is traversed by a fixed pin d'' , secured in a bracket d''' , which is in turn secured to the frame A , the resultant action of the groove D''''' and pin d'' being to carry the hub D'' , its arm D' and cast-off D toward and from the path of the needle.

The above described devices when incorporated in a machine of the class described, and the several cams adjusted in the proper relation with each other, and the driving shaft turned, so as to bring the needle, thread guide, looping hook, and cast-off into their initial positions, shown in Fig. 1, and the threads, leading from their thread supplies, passed through their respective guides, the machine is ready to be started up to form its first stitch.

The operation is as follows:—The operator at this point introduces the work

into the machine controlling the loose ends of the threads in the usual way, and then proceeds to start the machine and the needle advances until its point has passed forward through the work, when the thread guide and lifting finger start forward from their initial positions, and they, with the needle, advance together until the needle reaches the end of its forward stroke, where it rests, at which time the thread guide and lifting finger reaches the position, shown by dotted lines, in Fig. 6, and continues to advance until it reaches the position shown in full lines, where they rest, having deposited the thread in the hook of the needle. The needle now retreats, carrying a loop of thread back with it, until its hook is back in the work, at which point the thread guide and finger start backward in their reverse movements, the needle meanwhile moving in unison, until they have reached their initial positions, where they rest, the needle having at this time reached two-thirds of its backward stroke, at which point the looping hook starts forward, meets the needle, passes forward through its loop and continues to advance until its hook is over and beyond the locking thread L, at which time the needle reaches the end of its backward stroke, where it rests. The looping hook is now moved downward, engages with the locking thread, and draws a short loop of it back through the needle loop, as shown in Fig. 1. Simultaneously with the downward movement of the looping hook the cast-off is carried forward and downward from its initial position, shown in Figs. 1 and 3, to the position shown in Figs. 2 and 9, having engaged with the upper sides of the two strands of thread forming the needle loop and bent them down below the path of the needle, where it, together with the looping hook, rests. The needle now advances from its initial position until its hook passes by, and above the cast-off a sufficient distance to disengage its loop from its hook, as in Fig. 9, at which point the loop is left free to be drawn up, in the usual manner, around the locking loop sufficiently taut to prevent the locking loop from escaping from the needle loop when freed from the looping hook. At this point the looping hook starts on its reverse movement, releasing the locking loop, after which it is carried back to its initial position, where it rests. Simultaneously with its reverse movement just described, the needle and cast-off are carried backward from their positions shown in Fig. 9 to their initial positions, as in Fig. 1. The final tightening up of the needle loop around the locking loop to set the stitch, which, is effected in the usual manner, takes place at the point where the looping hook frees its loop, which operation completes the first stitch, and leaves the several de-

vices at rest in their initial positions, ready to repeat the operation. At the point in the operation just described, *i. e.*, when the stitch has finally been set, the thread guide F and finger F' which have remained at rest in their initial positions, are carried backward laterally to their full extent (as shown by dotted lines in Fig. 7) to allow the thread measurer to become engaged with the thread T, after which they are carried forward to their initial positions, with the loose ends of the thread attached to the work, they requiring no further aid from the operator in starting to make the second stitch.

Having now described the construction and mode of operation of my new invention, what I claim and desire to secure by Letters Patent is:—

1. In a sewing machine of the class described, the combination of a curved needle having its hook on its side of longest curvature adapted to draw a loop of thread through the work, a movable arm D', and cast off finger D, secured thereto, and located at one side of the needle, means to advance said finger across the needle path and swing it down below the needle, engaging with the upper sides of the threads that form the needle loop, and force it out of the hook of needle.

2. In an organized sewing machine of the class described, the combination of the following instrumentalities; a curved hook needle having its hook on its side of longest curvature, means to oscillate and advance it through the work, to engage with, and afterward draw a loop of thread back through the work, a thread guide F, and finger F', means to carry them from their normal positions forwardly and upwardly whereby they carry a strand of thread, upward, into the hook of the needle, a looping hook C, and means to carry it through the needle loop and draw a short strand of locking thread back through the needle loop, and a cast off, comprising a horizontal finger D, and means to oscillate it laterally to and across the path of movement of the needle as, and for the purpose set forth.

3. In a sewing machine of the class described, in combination, a curved needle B, having its hook on its side of longest curvature, means to oscillate it in the arc of a circle and advance it through the work, and a thread guide F and thread lifting finger F', and means to oscillate and advance them from their initial position, forwardly and upwardly, whereby they carry a strand of primary thread upward into the hook of the needle, and a thread disengaging finger D, means to oscillate and advance it into contact with the upper sides of the threads forming the needle loop and bend them down below the path of the needle, and a

looping hook C, normally located outside of the arc of the path of the needle, means to oscillate and advance it through the needle loop and engage it with a strand of secondary thread and draw a short loop of said thread back through the needle loop, substantially as, and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN E. BEAN.

Witnesses:

WILLIAM WHITE,

ELLEN F. BEAN.