

**No. 627,741.**

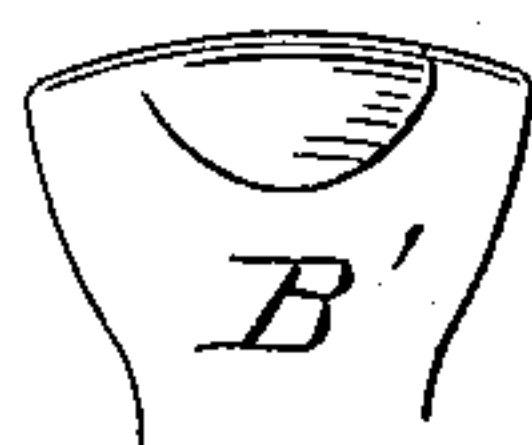
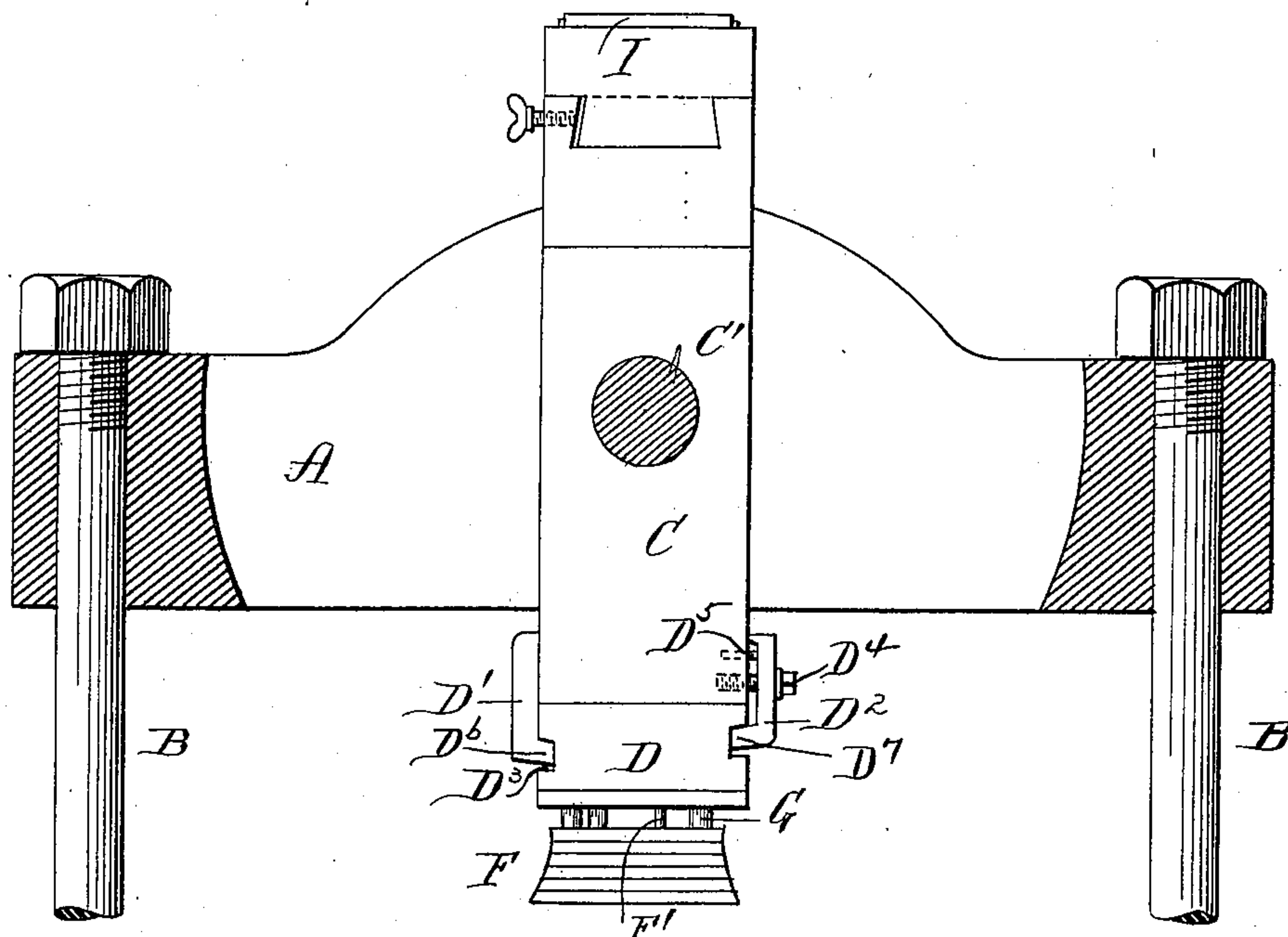
**Patented June 27, 1899.**

**E. WOODWARD.**  
**HEEL ATTACHING MACHINE.**

(Application filed Jan. 21, 1899.)

(No Model.)

**2 Sheets—Sheet 1.**



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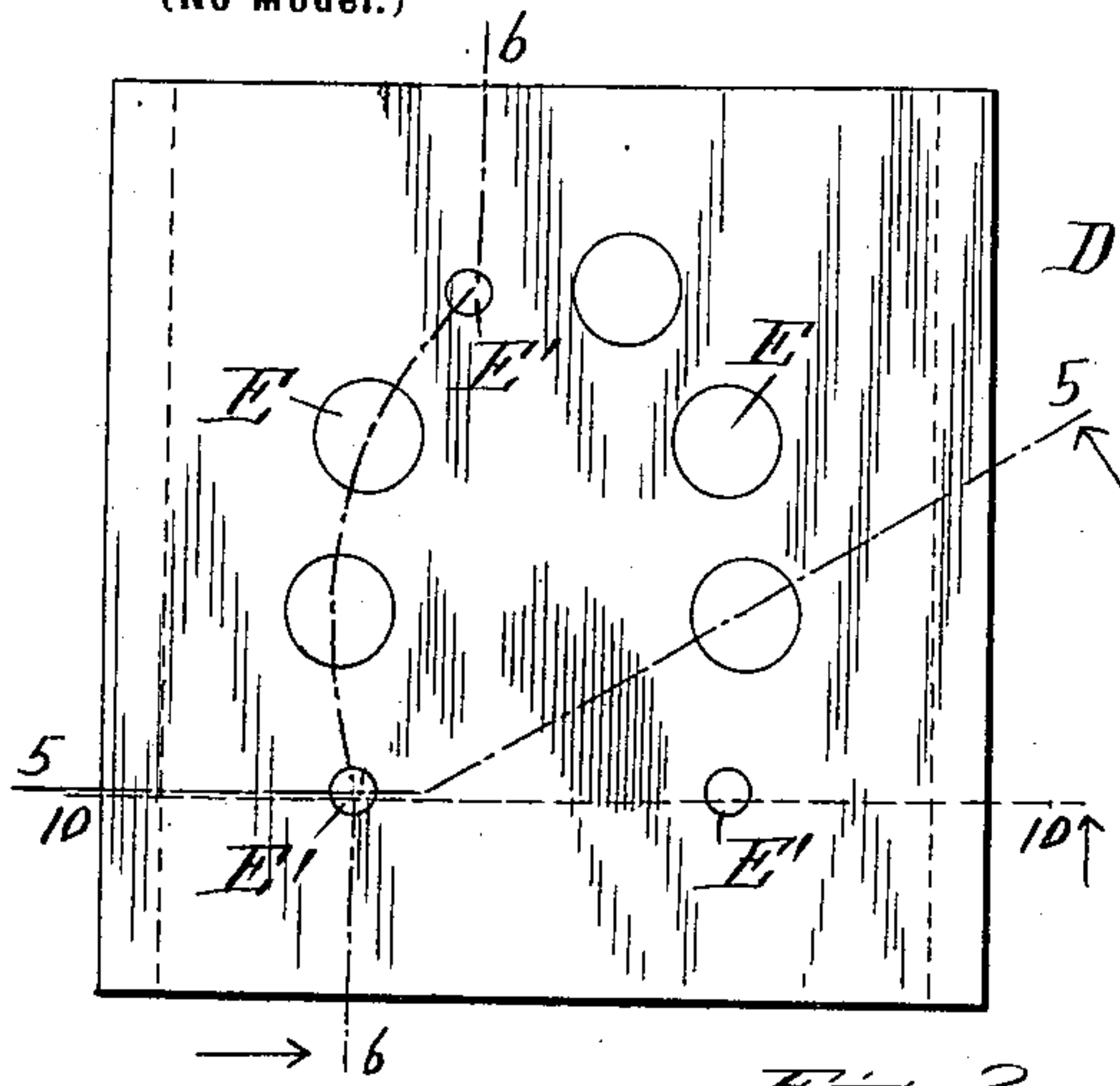


Fig. 2.

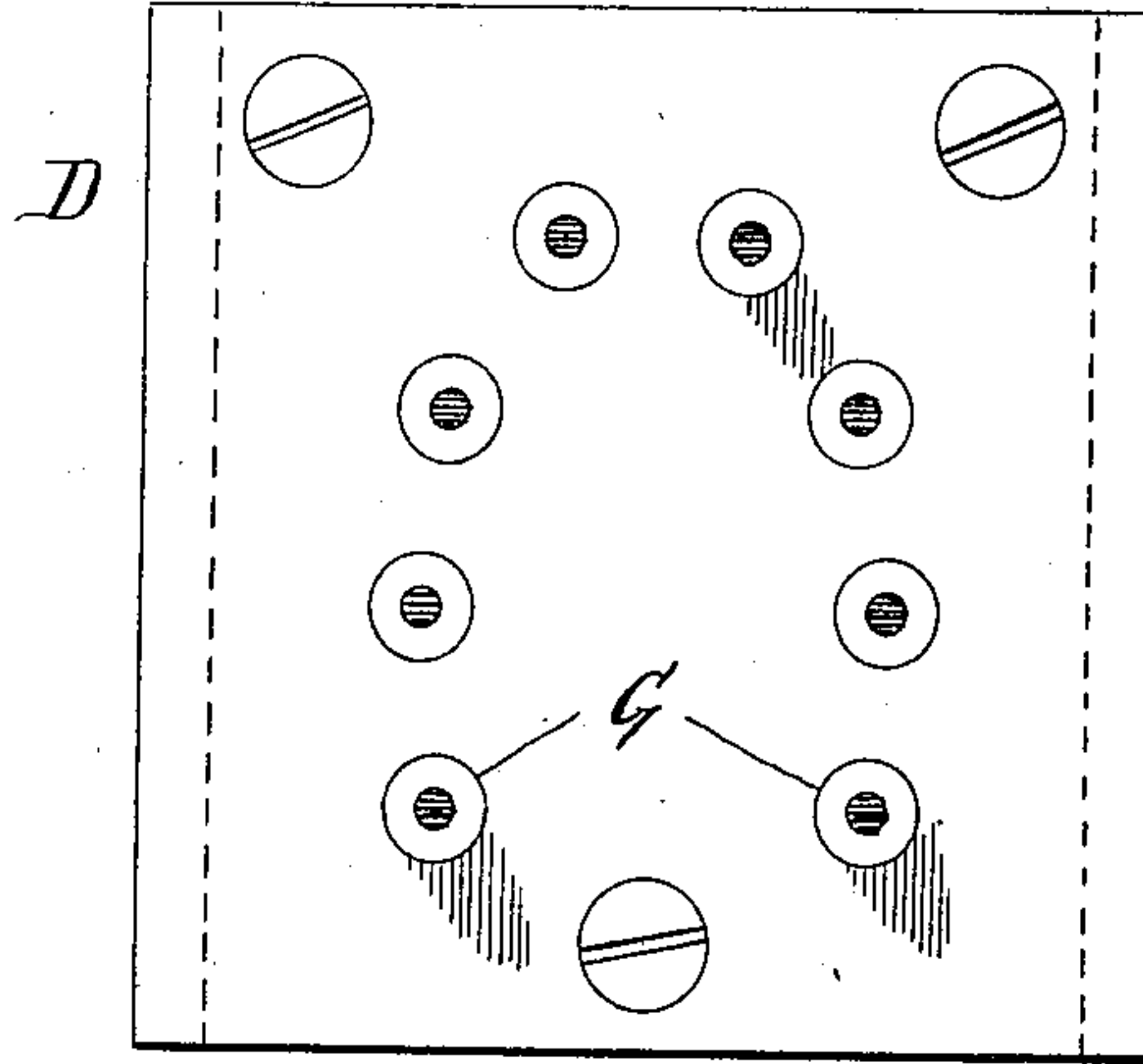


Fig. 3.

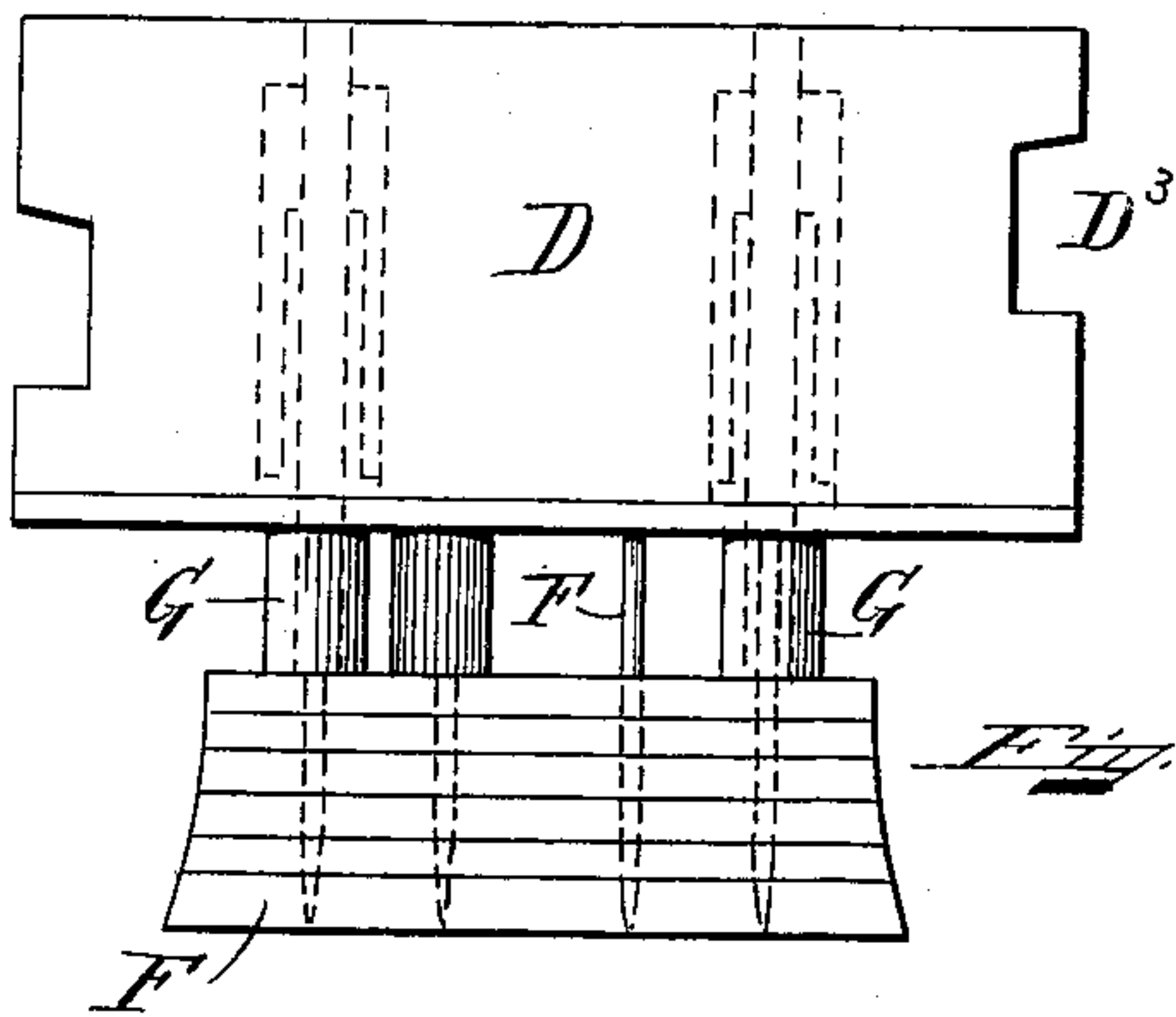


Fig. 4.

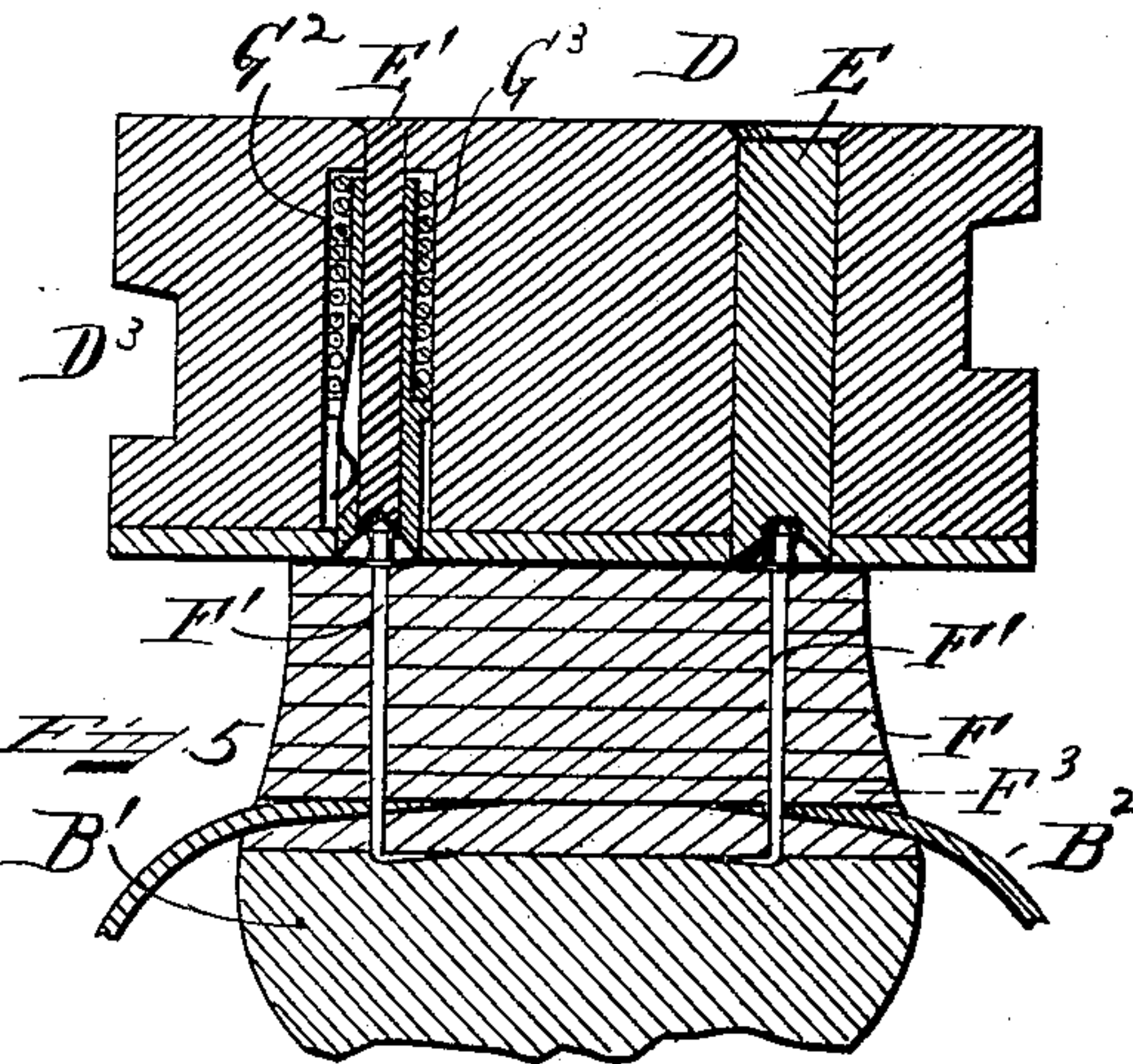


Fig. 5.

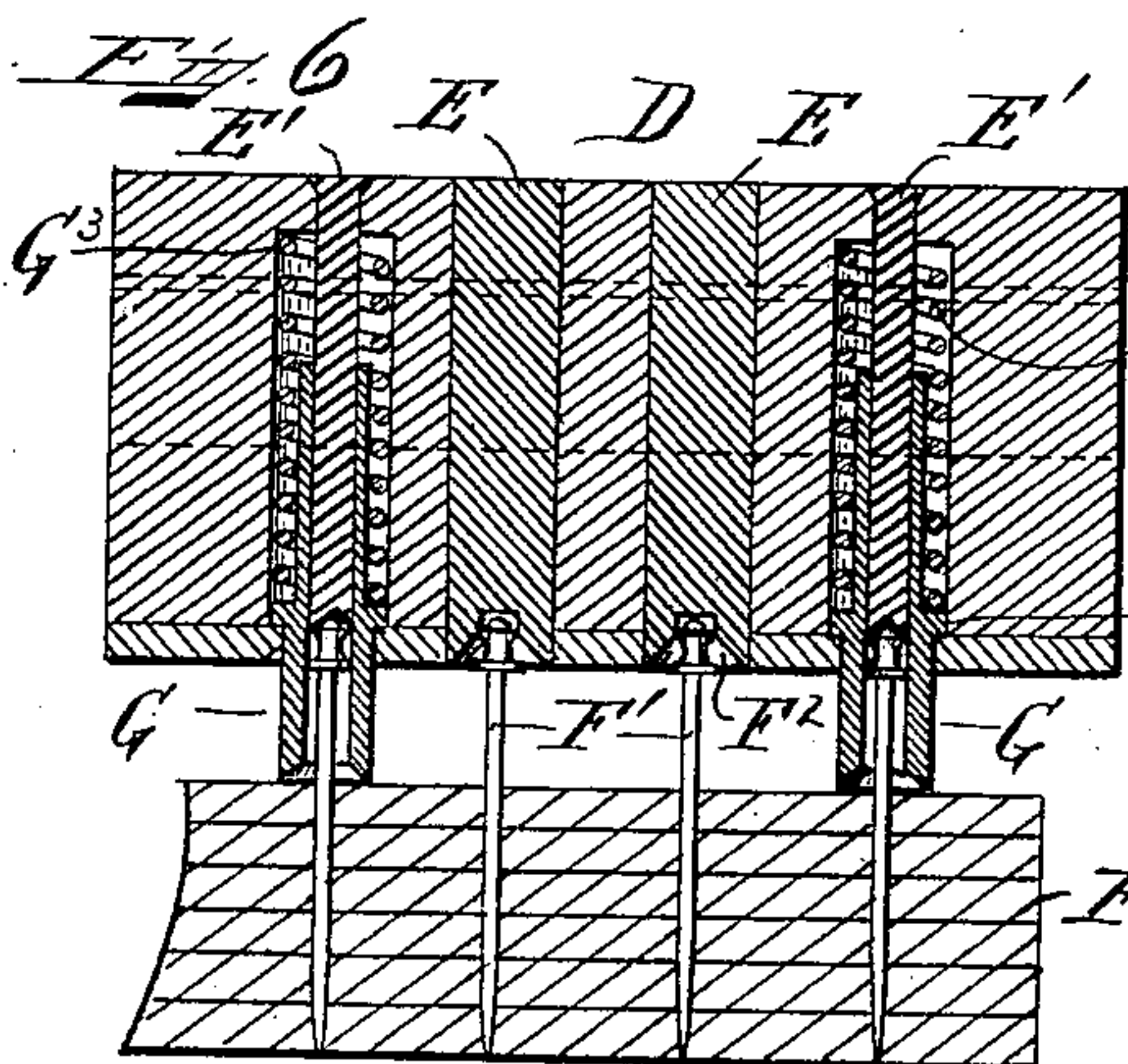


Fig. 6.

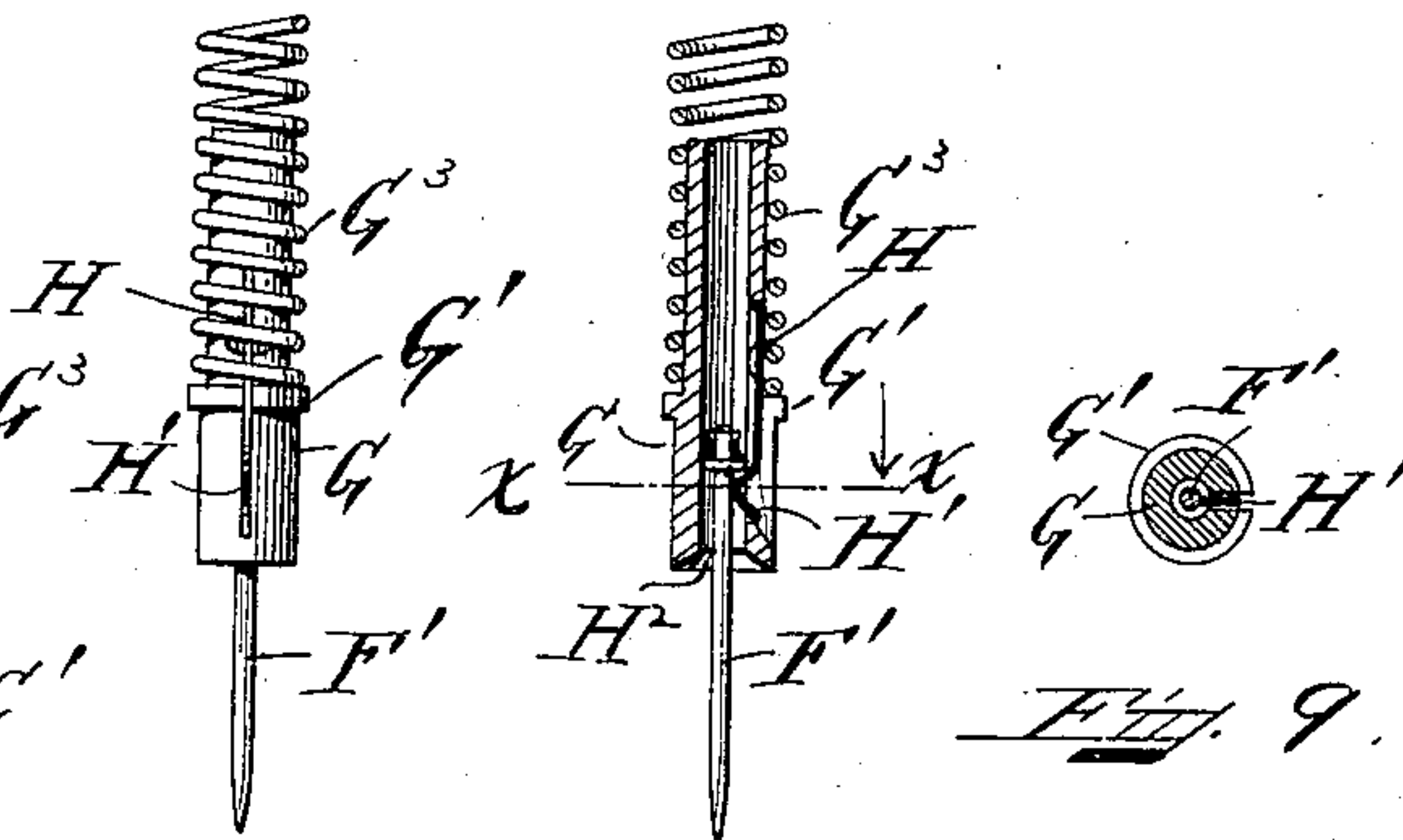


Fig. 7.

Fig. 8.

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# UNITED STATES PATENT OFFICE.

ERASTUS WOODWARD, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO  
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## HEEL-ATTACHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 627,741, dated June 27, 1899.

Application filed January 21, 1899. Serial No. 702,943. (No model.)

*To all whom it may concern:*

Be it known that I, ERASTUS WOODWARD, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain  
5 new and useful Improvements in Heel-Attaching Machines, of which the following is a specification.

My invention relates to a machine for attaching heels loaded with nails to the heel-seats of the soles of boots and shoes, and is especially adapted to be used with such heels as are constructed by the operation of the nailing-machines shown in reissued United States Letters Patent No. 11,486, dated April  
15 16, 1895, although it is equally well adapted for all heels in which the attaching-nails are driven before the heel is attached to the sole of the boot or shoe.

My invention consists of certain novel features hereinafter described, and particularly pointed out in the claims.

My invention is shown applied to a heel-machine in which there is a vertically-reciprocating head carrying an arm adapted to be  
25 oscillated by a shaft, one end of said arm carrying the nail-driving mechanism for attaching heels and the other end of said arm carrying the top lift to be attached to the heel at the proper time. I have not shown the  
30 mechanism for reciprocating the cross-head, as it is too well known in the art to require a description.

In the accompanying drawings, which illustrate a construction embodying my invention, Figure 1 represents a vertical section of such cross-head as is referred to with the jack in position for holding the shoe to be heeled. Fig. 2 is a top plan view of the nail-driving block for attaching a heel to the heel-  
40 seat of the boot or shoe. Fig. 3 is a bottom plan view of the nail-driving block reversed or as the nail-driving block would appear when uppermost. Fig. 4 is a front detail view of the nail-driving block. Fig. 5 is a sectional view of the nail-driving block, taken on the broken line 5 5, Fig. 2. Fig. 6 is a sectional view through the nail-driving block, taken on the line 6 6, Fig. 2. Figs. 7 and 8 are respectively side and central sectional views of  
50 one of the sleeves, showing a spring engaging a nail to hold the heel in position on the nail-

driving block. Fig. 9 is a sectional view on the line X X, Fig. 8. Fig. 10 is a cross-sectional view through the nail-driving-block on the line 10 10, Fig. 2.

Like letters of reference refer to like parts throughout the several views.

In the drawings, A represents the cross-head, (shown in section in Fig. 1,) and B rods by which it is reciprocated.

B' is a last supported on a suitable jack and on which is placed the shoe B<sup>2</sup> for heeling.

The arm C carries at one end the usual spring-clamps for holding the top lift. This arm C is mounted on a suitable shaft C' and  
65 may be located in any desired way, either in the position in which it is shown or the reverse position, with the driving mechanism in a position to receive the loaded heel F.

D is a nail-driving block adapted to be attached to one end of the arm C by clamps D' D<sup>2</sup>, fitting in the recesses D<sup>3</sup> of the driving-block. The clamp D' is cast with the arm C, and the clamp D<sup>2</sup> is movable to release the driving-block D, which can be fixed fast in its  
75 adjusted position by means of the set-screw D<sup>4</sup>. The pin D<sup>5</sup> moves in a slot in the arm C, and its object is to hold the clamp D<sup>2</sup> in its vertical position. By loosening up the set-screw D<sup>4</sup> the nail-driving block may be moved along  
80 the inward extensions D<sup>6</sup> D<sup>7</sup> of the clamps D' and D<sup>2</sup> to any desired position and then secured by tightening up the set-screw D<sup>4</sup>. These two clamps form a longitudinal guide-way in which the nail-driving block may be  
85 adjusted. This driving-block is provided with a series of large drivers E, secured in the block, and also three small drivers E'. The ends F<sup>2</sup> of the large drivers are beveled, this construction enabling the nails to enter the drivers  
90 readily. The three small drivers E' pass down into the hollow sleeves G, extending beyond the face of the block and provided near their lower ends with a circular shoulder G', resting against the bottom side of the block D.  
95 The spring G<sup>3</sup> is located around said sleeve and bears at its lower end against the collar G' and at its upper end against the upper limit of the recess G<sup>2</sup>, in which are located the driver E' and the spring G<sup>3</sup>. On one side of  
100 the sleeve G, as shown in Figs. 7 and 8, is a spring H, which is curved inwardly at its lower



end and projects far enough into the sleeve G to hold a nail when pressed inwardly beyond the curved portion H', so that the heel cannot be pulled off the block until the act  
 5 of driving the nail into the shoe to attach the heel takes place, which causes the sleeve G (of which there are three) to recede up into the block, as shown in Figs. 10 and 5, and thereby unlock the spring from the nail and  
 10 release the heel. The spring G<sup>3</sup> also holds the smaller spring H in its inward position, as shown in Fig. 8, to engage and lock the nails upon placing the loaded heel upon the nail-driving block. The ends H<sup>2</sup> of the sleeves  
 15 are also made beveled, so that the sleeves can be readily loaded with nails on the loaded heel.

In practice where a machine such as is shown in Fig. 1 is used the loaded heel is placed  
 20 upon the nail-driving block (which is then uppermost) to receive the heel from the boy attendant, so that the heads of four of the nails are received by the ends of the large drivers E, and the heads of three of the nails  
 25 are received into the lower ends of the sleeves G and pass up by the springs H in the sleeves G, and thereby hold the heel to the driving-block by means of the nails in the heel passing above the curved portion H' of the  
 30 spring H. The arm C is then turned by the boy to bring the loaded heel over the heel-seat F<sup>3</sup> of the boot or shoe, (see Fig. 1,) and the cross-head is then reciprocated, driving the nails and securing the heel to the sole of  
 35 the boot or shoe, as shown in Fig. 5. Then the arm C is oscillated and the top lift is brought in line with the heel on the shoe and attached to the heel by the next reciprocation of the head A. After the operator has  
 40 removed the shoe, with the heel and top lift attached, from the jack and is placing another shoe on the jack to receive a heel and top lift the boy attendant places a loaded heel on the driving-block, as described, and  
 45 then reverses the nail-driving block and places a top lift upon the top-lift block. Then the machine is ready for the operator, first, to secure the heel upon the shoe, then reverse the arm C, and secure the top lift to the heel.  
 50 During this operation of putting the heel and top lift onto the shoe the boy with one hand is securing a loaded heel and with the other hand a top lift.

The nail-block and the top-lift block, which  
 55 are carried on opposite ends of the arm C, are not turned in a complete circle in the operation of the Woodward heel-attaching machine, as it is found in practice more advantageous to turn the nail-driving block D both down-  
 60 wardly and upwardly in the same semicircle on one side of the machine and the top-lift block downwardly and upwardly in the same semicircle on the opposite side of the machine, so that the arm C is an oscillating arm and  
 65 not a rotatable or a revoluble arm.

The adjustability of the nail-block, as previously described, is for the purpose of locat-

ing the heel on the heel-seat without adjusting the jack, which is necessary for different shapes of heels, as some heels are straight on  
 70 the back, while others are curved inwardly toward the center of the foot, and therefore I have provided mechanism for adjusting the block without adjusting the jack, so that the upper rear edge of the heel will always come  
 75 directly over the rear edge of the shoe. For instance, in driving what is known as a "common-sense" heel, which is straight on the back, the nails are along the edge and the driving-block may be located so that the rear edge of  
 80 the heel will be in line directly with the rear edge of the shoe in the attachment of the heel, while in a French heel the nails are arranged around the edge of the bottom of the heel, but the upper side of the heel, which comes in con-  
 85 tact with the heel-seat, would project over the bottom part of the heel-seat. Therefore it becomes necessary to adjust the driving-block forwardly, so that the rear edge of the top side of the heel will come directly over the  
 90 rear edge of the shoe. In other words, the adjustability of the block provides that whatever the shape of the heel may be the rear edge of the top of the heel will always be in line with the rear edge of the heel-seat of the  
 95 boot or shoe.

In driving the heel upon the shoe it is necessary that the jack should be held firmly while the operation is taking place, because  
 100 if when the shoe strikes the heel-seat it is not locked firmly the shoe will slide out forward, and thereby bend the nails and not drive them. It is therefore necessary in order to keep the jack in place that the jack should  
 105 be locked in some definite position and not be adjustable a little backward or a little forward. It must be absolutely in the same place during the driving operation.

When the jack is worked in one position, there will come a little wear in that particu-  
 110 lar part under the jack, so that when the jack is moved forward and backward for the attachment of different sizes of heels there will not be the same bearing for the jack, which is liable to slip out from under the shoe,  
 115 whereas in the present machine, the jack being always fixed and not adjustable, any wear which may come under the jack has no effect on the permanency of the jack, the only effect being to keep the jack more firmly located  
 120 in its fixed position. The top-lift spanker-block, as previously mentioned, is adjustable, as is usual in heeling-machines, the object being to locate the top lift according to the shape of the heel, as the top lift in a French  
 125 heel comes nearer the center of the shoe than a common-sense heel. Although I have shown three sleeves G, yet it will be understood that any desired number may be used.

By having three sleeves projecting above  
 130 the ends of the other drivers the attendant can readily determine where to place the heel so that the two breast-nails and the rear nail will come in their proper places. Conse-



quently by locating these nails properly the other nails come into the concave recesses of their proper drivers. Where all the holes for the nails are on a level, as in the nail-block shown and described in the prior art, the attendant is liable to place the breast-nails in the wrong holes. Consequently all the other nails will be located out of place and time is lost in properly locating the heel. These three sleeves serve as guides to indicate the position of certain nails, and the other nails naturally come into their proper positions. These sleeves also serve to equalize the pressure on the heel, as they are independent of one another, and not being connected they form a series of independent concave circular pressure-feet. It is found in practice that the heel-seat is not always even and also many of the heels are not of the same thickness from side to side and from end to end. Consequently if a solid yielding block, as shown in the prior art, is used the pressure all comes on the outer side of the heel first struck and the block yields as one piece, thereby causing the heel to slip around, so that the heads of the nails not being held in the recesses of the drivers at the beginning of the driving operation are moved to one side of the holes in the nail-block out of perfect alinement with the drivers, and in the driving operation the nails are apt to be tipped over by the drivers, thereby throwing the heel off to one side of the shoe with the upper portion of the nails turned flat on the top of the heel, whereas by the use of three independent sleeves if one of said sleeves strikes first the uneven surface that one only yields without affecting the heel, as the pressure is on a small surface and in the line of drivers and the other sleeves come to their proper places in contact with the heel and hold it in proper position during the driving operation.

By having the heads of the nails located in the recesses of the drivers before the sleeves come in contact with the heel the tipping of the nails is prevented, because the heads of the nails are always in contact with the drivers and in the line of driving, and therefore cannot slip out of proper alinement during the driving operation. Further, such tipping cannot take place, because the pressure on the sleeves is in the line of the driving and does not come in advance of the nail-driving operation, but on or about the same time, and the driving-block does not touch the outer edge of the heel, which is apt to be uneven in the manufactured heel, in time to allow it to slip, because the nails are through the heel-seat and being turned before the block comes flat on the top of the heel.

When heels are loaded with nails, the nails in the heel do not always stand perfectly straight, and consequently in applying the loaded heel to the nail-block it becomes necessary to provide means to straighten up the nails, and the beveled ends of the drivers and

sleeves cause the nails to straighten up, thus centering them in their driving position, so that in the driving operation the nails are driven straight through the heel into the shoe and attach the heel to the shoe.

I do not limit myself to the arrangement and construction shown, as the same may be varied without departing from the spirit of my invention.

Having thus ascertained the nature of my invention and set forth a construction embodying the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a heel-attaching machine, a jack for the boot or shoe, a support movable in a vertical plane, a nail-driving block secured to said support and carrying a series of drivers, yielding sleeves surrounding two or more of said drivers, a heel-holding device for each sleeve extending into said sleeve to engage with a nail projecting into said sleeve to hold a nail-loaded heel on said driving-block with the nails in alinement with said drivers and adapted to release said heel by the movement of the drivers in the operation of driving nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

2. In a heel-attaching machine, a jack for the boot or shoe, a support movable in a vertical plane, a nail-driving block secured to said support and carrying a series of drivers, spring-controlled sleeves surrounding two or more of said drivers and extending beyond the face of the driving-block, a heel-holding device for each sleeve extending into said sleeve to engage with a nail projecting into said sleeve to hold a nail-loaded heel on said driving-block with the nails in alinement with said drivers and adapted to release said heel by the movement of the drivers in the operation of driving nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

3. In a heel-attaching machine, a jack for the boot or shoe, a support movable in a vertical plane, a nail-driving block secured to said support and carrying a series of drivers, yielding sleeves surrounding two or more of said drivers, a heel-holding device for each sleeve extending into said sleeve to engage with a nail projecting into said sleeve to hold a nail-loaded heel on said driving-block with the nails in alinement with said drivers and adapted to release said heel by the movement of the drivers in the operation of driving a nail into the sole of the boot or shoe, a top-lift-holding device on said movable support for receiving the top lifts and adapted to carry the same by a movement of said support into relation with the heel after it has been attached to the shoe, and mechanism for driving said nails into the sole of the boot or shoe to attach the heel thereto and for attaching the top lift to the attached heel.



4. In a heel-attaching machine, a jack for the boot or shoe, a nail-driving block carrying a series of drivers, yielding sleeves surrounding two or more of said drivers, a heel-holding device for each sleeve extending into said sleeve to engage with a nail projecting into said sleeve to hold a nail-loaded heel on said driving-block with the nails in alinement with said drivers and adapted to release said heel by the movement of the drivers in the operation of driving nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

5. In a heel-attaching machine, a jack for the boot or shoe, a nail-driving block carrying a series of drivers, spring-controlled sleeves surrounding two or more of said drivers and extending beyond the face of the driving-block, a heel-holding device for each sleeve extending into said sleeve to engage with a nail projecting into said sleeve to hold a nail-loaded heel on said driving-block with the nails in alinement with said drivers and adapted to release said heel by the movement of the drivers in the operation of driving nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

6. In a heel-attaching machine, a jack for the boot or shoe, a nail-driving block consisting of a series of drivers, a support on which said driving-block is longitudinally adjustable, means for holding a nail-loaded heel on said driving-block with the nails in alinement with said drivers, mechanism for releasing said holding means to release the heel in the operation of driving the nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

7. In a heel-attaching machine, a jack for the boot or shoe, a support movable in a vertical plane, a nail-driving block secured to said support and carrying a series of drivers having beveled edges, spring-controlled sleeves having beveled edges and surrounding two or more of said drivers and extending beyond the face of the driving-block, a heel-holding device for each sleeve extending into said sleeve to engage with a nail projecting into said sleeve to hold a nail-loaded heel on said driving-block with the nails in alinement with said drivers and adapted to release said heel by the movement of the drivers in the operation of driving nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

8. In a heel-attaching machine, a jack for the boot or shoe, a nail-driving block carrying a series of drivers having beveled edges, spring-controlled sleeves having beveled edges and surrounding two or more of said drivers and extending beyond the face of the driving-block, a heel-holding device for each sleeve extending into said sleeve to engage

with a nail projecting into said sleeve to hold a nail-loaded heel on said driving-block with the nails in alinement with said drivers and adapted to release said heel by the movement of the drivers in the operation of driving nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

9. In a heel-attaching machine, a jack for the boot or shoe, a nail-driving block carrying a series of drivers, means for holding the nail-loaded heel on said block with the nails in alinement with said drivers and adapted to be engaged by one or more of said drivers to release said heel in the operation of driving the nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

10. In a heel-attaching machine, a jack for the boot or shoe, a nail-driving block carrying a series of drivers, means for engaging one or more nails of a nail-loaded heel for holding the heel on said block with the nails in alinement with said drivers and adapted to be engaged by one or more of said drivers to release said heel in the operation of driving the nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

11. In a heel-attaching machine, a jack for the boot or shoe, a movable support, a nail-driving block secured to said support and carrying a series of drivers, means for engaging one or more nails of a nail-loaded heel for holding the heel on said block with the nails in alinement with said drivers and adapted to be engaged by one or more of said drivers to release said nail from said heel-holding device in the operation of driving the nails into the sole of the boot or shoe, a top-lift-holding device on said movable support for receiving the top lifts and adapted to carry the same by a movement of said movable support into relation with the heel after it has been attached to the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe to attach the heel thereto and for attaching the top lift to the attached heel.

12. In a heel-attaching machine, a jack for the boot or shoe, a nail-driving block carrying a series of drivers, sleeves surrounding two or more of said drivers, springs acting on said sleeves, a heel-holding device for each sleeve consisting of a spring having an inwardly-curved end extending into said sleeve to engage with a nail projecting into said sleeve to hold a nail-loaded heel on said driving-block with the nails in alinement with said drivers and adapted to release said heel by the movement of the drivers in the operation of driving the nails into the sole of the boot or shoe, and mechanism for driving said nails into the sole of the boot or shoe for attaching the heel thereto.

13. In a heel-attaching machine, a jack for the boot or shoe, a nail-driving block carry-



ing a series of drivers, sleeves surrounding  
two or more of said drivers, springs acting on  
said sleeves, a heel-holding device for each  
sleeve controlled by said sleeve-springs and  
5 having an inwardly-curved end extending  
into said sleeve to engage with a nail project-  
ing into said sleeve to hold a nail-loaded heel  
on said driving-block with the nails in aline-  
ment with said drivers and adapted to release  
10 said heel by the movement of the drivers in  
the operation of driving the nails into the sole

of the boot or shoe, and mechanism for driv-  
ing said nails into the sole of the boot or shoe  
for attaching the heel thereto.

In testimony whereof I have signed my 15  
name to this specification, in the presence of  
two subscribing witnesses, this 20th day of  
January, A. D. 1899.

ERASTUS WOODWARD.

Witnesses:

A. L. NUSSER,  
E. L. HARLOW.