

No. 713,728.

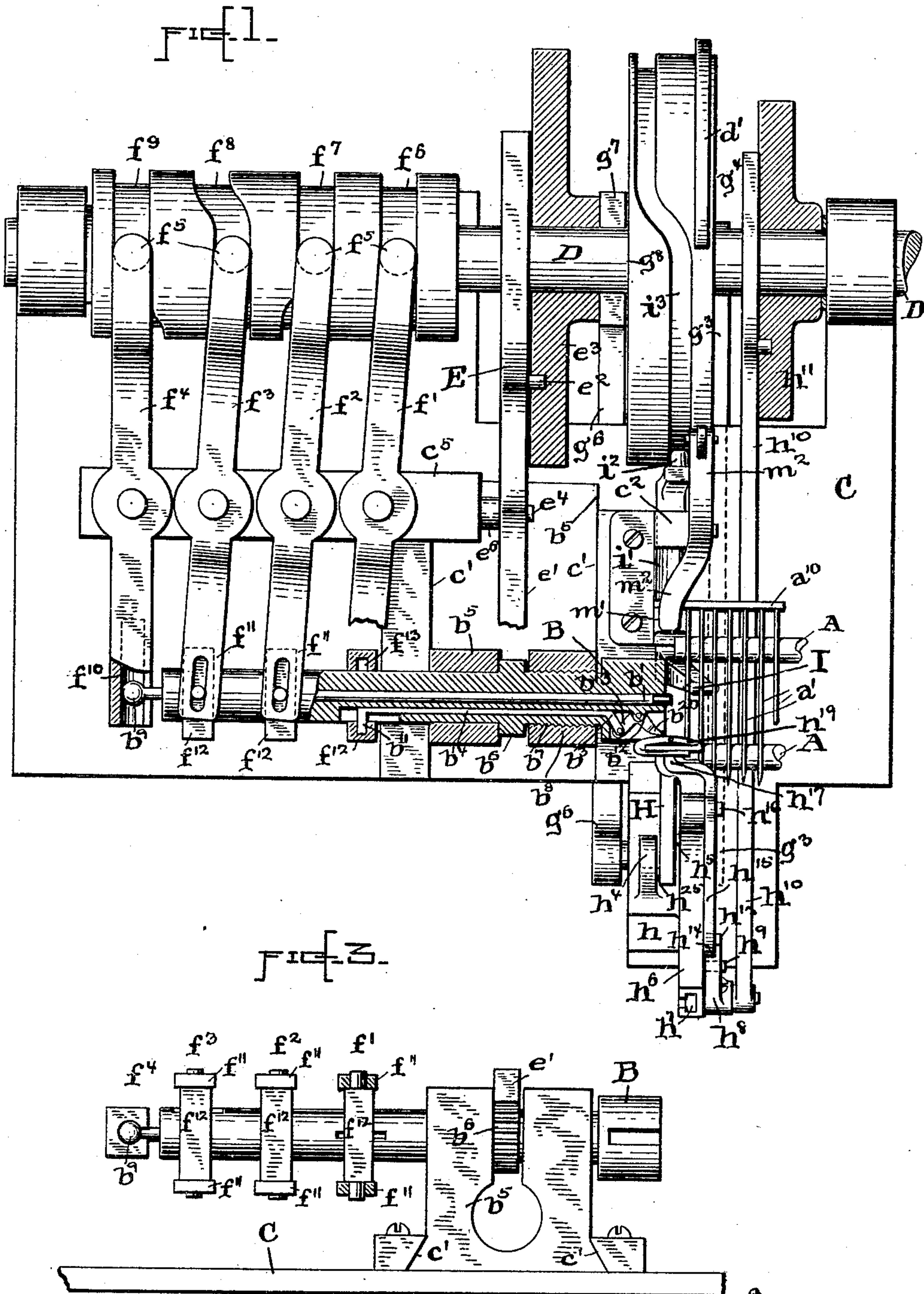
Patented Nov. 18, 1902.

P. E. WIBERG.  
SAFETY PIN MACHINE.

(Application filed Apr. 29, 1901. Renewed Mar. 20, 1902.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:  
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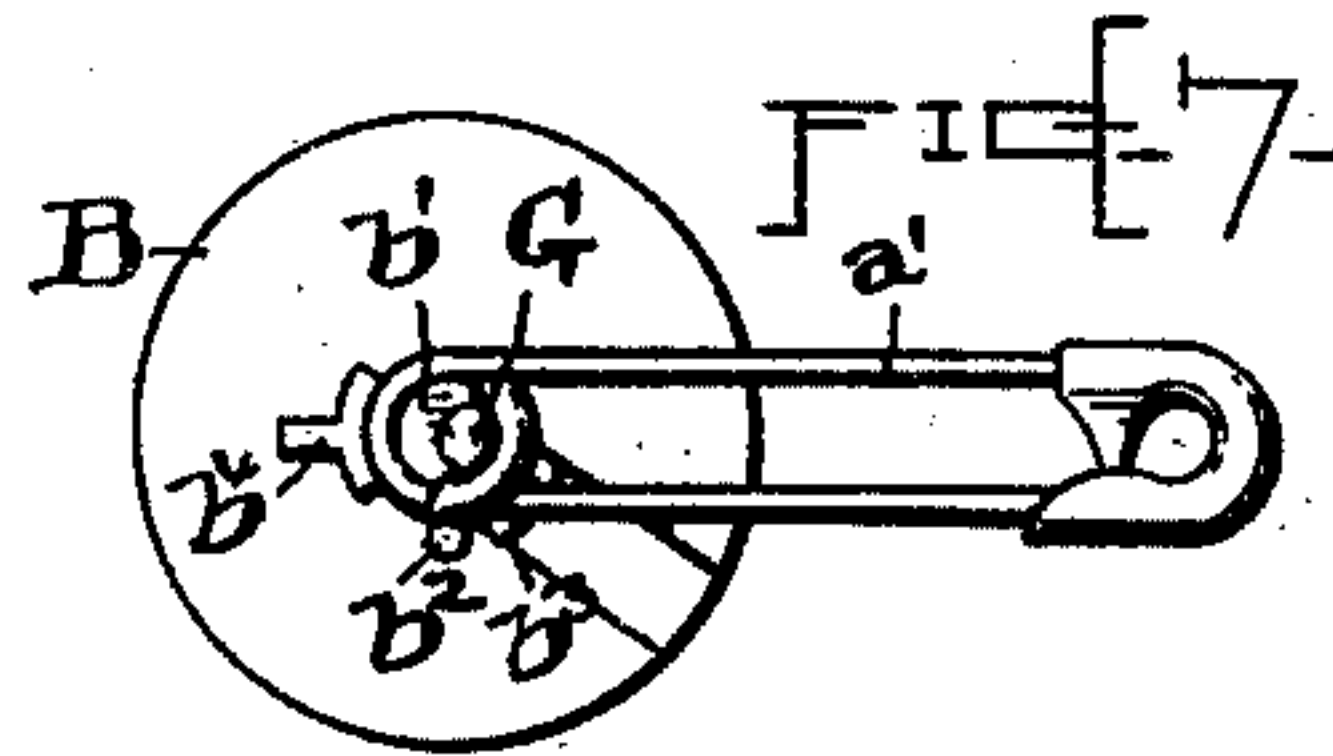
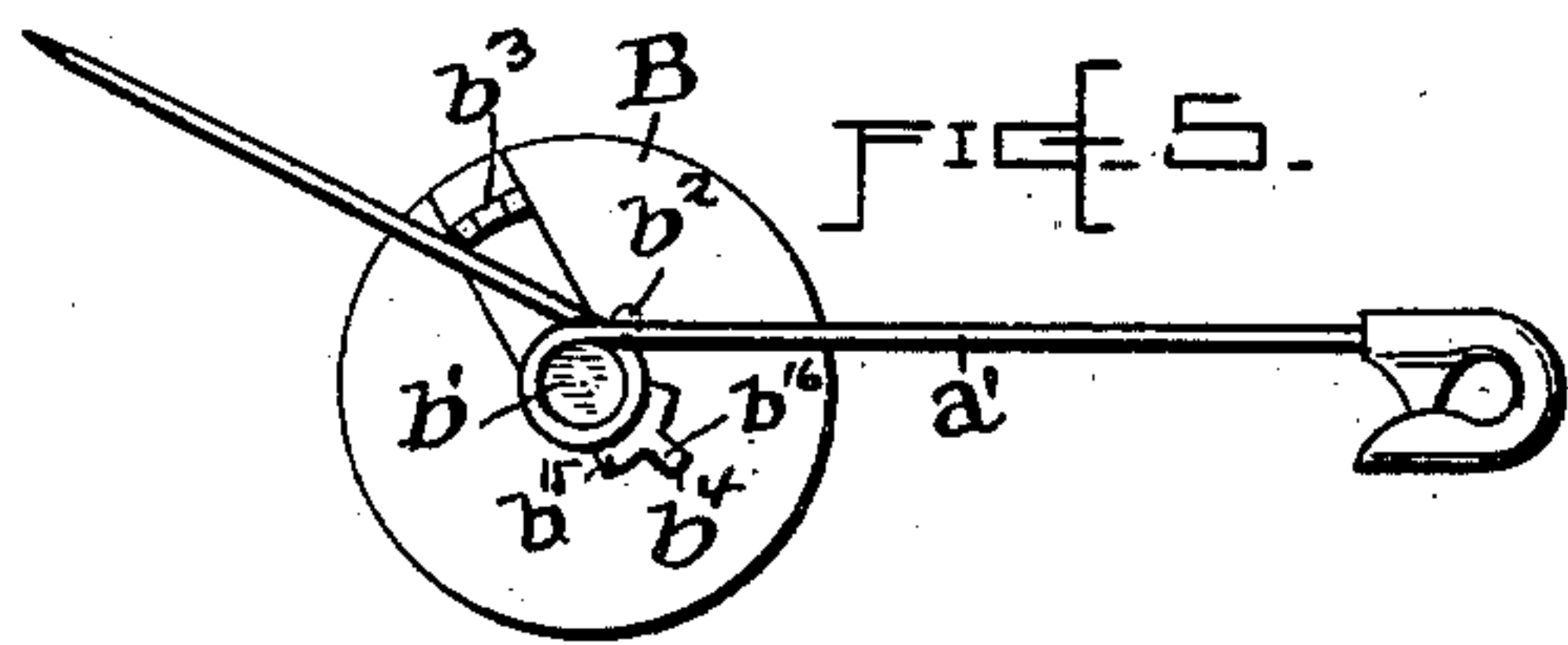
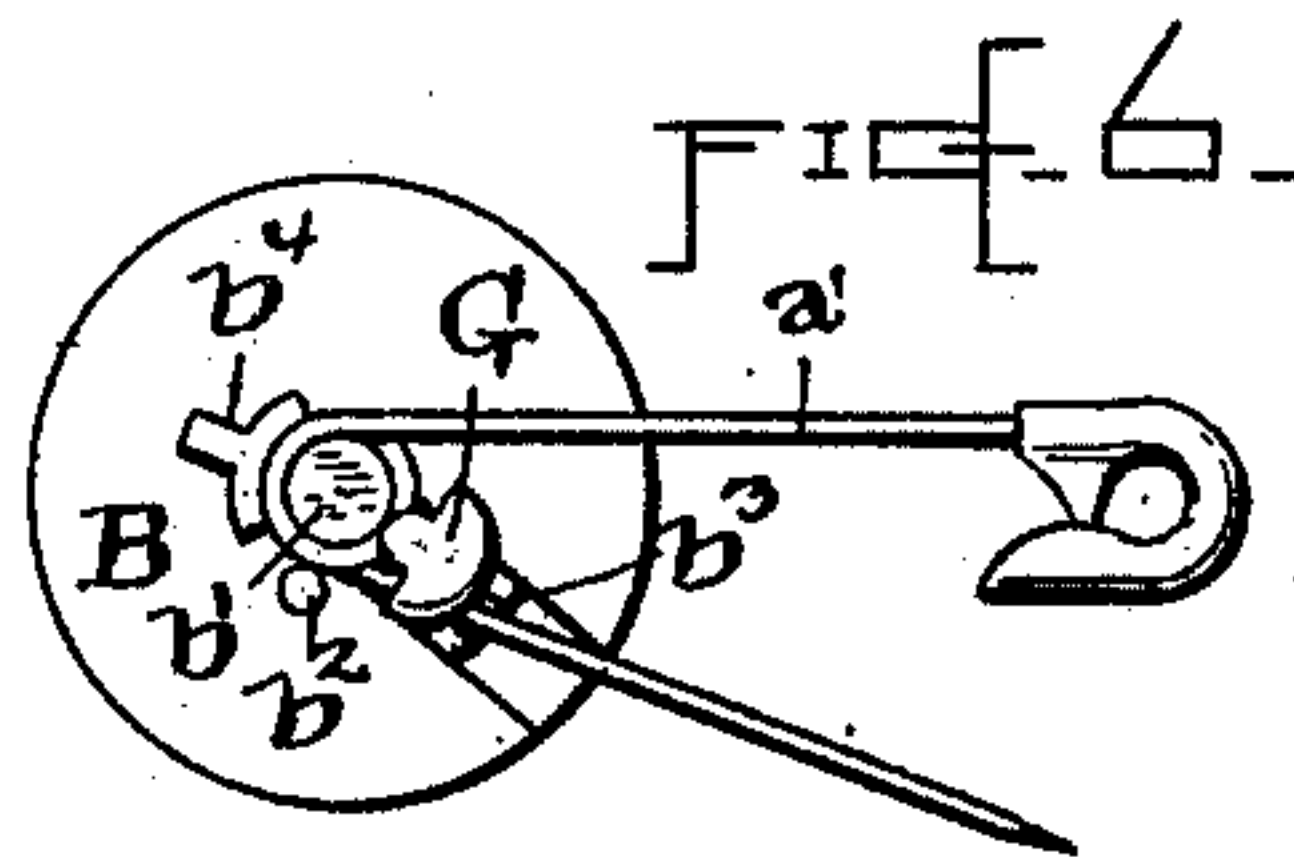
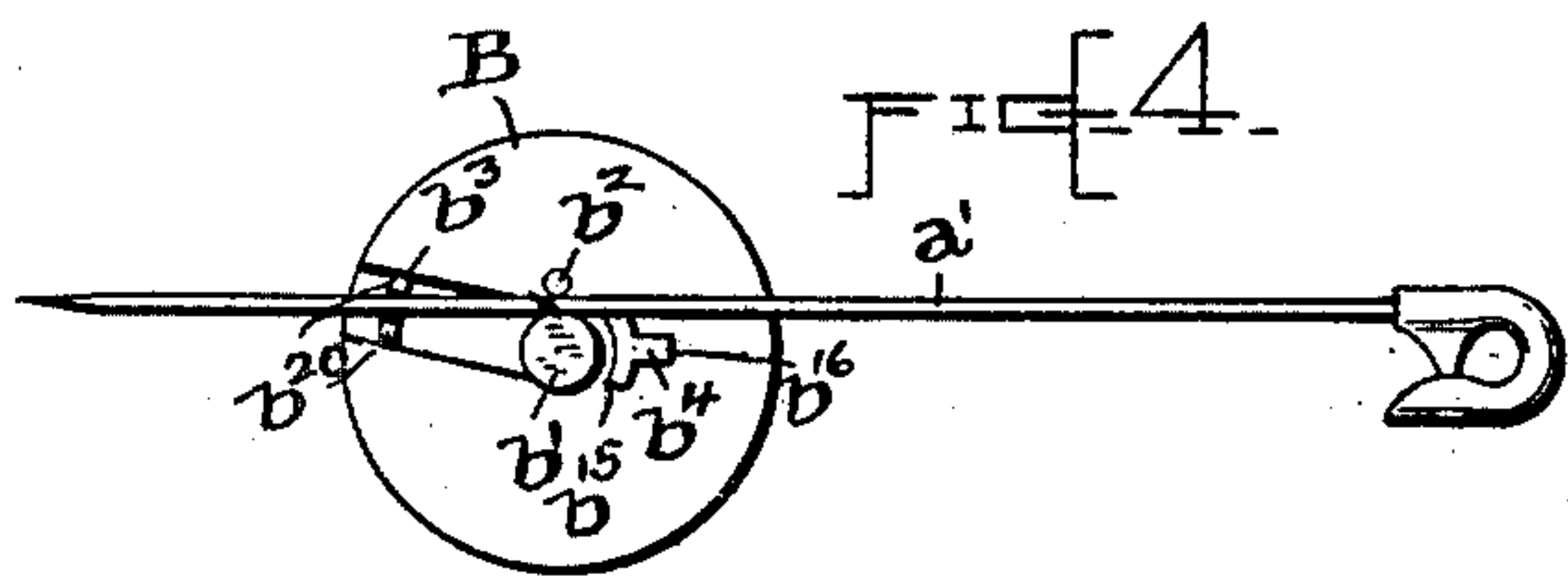
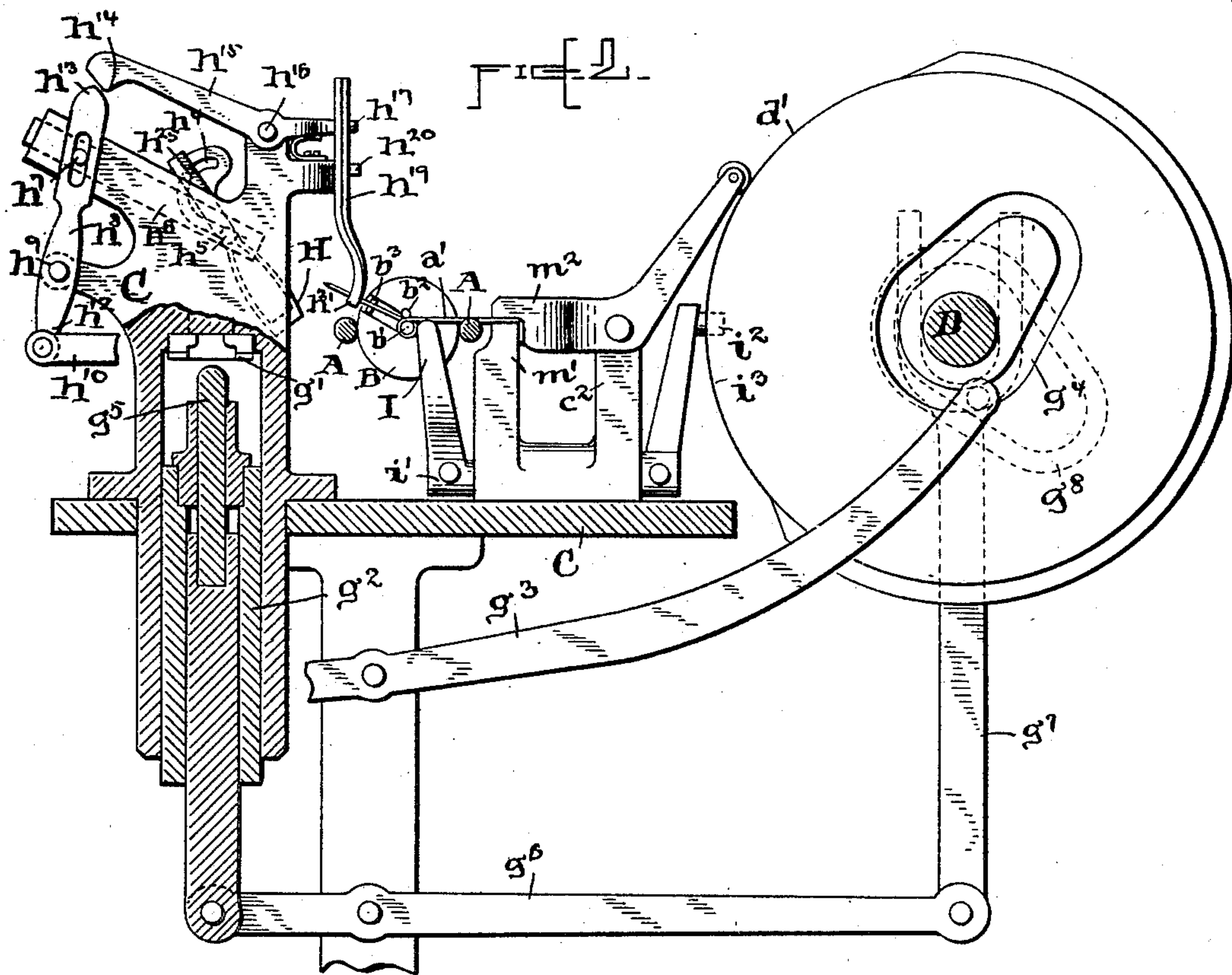
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3 Sheets—Sheet 2.



Witnesses

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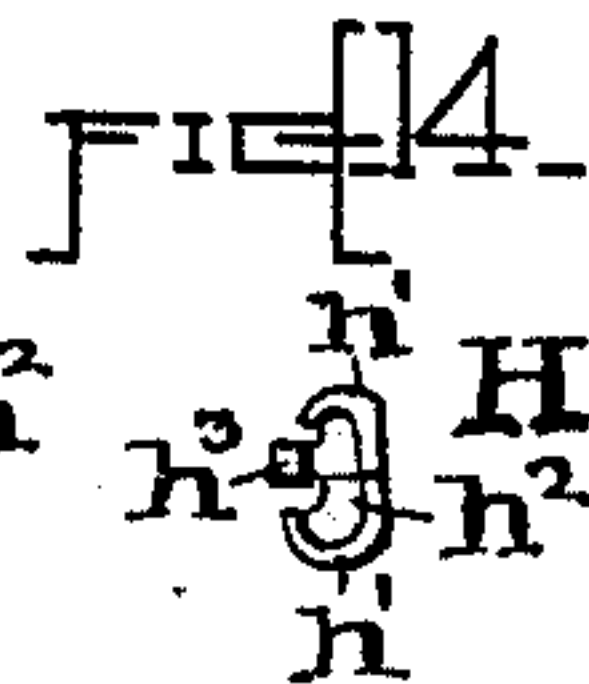
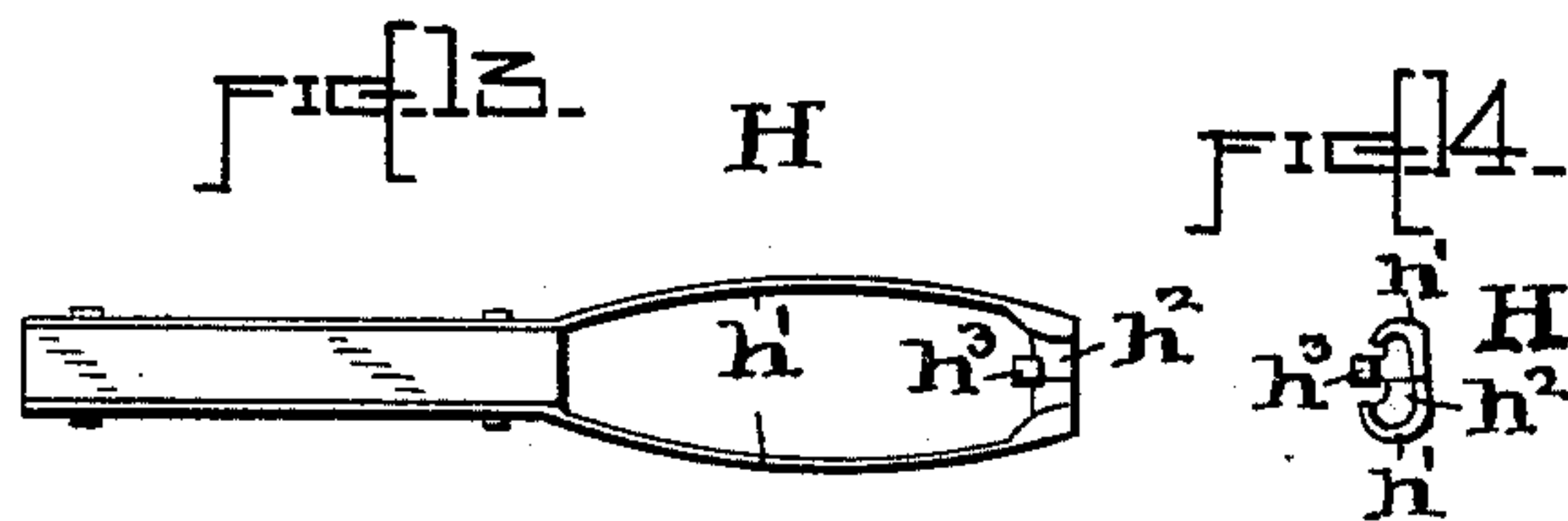
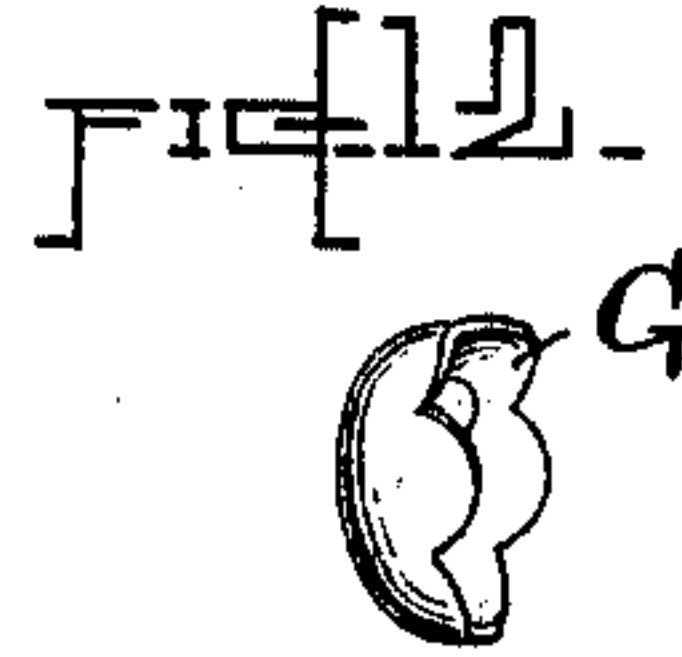
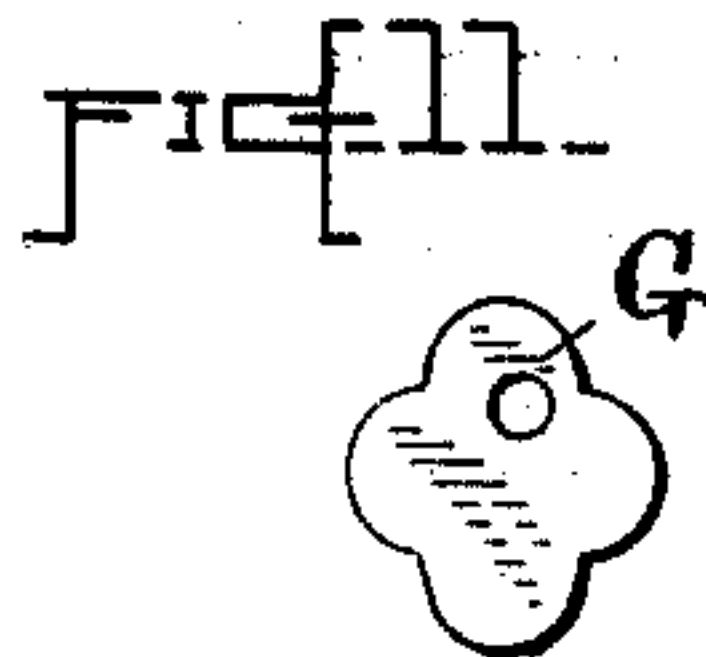
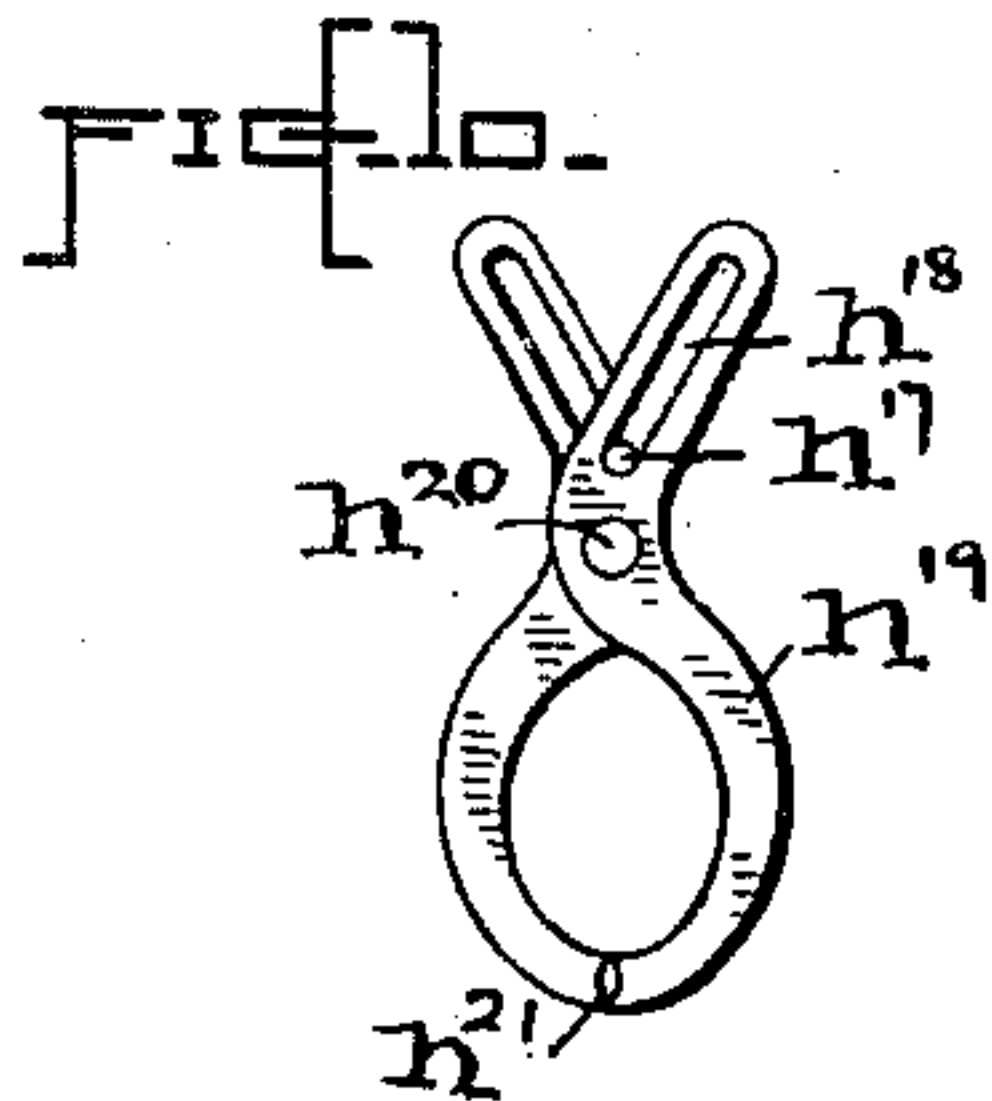
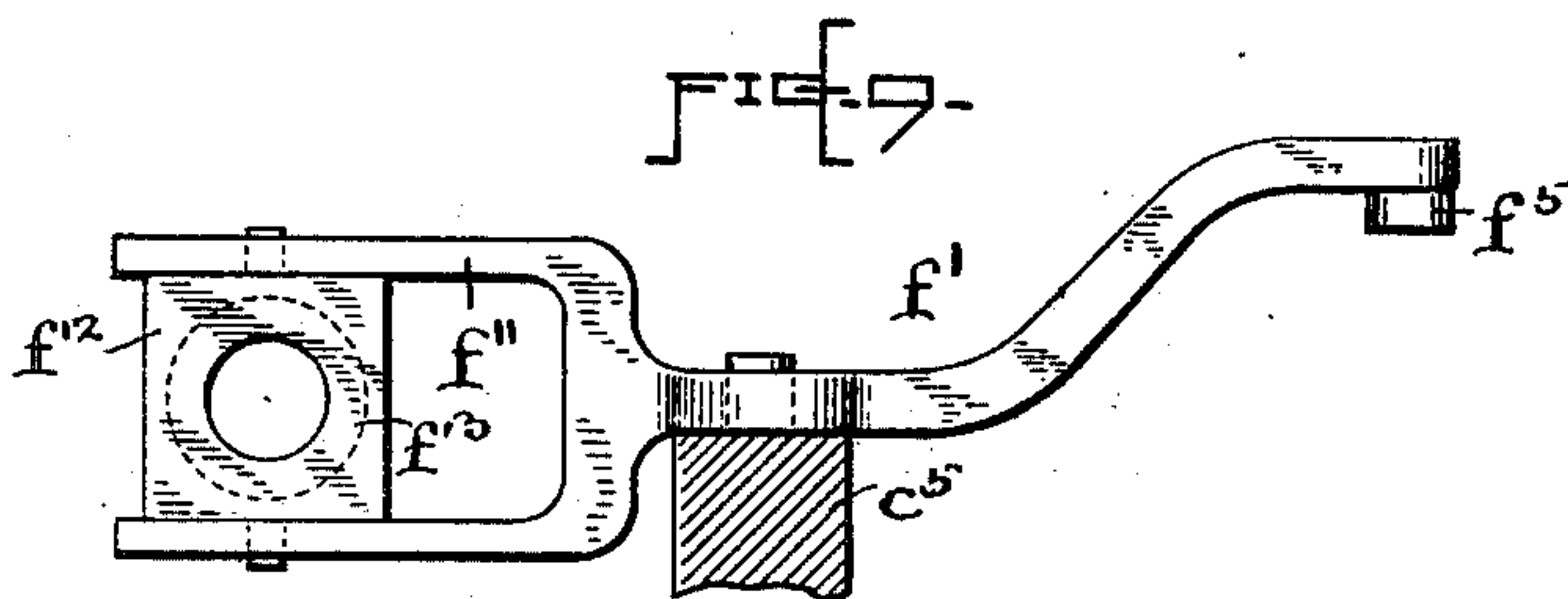
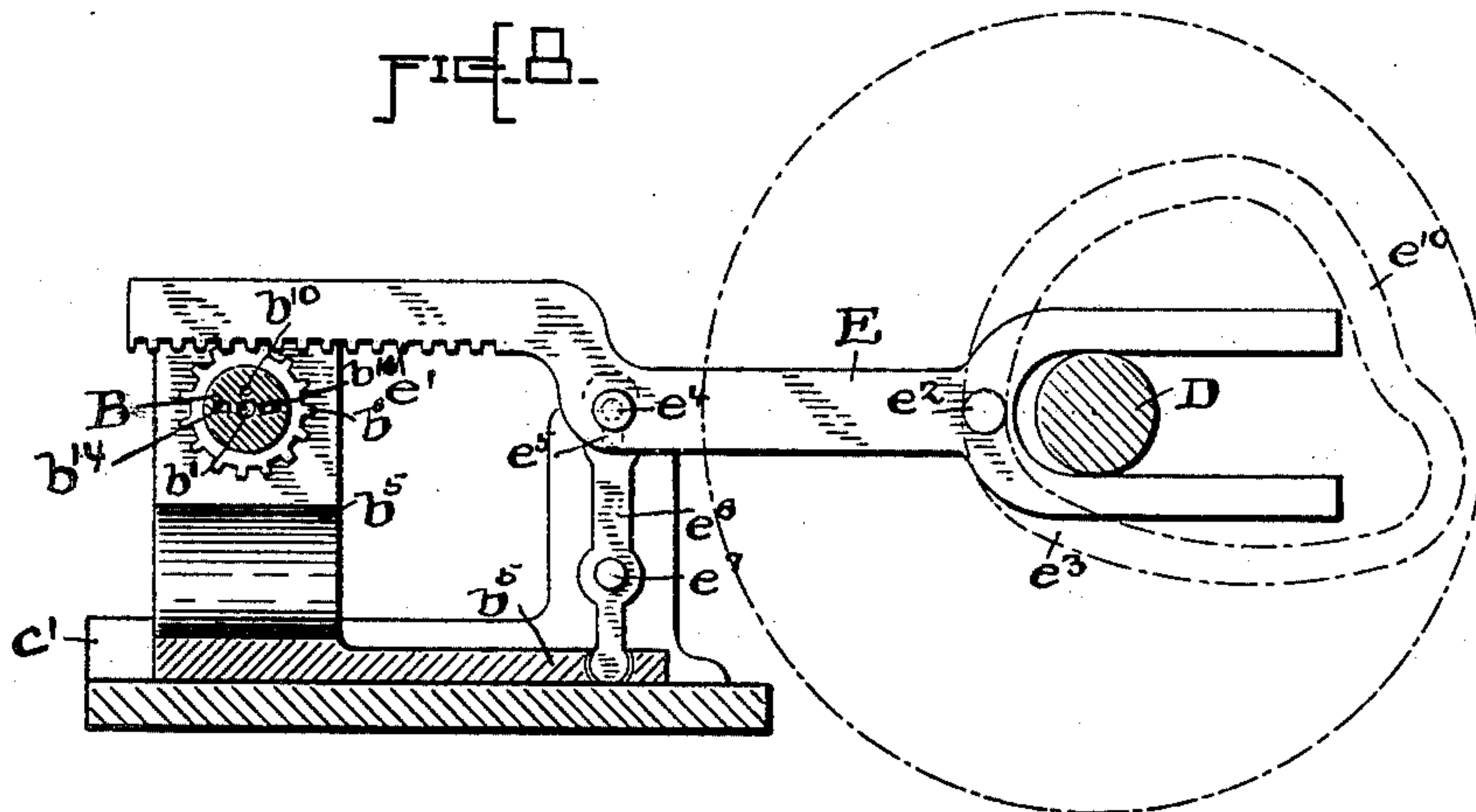
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SAFETY PIN MACHINE.

(Application filed Apr. 29, 1901. Renewed Mar. 20, 1902.)

(No Model.)

3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

PETER E. WIBERG, OF BLOOMFIELD, NEW JERSEY.

## SAFETY-PIN MACHINE.

SPECIFICATION forming part of Letters Patent No. 713,728, dated November 18, 1902.

Application filed April 29, 1901. Renewed March 20, 1902. Serial No. 99,034. (No model.)

*To all whom it may concern:*

Be it known that I, PETER E. WIBERG, a citizen of the United States, and a resident of Bloomfield, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Safety-Pin Machines, of which the following is a specification.

My invention has reference to safety-pin machines, and relates more particularly to mechanism for coiling the wire and for making and attaching the coil-guard to the pin during the process of the manufacture of the latter. Heretofore the guard which surrounds the coil at the lower end of the pin has been put on by hand after the pin has been manufactured and clenched in position by means of a foot-press.

My invention contemplates means whereby the guard can be stamped out automatically and put on the pin while the latter is being coiled, all in one continuous operation.

To this end the invention consists in the hereinafter-described means, which may be utilized in connection with the process disclosed in a sister application executed by me on the 5th day of April, 1901, Serial No. 57,922.

In order to explain my invention more readily, I have embodied it in the machine shown in the accompanying drawings, in which the invention is conveniently illustrated; but variations and changes may of course be made within the scope of the claims.

Figure 1 is a plan view of a machine, partially in section, embodying my invention. Fig. 2 is a side view also partially in section. Fig. 3 is a front end view. Figs. 4, 5, 6, and 7 are detail views showing the pin at its different stages of development and the relative positions and functions of the members of the coiling-spindle. Fig. 8 is a side view of the cam which operates the spindle B and adjacent means. Fig. 9 is a side view of one of the levers operating the members of the spindle B. Fig. 10 is a detail view of the tongs, which grasps the pin when the guard is to be slipped on. Fig. 11 is a view of the coil-guard blank. Fig. 12 is a perspective view of the finished coil-guard. Figs. 13 and 14 are detail views of the conveyer.

Similar letters of reference indicate corresponding parts in the different views.

I shall describe a safety-pin machine em-

bodimenting my invention and afterward point out the novel features in the claims.

Machines for making safety-pins are usually constructed so as to receive a strand of wire and to cut it into suitable lengths for different sizes of pins, after which the lengths of wire are carried, by means of two helically-screw-cut rods acting as conveyers, to the means for putting on the cap at the top, making the coil, &c., the points being put on by a set of files acting on the pins while in transit. My machine may be constructed to act on pins which have or have not had the cap at the top put on or which have not yet been pointed, such matters being immaterial so far as this invention is concerned; but the machine will preferably be constructed as shown in the drawings.

A represents the ends of the helical screws which feed the pins  $a'$ , shown in this instance as being merely pointed without having any caps put on, and  $a^{10}$  is a rack for keeping the pins on the screws A and to prevent their being thrown off by the rotation of the said screws. As the pins reach the ends of the screws A they drop on the anvil  $m'$  and have their upper ends bent by the hammer  $m^2$ . The hammer  $m^2$  is pivoted in the extension  $c^2$  of the framework C and is operated by means of the cam  $d'$ , mounted on the main shaft D. As the pins drop in position on the anvil  $m'$  they are also supported by the central movable member  $b'$  of the spindle B. The spindle B is mounted in the bearings  $b^5$ , adapted to slide in the groove  $c'$  of the framework C, and carries four members  $b'$ ,  $b^2$ ,  $b^3$ , and  $b^4$ . This spindle partakes of three motions—viz., a rotating motion, a reciprocating or longitudinal motion, and a transverse sliding motion in the bearings  $b^5$ . Besides, the four members  $b'$ ,  $b^2$ ,  $b^3$ , and  $b^4$  each have a separate motion independent of but harmonious with the movements of the spindle. The rotating motion of the spindle B is imparted by means of the pinion  $b^6$  being rotated by the rack  $e'$ , carried by the forked lever E, having the roll  $e^2$  cooperating with the cam  $e^3$  on the main shaft D. The lever E is provided with a bolt  $e^4$ , which slides in the slot  $e^5$  of the lever  $e^6$ , pivoted at  $e^7$  to the framework and projecting into the bearings  $b^5$ , whereby the said bearings carrying the spin-



die are given a transverse motion back and forth. As the spindle B rotates it moves forward and backward by reason of the threaded portion  $b^7$  cooperating with the threaded portion  $b^8$  in the bearings  $b^5$ .

The cam  $e^3$  is constructed with a portion  $e^{10}$ , which operates on the roller  $e^2$  so as to cause no movement of the spindle B while the roller  $e^2$  is traveling over the said portion  $e^{10}$ . Of course when the roller  $e^2$  is on the return movement the spindle slides back in the bearings  $b^5$  and rotates in the opposite direction, so that it is moved back to its original position with each complete revolution of the cam  $e^3$ .

Upon the extension  $e^5$  of the framework C are pivoted four levers  $f^1, f^2, f^3$ , and  $f^4$ , each provided with a friction-roll  $f^5$  at one end, engaging, respectively, with the cams  $f^6, f^7, f^8$ , and  $f^9$ , conveniently mounted on the shaft D. These levers and cams operate the four members of the spindle B, causing the said members to protrude from the latter at the proper time to perform their various functions. The central member  $b^1$  is in the form of a stem extending through the center of the spindle B and terminating in a rounded portion  $b^9$ , extending into the slot  $f^{10}$  of the lever  $f^4$ , in which slot the said rounded portion is free to move transversely, so as to conform itself to the transverse movement of the spindle B. The lever  $f^1$  terminates in a forked portion, forming a guideway  $f^{11}$ , in which guideway the square piece  $f^{12}$  slides. The square piece  $f^{12}$  surrounds the spindle B and by its cooperation with the guide  $f^{11}$  compensates for the sliding movement of the said spindle. The member  $b^3$  consists of a pivoted portion  $b^{12}$ , terminating at one end in two arms  $b^{20}$  and at the other end in the portion  $b^{13}$ , attached to the stem  $b^{14}$ , provided with a button  $b^{11}$ , extending into the circular groove  $f^{13}$  in the square piece  $f^{12}$ , which latter having a longitudinal sliding movement on the spindle B when actuated by the cam and lever causes the longitudinal movement of the stem  $b^{14}$ . The circular groove  $f^{13}$  is provided in order that the button may slide in same, and thus adapt itself to the rotation of the spindle B.

The coiling member  $b^2$  is in the form of a stem and extends longitudinally through the slot  $b^{10}$  and is operated in a manner similar to that described in connection with the member  $b^3$ .

The guiding member  $b^4$  consists of a guide portion  $b^{15}$  and a stem  $b^{16}$ , operated in the same manner as the members  $b^3$  and  $b^2$ .

The coil-guard G is made from a strip of metal fed in any well-known or suitable manner to the portion  $g^1$ , where it is acted upon by the blanking-die  $g^2$ , operated by the lever  $g^3$ , cooperating with the cam  $g^4$ , after which the blank is operated upon by the forming-die  $g^5$ , operated by the levers  $g^6$  and  $g^7$  and the cam  $g^8$ .

The guard G, after it has been formed, is received by the conveyer H, constructed,

preferably, with two arms  $h^1$ , of springy material, meeting at the top and forming the recess  $h^2$ , a supporting portion for the guard being formed by the projection  $h^3$  on one of the arms  $h^1$ . The conveyer H has a pin  $h^{25}$ , traveling in the curved slot  $h^4$  of the framework and is further pivoted at  $h^5$  to the arm  $h^6$ , which latter has a pin-and-slot connection  $h^7$  with the lever  $h^8$ , pivoted at  $h^9$  in the framework C and attached at its other end  $h^{12}$  to the operating-lever  $h^{10}$ , cooperating with the cam  $h^{11}$  on the shaft D. The curved slot  $h^4$  is so constructed as to bring the conveyer H alternately in alinement with the die mechanism and the point of the pin, as shown in Fig. 2. The lever  $h^8$  is also provided with a contacting portion  $h^{13}$ , having a sharp edge adapted to engage with a similar contacting portion  $h^{14}$  on the rock-arm  $h^{15}$ , pivoted at  $h^{16}$  and having a pin  $h^{17}$  at its upper end working in the slot  $h^{18}$  of the tongs  $h^{19}$ , pivoted at  $h^{20}$  to the framework and provided with the jaws  $h^{21}$ , adapted to grasp the pin for the purpose hereinafter explained.

I is a punch mounted on the rock-arm  $i^1$ , pivoted in the framework and operated by the roller  $i^2$ , cooperating with the cam  $i^3$ .

The operation is as follows: The pin, being delivered by the helical screws A, is dropped upon the anvil  $m^1$ , where it is operated upon by the hammer  $m^2$ , thereby both bending and holding the pin; but if the head or cap has already been put on, as shown in Figs. 4, 5, 6, and 7, means are provided for grasping and holding the pin only without bending the same. At this moment the member  $b^1$  will protrude from the spindle B and support the pin at the point where it is to be coiled. The coiling member  $b^2$  now protrudes, and the spindle B commences to rotate, thus coiling the pin. Simultaneously with this the spindle also moves transversely, so as to compensate for the taking in of the wire as it is coiled, and moves forward a distance equal to the thickness of the material—that is, the wire forming the pin—so as to enable the strand to be properly coiled. When the wire has been partially coiled, as shown in Fig. 2, the various movements of the spindle cease and it remains in the place indicated, owing to the construction of the cam  $e^{10}$ , as hereinbefore explained. At this moment the point of the pin is grasped by the tongs  $h^{19}$ , so as to insure perfect alinement, while the conveyer H brings the guard G, previously taken from the dies, and slides it up on the pin, the said guard being provided with a hole for that purpose. When the said guard has been brought up a proper distance, the member  $b^3$  protrudes from the spindle B and with its two arms  $b^{20}$  lifts the guard from the conveyer H, the said conveyer returning quickly, and the spindle B again rotates and moves transversely, thereby continuing the coiling operation until it is finished, the two arms  $b^{20}$  of the member  $b^3$  meanwhile pressing the guard on the coil until it has reached its proper position. Just prior



to this the central member  $b'$  and the coiling member  $b^2$  are drawn in, the guiding member  $b^4$  having just previous to this come out, thus steadying the pin. The central member  $b'$  now shoots out again, while the punch I, being now opposite to the central member on account of the transverse movement of the spindle, is operated at the same moment, thus clenching the guard in position on the pin.

10 All the members are now drawn in and the pin drops into a suitable receptacle on the machine, after which the spindle B returns to its original position and the operation is repeated.

15 In addition to coiling the pin and putting on the guard the means herein described will close the pin, as shown in Fig. 7, if the said pin has been provided with a cap prior to the operation described herein taking place.

20 It will of course be understood that any suitable form of die may be used. The dies shown in the drawings are merely conventional representations, and, further, that the guards might be stamped out independently of the conveying means and fed to the pins or to the conveying means in some other suitable manner.

Having thus described my invention, what I claim is—

30 1. In a machine of the character set forth, means for coiling a strand of material, means for slipping a coil-guard on same, and means for clenching the guard in position.

35 2. In a machine of the character set forth, means for coiling a strand of material, means for conveying to and slipping a coil-guard on same, means for removing the guard from the conveying means, and means for clenching the guard in position on the coil.

40 3. In a machine of the character set forth, means for coiling a strand of material, means for conveying to and slipping a coil-guard on the same, means for removing the guard from the conveying means and for causing it to assume its proper position on the coil, and means for clenching the guard in position.

45 4. In a machine of the character set forth, means for coiling a strand of material, means for operating suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the coil at the proper moment to slip it on same, and means for clenching the guard in position on the coil.

55 5. In a machine of the character set forth, means for coiling a strand of material, means for operating suitable die mechanism to produce a guard for the coil, means for conveying said guard from the die mechanism to the coil at the proper moment to slip it on same, means for removing the guard from the conveying means and for causing it to assume its proper position on the coil, and means for clenching the guard in position.

65 6. In a machine of the character set forth, means for partially coiling a strand of material, means for slipping a coil-guard on same

subsequent to the partial coiling of the material, means for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position on the coil.

7. In a machine of the character set forth, means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

8. In a machine of the character set forth, means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position while the coiling of the material is being completed, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

9. In a machine of the character set forth, means for partially coiling a strand of material, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism at the proper moment to slip it on the material subsequent to the partial coiling of same, means for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

10. In a machine of the character set forth, means for partially coiling a strand of material, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the partially-coiled material at the proper moment to slip it on same subsequent to the partial coiling of the said material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position while the coiling of the material is being completed, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

11. In a machine of the character set forth, means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means



for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, and means for clenching the guard when the latter has assumed its proper position on the coil.

12. In a machine of the character set forth, means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, means for clenching the guard when the latter has assumed its proper position on the coil, and means for steadying the material during the period lapsing between the completion of the coiling of the said material and the clenching of the guard.

13. In a machine of the character set forth, means for partially coiling a strand of material, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism at the proper moment to slip it on the material subsequent to the partial coiling of same, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, and means for clenching the guard when the latter has assumed its proper position on the coil.

14. In a machine of the character set forth, means for partially coiling a strand of material, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism at the proper moment to slip it on the material subsequent to the partial coiling of same, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, means for clenching the guard when the latter has assumed its proper position on the coil, and means for steadying the material during the period lapsing between the completion of the coiling of the said material and the clenching of the guard.

15. In a machine of the character set forth, means for partially coiling a strand of material, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the partially-coiled material at the

proper moment to slip it on same subsequent to the partial coiling of the said material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, and means for clenching the guard when the latter has assumed its proper position on the coil.

16. In a machine of the character set forth, means for partially coiling a strand of material, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the partially-coiled material at the proper moment to slip it on same subsequent to the partial coiling of the said material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, means for clenching the guard when the latter has assumed its proper position on the coil, and means for steadying the material during the period lapsing between the completion of the coiling of the said material and the clenching of the guard.

17. In a machine of the character set forth, means for partially coiling a strand of material, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the partially-coiled material at the proper moment to slip it on same subsequent to the partial coiling of said material, means for causing the material to be in alinement with the line of travel of the conveying means, operating immediately subsequent to the partial coiling of the material and prior to the slipping on of the guard, means for removing the guard from the conveying means, means for completing the coiling of the material immediately subsequent to the guard being slipped on, means for causing the guard to assume its proper position while the coiling of the material is being completed, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

18. In a machine of the character set forth, means for partially coiling a strand of material, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the partially-coiled material at the proper moment to slip it on same subsequent to the partial coiling of the said material, means for causing the material to be in alinement with the line of travel of the conveying means, operating immediately subsequent to



the partial coiling of the material and prior to the slipping on of the guard, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, means for clenching the guard when the latter has assumed its proper position on the coil, and means for steadying the material during the period lapsing between the completion of the coiling of the said material and the clenching of the guard.

19. In a machine of the character set forth, means for coiling a strand of material, means for operating suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the material at the proper moment to slip it on same, means for causing the material to be in alinement with the line of travel of the conveying means immediately prior thereto, means for removing the guard from the conveying means and for causing it to assume its proper position on the coil, and means for clenching the guard in position.

20. In a machine of the character set forth, means for coiling a strand of material, means for conveying to and slipping a coil-guard on same, means for causing the material to be in alinement with the line of travel of the conveying means immediately prior thereto, means for removing the guard from the conveying means, and means for clenching the guard in position on the coil.

21. In a safety-pin machine, means for partially coiling a pin provided with a cap, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the pin, means for conveying said guard from the die mechanism to the partially-coiled pin at the proper moment to slip it on same subsequent to the partial coiling of the said pin, means for causing the pin to be in alinement with the line of travel of the conveying means operating immediately subsequent to the partial coiling of the pin and prior to the slipping on of the guard, means for removing the guard from the conveying means, means for completing the coiling of the pin immediately subsequent to the guard being slipped on and for closing the pin immediately subsequent to the completion of the coiling, means for causing the guard to assume its proper position while the coiling of the pin is being completed, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the pin.

22. In a safety-pin machine, means for partially coiling a pin provided with a cap, means for operating simultaneous therewith suitable die mechanism to produce a guard for the coil on the pin, means for conveying said guard from the die mechanism to the partially-coiled pin at the proper moment to slip it on same subsequent to the partial coiling of the said

pin, means for causing the pin to be in alinement with the line of travel of the conveying means operating immediately subsequent to the partial coiling of the pin and prior to the slipping on of the guard, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on and for closing the pin immediately subsequent to the completion of the coiling, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, means for clenching the guard when the latter has assumed its proper position on the coil, and means for steadying the pin during the period lapsing between the completion of the coiling of the pin and the clenching of the guard.

23. In a safety-pin machine, means for coiling a pin provided with a cap, means for operating suitable die mechanism to produce a guard for the coil on the pin, means for conveying said guard from the die mechanism to the pin at the proper moment to slip it on same, means for causing the pin to be in alinement with the line of travel of the conveying means immediately prior thereto, means for removing the guard from the conveying means and for causing it to assume its proper position on the coil, means for clenching the guard in position, and means for closing the pin subsequent to the completion of the coiling of the pin.

24. In a machine for manufacturing safety-pins, &c., means for coiling a pin provided with a cap, means for conveying to and slipping a coil-guard on same, means for causing the pin to be in alinement with the line of travel of the conveying means immediately prior thereto, means for removing the guard from the conveying means, means for clenching the guard in position on the coil, and means for closing the pin subsequent to the completion of the coiling of the pin.

25. In a machine for manufacturing safety-pins, &c., the combination with a coiling-spindle of means for imparting synchronously a rotating, a transverse and a longitudinal movement to same, means for discontinuing the movements prior to their completion in one direction, and means for continuing the movements in the same direction.

26. In a machine for manufacturing safety-pins, &c., the combination with a coiling-spindle of means for imparting synchronously a rotating, a transverse and a longitudinal movement to same, means for discontinuing the movements prior to their completion in one direction, means for continuing the movements in the same direction and means for reversing them and continuing them in the opposite direction.

27. In a machine for manufacturing safety-pins, &c., the combination with a coiling-spindle of means for imparting synchronously a rotating, a transverse and a longitudinal movement to same, means for discontinuing the



movements prior to their completion in one direction, means for continuing the movements and means for moving the spindle back to its original position.

5 28. In combination, a spindle, a pinion mounted on same, a threaded portion on same, a transversely-slidable bearing, a threaded portion on the bearing adapted to engage with the threaded portion on the spindle to move  
10 the spindle longitudinally when rotated, a cam, a lever actuated thereby, a gear-rack carried by the lever adapted to engage with the pinion on the spindle to rotate the same, a pivoted lever having free ends, one coöper-  
15 ating with the lever actuated by the cam and the other engaging with the bearings to impart a transverse movement to same.

29. A spindle having a rotating, a transverse and a longitudinal movement, and a  
20 plurality of members each having a longitudinal movement causing them to protrude from the spindle periodically.

30. A spindle having a rotating, a transverse and a longitudinal movement, and a  
25 plurality of members each having a longitudinal movement, and a pivoted portion bifurcated at its outer end, adapted to be operated by one of said members to protrude periodically from the spindle.

31. A spindle having a rotating, a transverse and a longitudinal movement in two directions, and a plurality of members adapted to protrude therefrom at periods, and means  
30 whereby one of said members protrudes twice to each complete movement of the spindle, while the other members protrude but once.

32. A spindle having a rotating, a transverse and a longitudinal movement, a central member adapted to protrude therefrom at intervals, and a plurality of members radially  
40 disposed adapted also to protrude therefrom at intervals.

33. A spindle having a rotating, a transverse and a longitudinal movement, a plurality of members located therein, and means  
45 for causing said members to protrude periodically from the spindle.

34. A spindle having a rotating, a transverse and a longitudinal movement, a plurality of members located therein, a stationary means for causing said members to protrude periodically from the spindle, and means  
50 whereby the rotating, transverse and longitudinal movements of the spindle are compensated for so as to enable the means for causing the members to protrude to operate in the various positions of the spindle.

35. A spindle having a rotating, a transverse and a longitudinal movement, a central longitudinal member in said spindle terminating at its rear end in a rounded portion, a cam, a lever operated by same to cause the central member to protrude at intervals from the spindle, and a slot in said lever transverse to  
60 the axis of the spindle for the reception of the rounded portion of the central member there-

by compensating for the transverse movement of the spindle.

36. A spindle having a rotating, a transverse and a longitudinal movement, a longitudinal member in said spindle, a cam, a lever actuated thereby to cause the longitudinal member to protrude from the spindle at intervals, a guide on the end of the lever adjacent to the longitudinal member, a block  
70 loose on the spindle and adapted to slide in the guide to compensate for the transverse movement of the spindle, and adapted to slide on the spindle to compensate for the longitudinal movement of the latter, a circumferential groove in the block, and a button fast on the longitudinal member adapted to slide in the groove to compensate for the rotation of the spindle.

37. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a transverse and a longitudinal movement, means for discontinuing said movements prior to their completion in one direction and for continuing them in the same direction, and means  
85 carried by said spindle for coiling a strand of material.

38. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a longitudinal, and a transverse motion and having means for coiling a strand of material, means for slipping a coil-guard on said material, and means for clenching the guard in position.

39. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a transverse and a longitudinal movement and having means for coiling a strand of material, means for conveying to and slipping a coil-guard on said material, means for removing  
100 the guard from the conveying means and for causing it to assume its proper position on the coil, and means for clenching the guard in position.

40. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a transverse and a longitudinal movement and having means for coiling a strand of material, means for operating suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the material at the proper moment to slip it on same, and means for clenching the guard in position on the coil.

41. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a transverse and a longitudinal movement and having means for coiling a strand of material, means for operating suitable die mechanism to produce a guard for the coil on the material, means for conveying said guard from the die mechanism to the material at the proper moment to slip it on same, means carried by the spindle for causing the guard to assume its proper position on the coil, and  
125 means for clenching the guard in position.

42. In a machine for manufacturing safety-



pins, &c., a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for slipping a coil-guard on same subsequent to the partial coiling of the material, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position on the coil.

43. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on said material subsequent to the partial coiling of same, means for removing the guard from the conveying means, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

44. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position while the coiling of the material is being completed, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

45. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on said material subsequent to the partial coiling of same, means carried by the spindle for removing the guard from the conveying means, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, means carried by the spindle for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, and means for clenching the guard when the latter has assumed the proper position on the coil.

46. In a machine for manufacturing safety-pins, &c., a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper

position immediately subsequent to the completion of the coiling of the material, means for clenching the guard when the latter has assumed its proper position on the coil, and means for steadying the material during the period lapsing between the completion of the coiling of the said material and the clenching of the guard.

47. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material, a spindle having a rotating, a transverse and a longitudinal movement, means for discontinuing said movements prior to their completion in one direction and for continuing them in the same direction, and means carried by said spindle for coiling a strand of material.

48. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material, a spindle having a rotating, a transverse and a longitudinal movement and having means for coiling said strand of material, means for slipping a coil-guard on same, and means for clenching the guard in position.

49. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material, a spindle having a rotating, a transverse and a longitudinal movement and having means for coiling the said strand of material, means for conveying to and slipping a coil-guard on same, means for removing the guard from the conveying means and for causing it to assume a proper position on the coil, and means for clenching the guard in position.

50. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material and simultaneously therewith bending the end of same, a spindle having a rotating, a transverse and a longitudinal movement, means for discontinuing said movements prior to their completion in one direction and for continuing them in the same direction, and means carried by said spindle for coiling a strand of material.

51. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material and simultaneously therewith bending the end of same, a spindle having a rotating, a longitudinal and a transverse movement and having means for coiling said strand of material, means for slipping a coil-guard on the said material, and means for clenching the guard in position.

52. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material and simultaneously therewith bending the end of same, a spindle having a rotating, a transverse and a longitudinal movement, and having means for coiling a strand of material, means for conveying to and slipping a coil-guard on said material, means for removing the guard from the conveying means and for causing it to assume its proper position on the coil, and means for clenching the guard in position on the coil.



53. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling the said strand of material, means for slipping a coil-guard on same subsequent to the partial coiling of the material, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position on the coil.

54. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on said material subsequent to the partial coiling of same, means for removing the guard from the conveying means, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

55. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position while the coiling of the material is being completed, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

56. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on said material subsequent to the partial coiling of same, means carried by the spindle for removing the guard from the conveying means, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, means carried by the spindle for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, and means for clenching the guard when the latter has assumed its proper position on the coil.

57. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling

a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, means for clenching the guard when the latter has assumed its proper position on the coil, and means for steadying the material during the period lapsing between the completion of the coiling of the said material and the clenching of the guard.

58. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material and simultaneously therewith bending the end of same, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for slipping a coil-guard on same subsequent to the partial coiling of the said material, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position on the coil.

59. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material and simultaneous therewith bending the end of same, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on said material subsequent to the partial coiling of same, means for removing the guard from the conveying means, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, and means for clenching the guard in position, substantially simultaneous with the completion of the coiling of the material.

60. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material and simultaneously therewith bending the end of same, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position while the coiling of the material is being completed, and means for clenching the guard in position substantially simultaneous with the completion of the coiling of the material.

61. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material and simultaneously therewith bending the end of same, a spindle having a rotating, a transverse and a longitudinal



nal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on said material subsequent to the partial coiling of same, means carried by the spindle for removing the guard from the conveying means, means carried by the spindle for completing the coiling of the material subsequent to the guard being slipped on, means carried by the spindle for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, and means for clenching the guard when the latter has assumed its proper position on the coil.

62. In a machine for manufacturing safety-pins, &c., means for grasping and holding a strand of material and simultaneously therewith bending the end of same, a spindle having a rotating, a transverse and a longitudinal movement and having means for partially coiling a strand of material, means for conveying to and slipping a coil-guard on same subsequent to the partial coiling of the material, means for removing the guard from the conveying means, means for completing the coiling of the material subsequent to the guard being slipped on, means for causing the guard to assume its proper position immediately subsequent to the completion of the coiling of the material, means for clenching the guard when the latter has assumed its proper position on the coil, and means for steadying the material during the period lapsing between the completion of the coiling of the said material and the clenching of the guard.

63. In a machine for manufacturing safety-pins, &c., the combination of means for feeding or delivering a coil-guard located in one plane, means for receiving the coil-guard lo-

cated in a different plane, and a conveying means adapted to ply alternately between the two means to convey the coil-guard from one to the other.

64. In a machine for manufacturing safety-pins, &c., the combination of means for feeding a coil-guard, and means for utilizing said coil-guard, of means for conveying the said coil-guard from the feeding means to the utilizing means.

65. In a machine for manufacturing safety-pins, &c., the combination of means for operating suitable die mechanism to produce a coil-guard and means for utilizing said coil-guard, of means for conveying the said coil-guard from the die mechanism to the means for utilizing the said guard.

66. In a machine for manufacturing safety-pins, &c., the combination of means for supporting a strand of material, means for conveying a coil-guard to the strand and slipping it on same, and means for insuring the alinement of the strand with the conveying means.

67. In a machine for manufacturing safety-pins, &c., the combination with means for supplying coil-guards to a strand of material, of a pair of tongs adapted to close at intervals around the strand of material to adjust the alinement of same with relation to the means for supplying the guard, and means for operating the tongs on a quick action.

Signed at New York, in the county of New York and State of New York, this 5th day of April, A. D. 1901.

PETER E. WIBERG.

Witnesses:

AXEL V. BEEKEN,  
ARTHUR L. HELMES.