No. 682,686. Patented Sept. 17, 1901.

B. F. HALL.

PUNCHING MACHINE.

(Application filed May 10, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

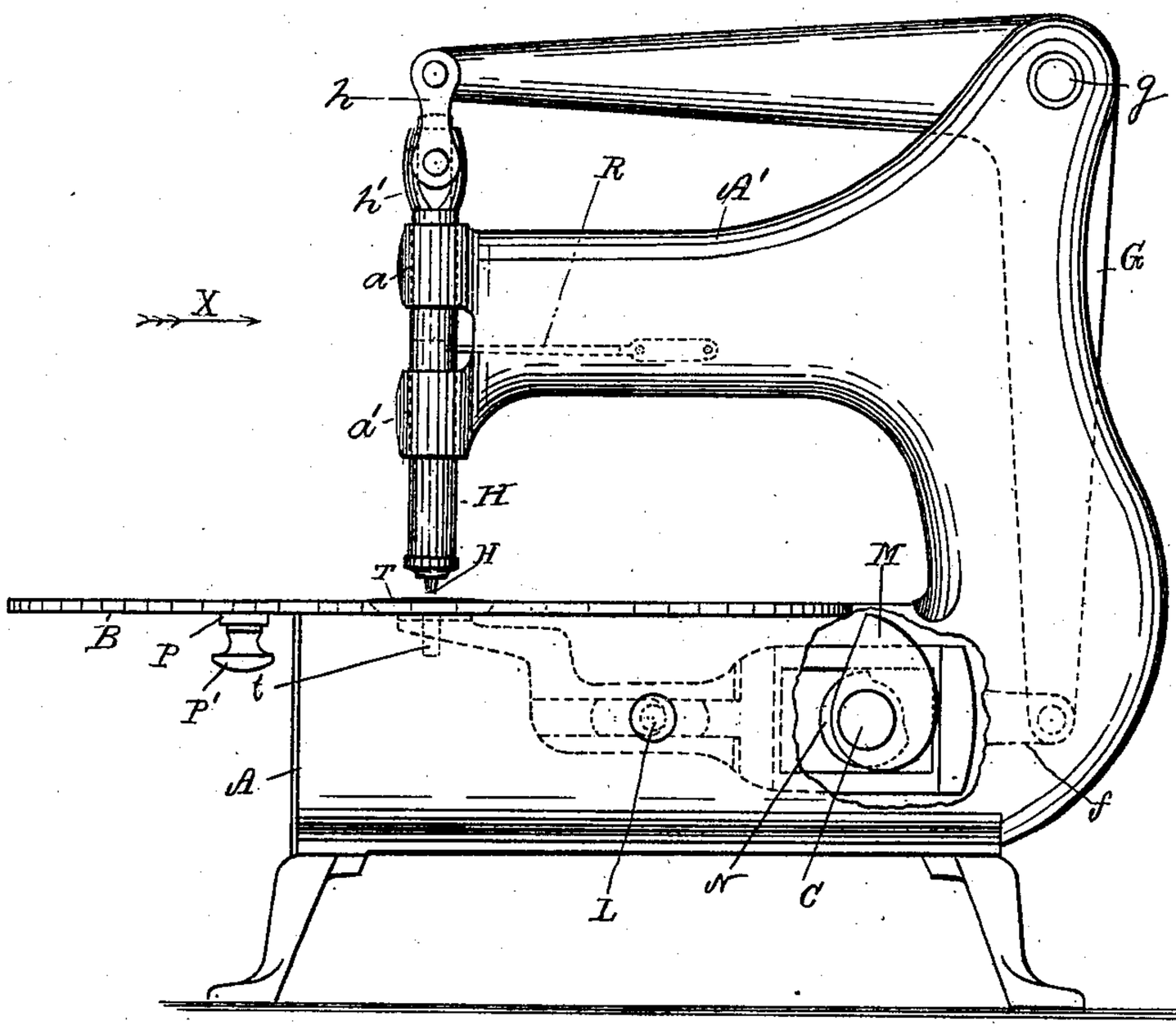
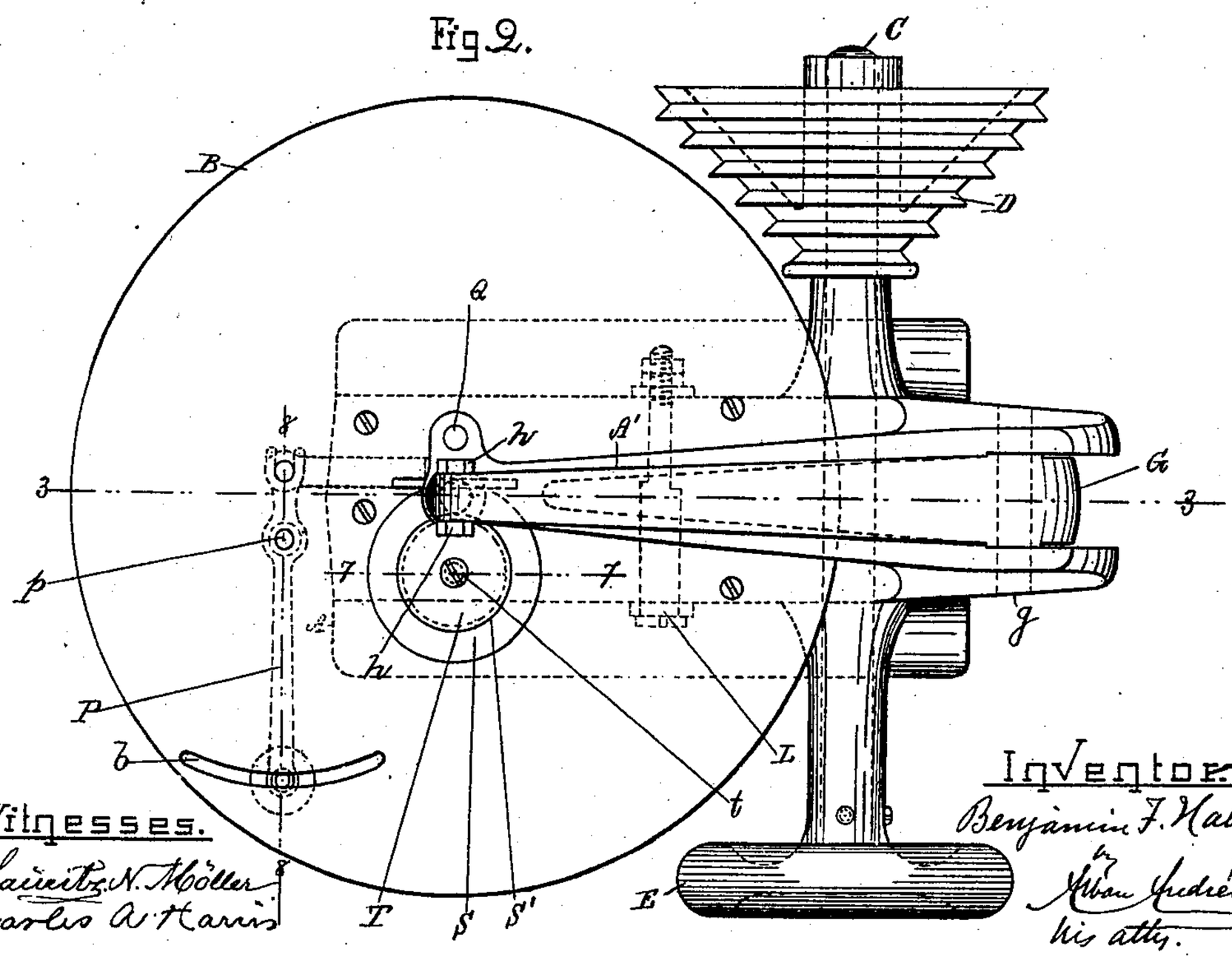


Fig. 2.



Witnesses.
Lauritz N. Möller
Charles A. Harris

Inventor:
Benjamin F. Hall
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(No Model.) 3 Sheets—Sheet 2.

Fig. 3.

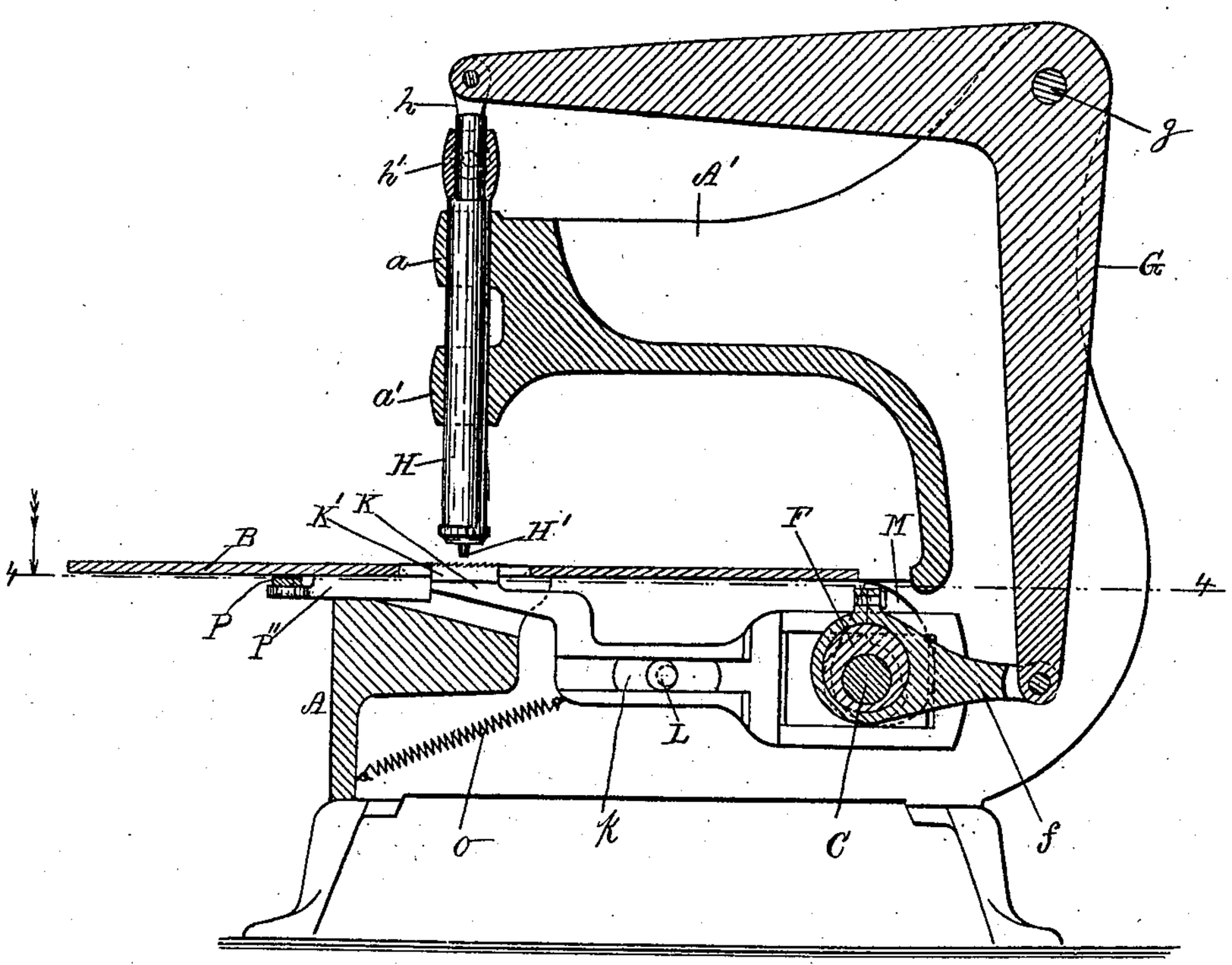

Fig. 4.

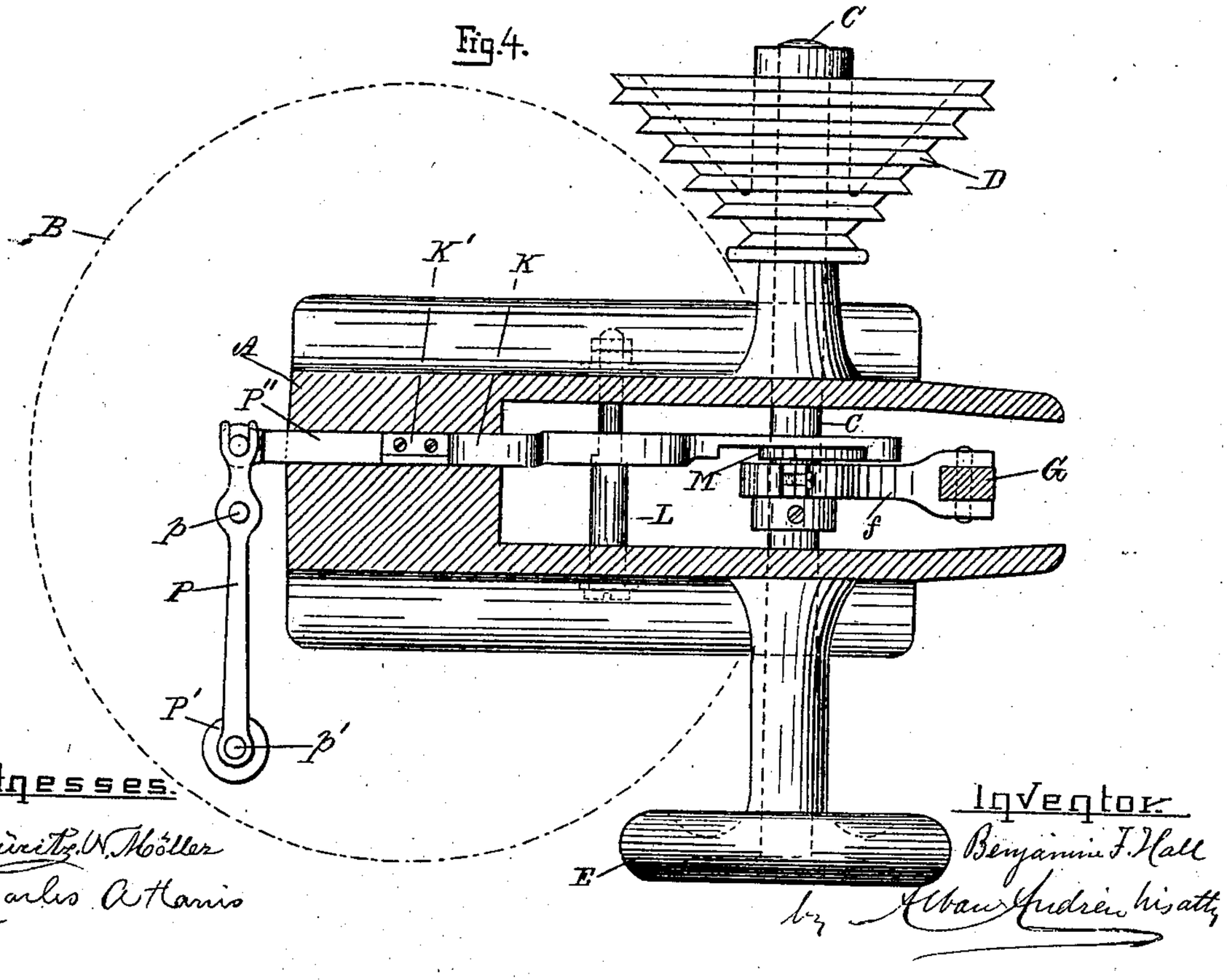

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Fig. 6.

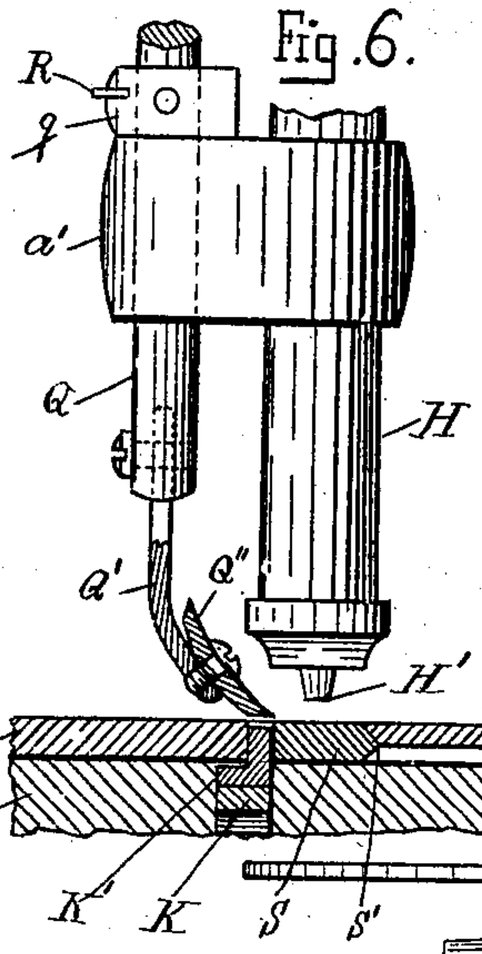


Fig. 5.

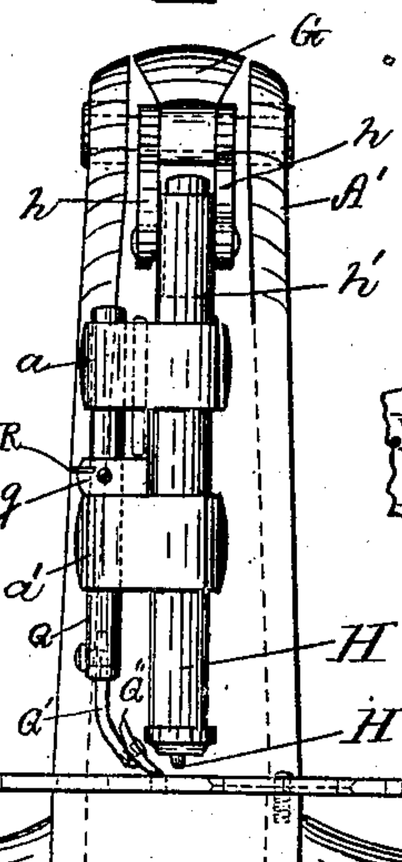


Fig. 10.

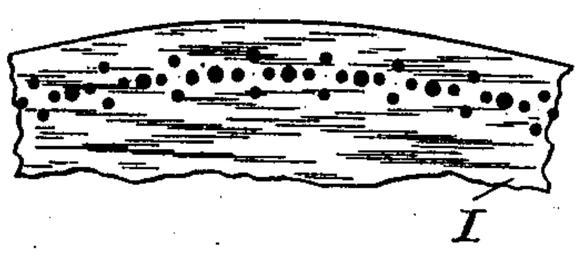


Fig. 7.

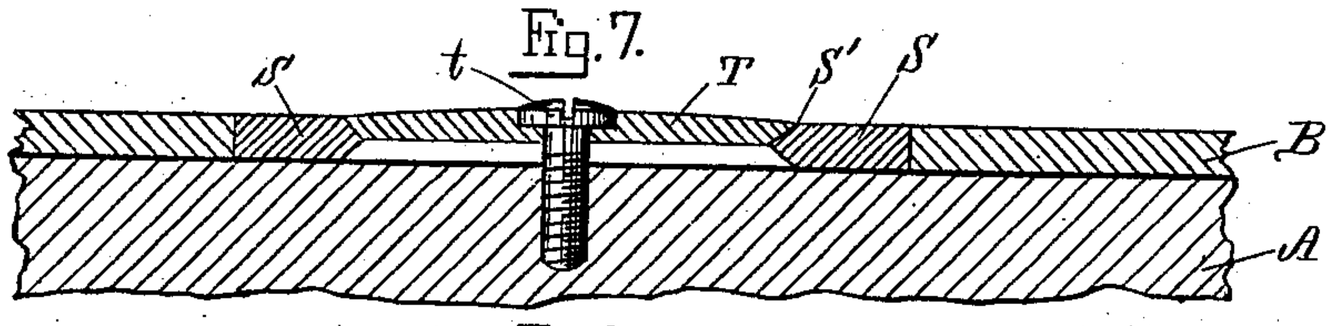


Fig. 8.

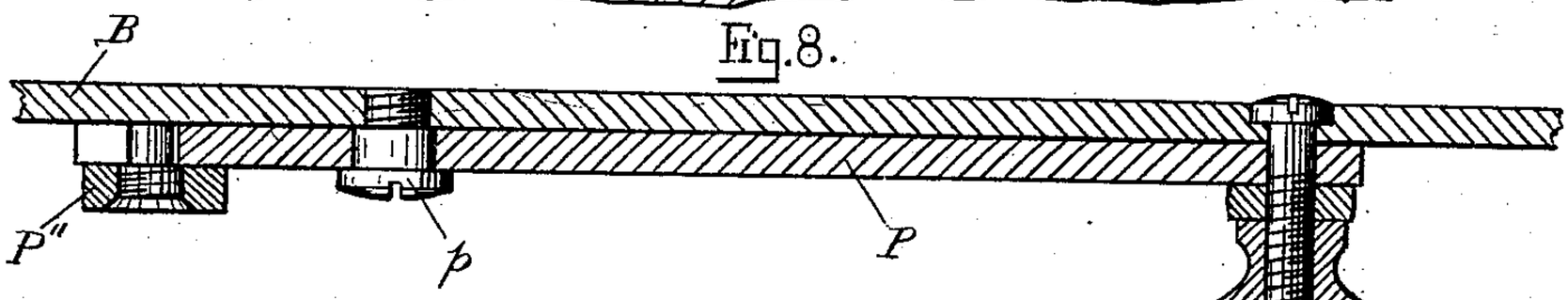
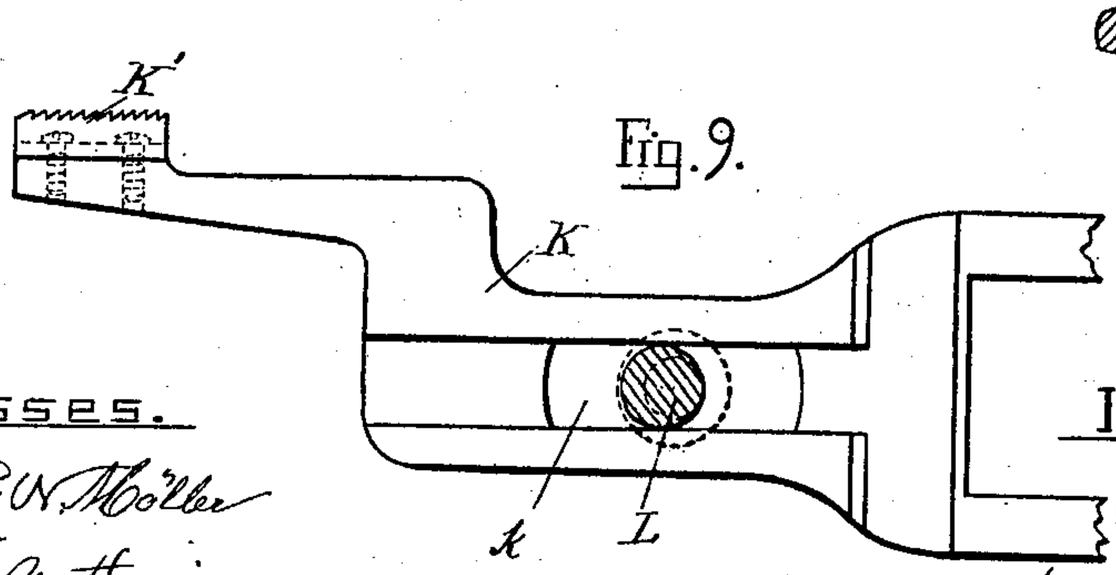


Fig. 9.



Witnesses.

Laurits N. Møller

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UNITED STATES PATENT OFFICE.

BENJAMIN F. HALL, OF SALEM, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ZINA GOODELL, OF SAME PLACE.

PUNCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 682,686, dated September 17, 1901.

Application filed May 10, 1901. Serial No. 59,565. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. HALL, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Punching-Machines, of which the following is a specification.

This invention relates to improvements in punching-machines particularly adapted for punching or perforating ornamental shoe portions—such, for instance, as foxings, lace-pieces, vamps, tips or toe-caps, or other ornamental parts of boots and shoes. It is also applicable for the purpose of perforating other articles or materials as may be desired.

The invention is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of the machine, showing a portion of the frame broken away. Fig. 2 represents a top plan view of Fig. 1. Fig. 3 represents a vertical section of the machine. Fig. 4 represents a horizontal section on the line 4 4, shown in Fig. 3. Fig. 5 represents an enlarged detail end elevation of the die-holder bar and presser-foot bar, showing the presser-foot, work-support, die-plate, die-plate clamping-disk, and feed-point and its carrier in section. Fig. 7 represents an enlarged cross-section on the line 7 7, shown in Fig. 2. Fig. 8 represents an enlarged cross-section on the line 8 8, shown in Fig. 2. Fig. 9 represents an enlarged side elevation of a portion of the feed-point carrier and feed-point, and Fig. 10 represents a piece of leather or other material punched or perforated by my improved machine.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In the drawings, A represents the base portion of the frame of the machine, integral with which is cast the gooseneck portion A′. To the top of the base portion A is suitably secured the work-supporting plate B.

C is the rotary driving-shaft, journaled in bearings in the frame portion A. To one end of said shaft is secured, preferably, a cone-pulley D, to which a rotary motion is imparted by means of belt-power, as usual. E is a hand-wheel or balance-wheel secured to the opposite end of the shaft C for the purpose of adjusting the positions of the various working parts of the machine previous to starting the same, so as to enable the work to be placed in proper position previous to the commencement of the punching or perforating operation.

To the shaft C is secured an eccentric F, surrounded by a strap *f*, the rear end of which is pivotally connected to the lower end of a bell-crank lever G, which is pivoted at *g* to the rear upper portion of the gooseneck A′, as shown. To the front end of the lever G is pivotally connected a pair of links *h h*, the lower ends of which are pivotally connected to a collar *h′*, secured to the upper end of the die-holder bar H, the latter being guided vertically in bearings *a a′*, forming parts of the forward end of the gooseneck A′, shown in Figs. 1, 3, and 5.

H′ is the die, secured in a suitable manner to a die-holder attached to the lower end of the die-holder bar, as is common in devices of this kind. The said die is made of a form or construction to make the desired perforations in the goods I, a representation of which is shown in Fig. 10. The construction of said die will of course be varied according to the design of the perforations to be made in the goods.

By the construction above mentioned it will be seen that a vertical reciprocating motion is imparted to the die and its die-holder bar from the rotary shaft C during the operation of the machine.

The feed device for automatically and intermittently feeding the goods to the die during the punching or perforating operation is what is usually termed a "four-motion feed" and is constructed as follows: It consists of a feed-point carrier or lever K, pivoted on an eccentric-pin L, adjustably secured in a suitable manner in bearings in the frame portion A. Said eccentric L projects through a slotted perforation *k* in the lever K, as shown in Figs. 1, 3, and 9. On the rotary shaft C are secured two cams—namely, M and N, (shown in Fig. 1,) the former serving the purpose of imparting a feed motion to the feed-point carrier K and its serrated

feed-point K′, and the cam N serving the purpose of raising the said feed-point during the feed of the material. A spring O, connected to said feed-point carrier and to the forward portion of the frame A, serves the purpose of moving the feed-point carrier opposite to the line of feed and downward during the release of the respective cams M N from the rear portion of the feed-point carrier K, as is usual in four-motion feeds. By adjusting the position of the eccentric L the position of the feed-point K′ can be regulated relative to the upper surface of the work-support B, as may be needed from time to time to compensate for the wear of said feed-point or its connected parts. In connection with such four-motion feed I use a feed-regulating device consisting of an adjustable lever P, pivoted at *p* to the under side of the work-plate B, as shown in Figs. 2, 4, and 8. To the front end of said lever is connected a headed screw *p′*, adjustable in a curved slot *b* in the work-plate B and adapted to be secured to the latter after being adjusted by means of a thumb-nut P′. (Shown in Fig. 8.) The opposite end of the said lever P is pivotally connected to a feed-regulator rod or bar P″, the inner end of which serves as a stop to limit the outward motion of the feed-point carrier after its release from the cam M and while it is being moved by the spring O to its outward position.

Q is the presser-foot bar, vertically movable in the bearings *a a′* in the outer end of the gooseneck A′, as shown in Figs. 5 and 6. To said presser-foot bar is attached a collar *q*, which is held in contact with the upper end of the bearing *a′* by means of a yielding spring R. (Shown in Figs. 5 and 6, as well as in dotted lines in Fig. 1.)

To the lower end of the presser-foot bar Q is adjustably secured a rod Q′, to the lower end of which is journaled the rotary presser-foot Q″. (Shown in Figs. 5 and 6.) The rotary presser-foot Q″ is held from contact with the upper surface of the work-plate B, as shown in Fig. 6, so as to allow the material to be readily introduced between said work-plate and presser-foot and also for the purpose of preventing an undue pressure by the presser-foot onto the goods during the feeding and punching operation, thus enabling the work to be adjusted readily during the punching operation.

In a circular perforation in the work-supporting table B is located an annular die-plate S, which is supported upon the frame A and serves to receive the imprint of the die during the punching or perforating operation. Said die-plate is preferably made of brass, and as a portion of its upper surface becomes worn or defaced it may readily be adjusted by turning it more or less around its axis and securing it in such adjusted position. The inner surface S′ of the said die-plate S is made V-shaped in section, as shown in Figs. 6 and 7, and on top of such V-shaped inner edge is located a circular clamping-plate T, having a conical edge adapted to rest upon the V-shaped inner edge of the circular die-plate ring S, as shown in Fig. 7.

t is a fastening-screw going loosely through a central perforation in the clamping-plate T and screwed into a screw-threaded perforation in the base A, as shown in Fig. 7, and by this means the die-plate may be firmly secured in its adjusted position relative to the die. Should the upper surface of said die-plate become worn or defaced by the punching-die, it may readily be removed, turned over, and secured in such reversed position by means of the clamping-plate T and fastening-screw *t*, thus materially increasing the life of said die-plate.

In connection with the work-supporting table B, I use a suitable gage, against which the edge of the work is guided during the punching operation, as is common in devices of this kind.

The operation of this my improved punching or perforating machine is as follows: The article to be perforated is placed upon the table B, with its edge against a gage thereon, and after the presser-foot is raised it is allowed to drop onto the article by the influence of the spring R. The machine is then set in operation by imparting a rotary motion to the driving-shaft C, causing the die-holder bar and its die to be vertically reciprocated for the purpose of punching or perforating the article and causing the feed device to intermittently feed the said article the desired distance, while the die is raised above the work, and so on during the operation of the machine.

What I wish to secure by Letters Patent and claim is—

1. In a punching or perforating machine, in combination a frame A, and gooseneck A′, a vertically-reciprocating die and die-carrier, a spring-pressed rotary presser-foot, a four-motion feed device, a reversible adjustable circular die-plate ring and a clamping-plate for securing said ring in its adjusted position substantially as and for the purpose set forth.

2. In a punching or perforating machine, in combination, a rotary driving-shaft, a knee-lever actuated by an eccentric on said shaft and connected to a reciprocating die-carrier, a pair of cams secured to said shaft, a pivoted feed-carrier actuated by said cam and a spring, and an adjustable feed-regulating device, consisting of an adjustable pivoted lever having one of its ends connected to a bar serving as a stop against the forward end of the feed-carrier substantially as and for the purpose set forth.

3. In a punching or perforating machine, in combination a vertically-reciprocating die-holder bar and die, a work-support, an adjustable die-plate ring and a spring-pressed rotary presser-foot arranged upon a yielding presser-foot bar, having secured to it a collar or projection *q*, for limiting its downward

motion so as to normally hold said presser-foot from contact with the table and feed-point of the feed device, substantially as herein set forth and described.

4. In a punching or perforating machine, in combination a vertically-reciprocating die-carrier and die, a spring-actuated presser-foot and a four-motion feed-point carrier actuated by a spring and a pair of cams and pivotally hung upon an eccentric-pin capable of rotary adjustment for adjusting the position of the feed-point relative to the top of the work-plate substantially as herein set forth and described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BENJAMIN F. HALL.

Witnesses:
ALBAN ANDRÉN,
THEKLA ANDRÉN.