

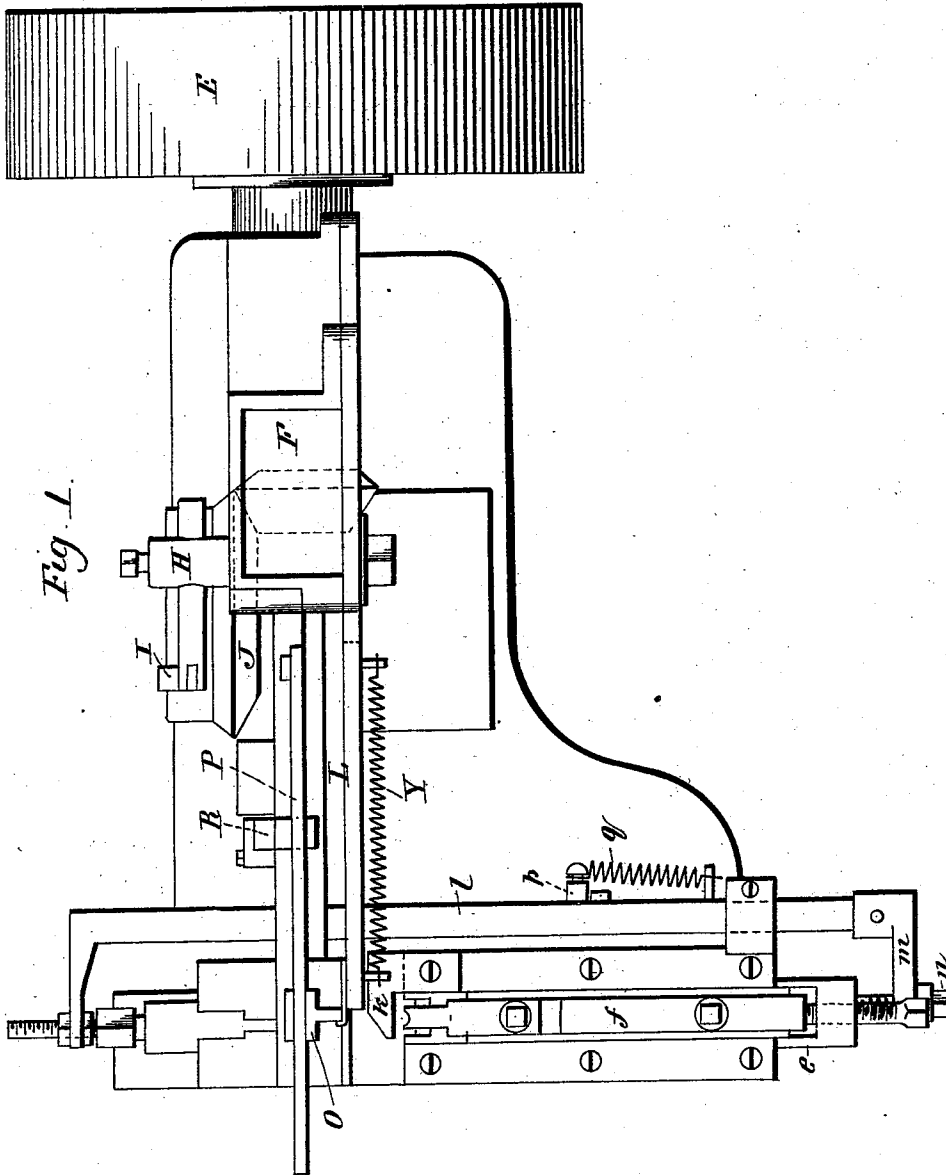
(No Model.)

5 Sheets—Sheet 1.

T. A. PERRINS.  
MACHINE FOR FORMING LACING HOOKS.

No. 558,306.

Patented Apr. 14, 1896.



Witness.  
J. H. Thompson  
William D. Kelsey.

Fig. 1<sup>a</sup>



Fig. 1<sup>b</sup>



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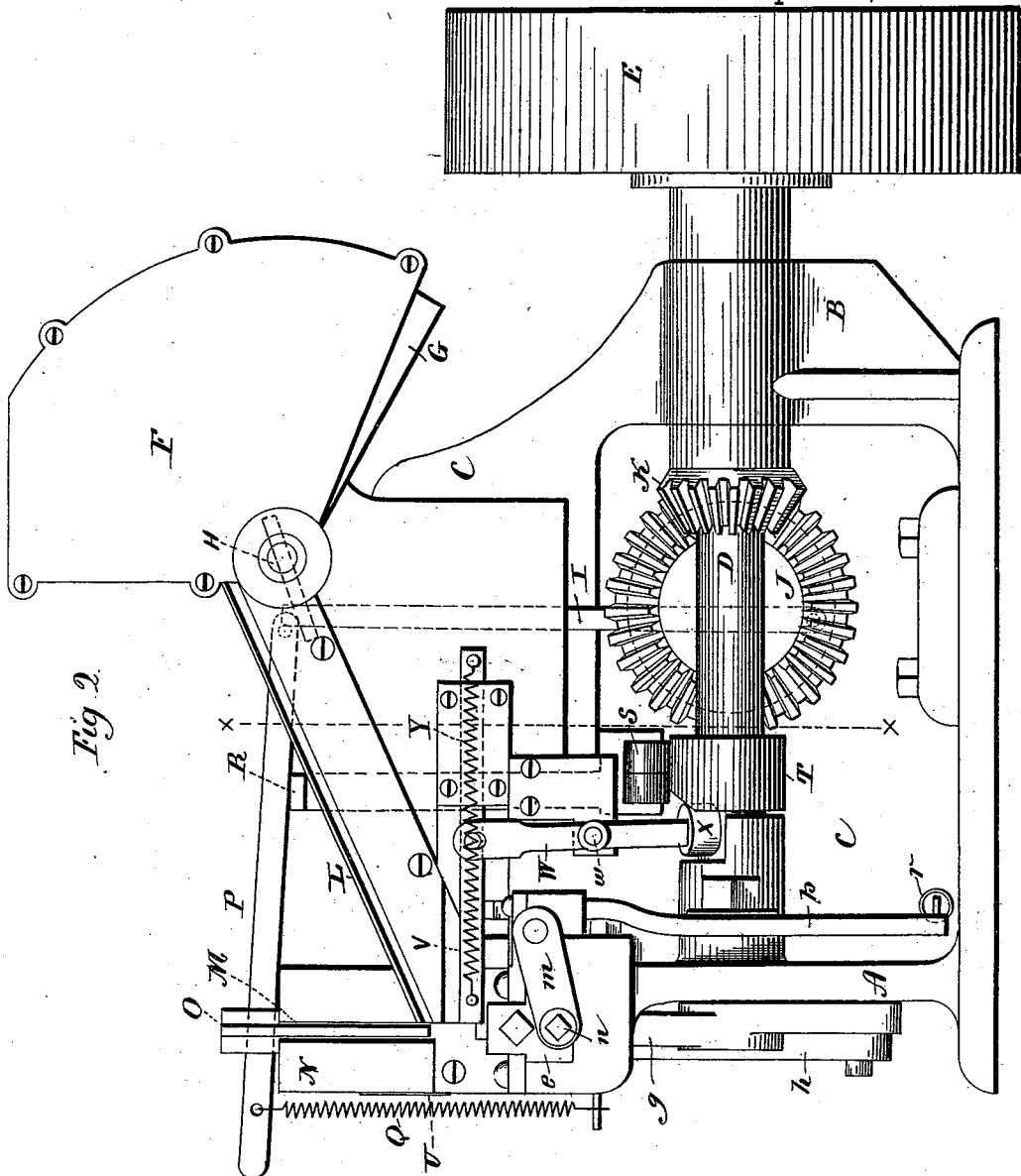
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J. H. Shumway  
Lillian D. Kelsey

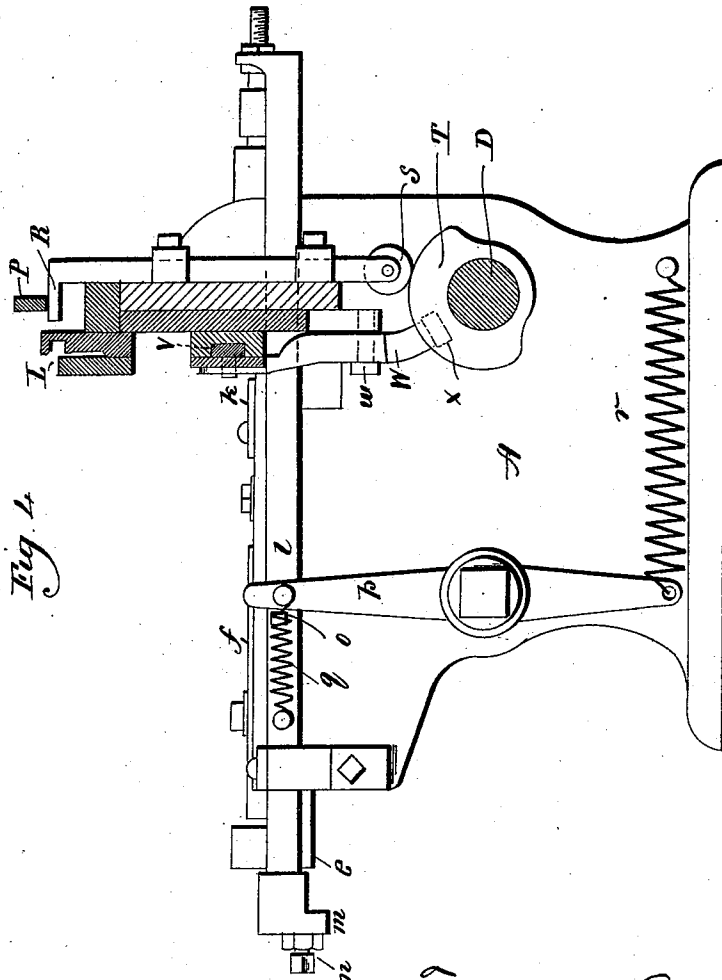
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5 Sheets—Sheet 4.

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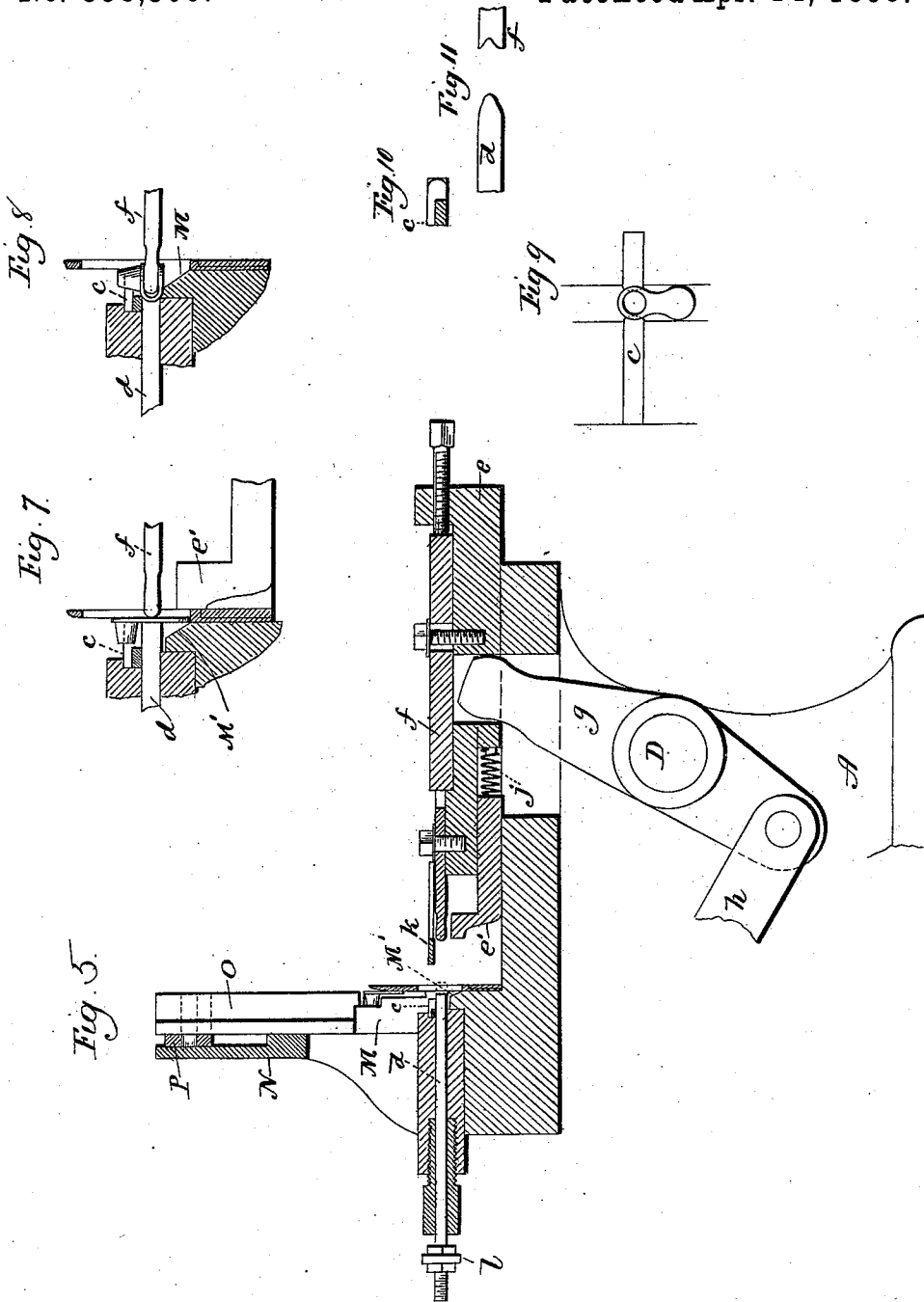
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5 Sheets—Sheet 5.

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# UNITED STATES PATENT OFFICE.

THOMAS A. PERRINS, OF ANSONIA, CONNECTICUT.

## MACHINE FOR FORMING LACING-HOOKS.

SPECIFICATION forming part of Letters Patent No. 558,306, dated April 14, 1896.

Application filed September 26, 1895. Serial No. 563,746. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS A. PERRINS, of Ansonia, in the county of New Haven and State of Connecticut, have invented a new  
5 Improvement in Machines for Forming Lacing-Hooks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and  
10 exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a top or plan view of the machine; Fig. 1<sup>a</sup>, a perspective view of the blank as fed  
15 to the machine; Fig. 1<sup>b</sup>, a perspective view of the completed hook; Fig. 2, a side view of the machine; Fig. 3, a front view; Fig. 4, a section on line *xx* of Fig. 2, looking forward; Fig. 5, a vertical section of the head of the  
20 machine; Fig. 6, a face view of the guide and chute, illustrating the delivery of the blanks from the chute into the slot; Figs. 7 and 8, sectional views of the bending operation; Fig. 9, a front view of the dies for bending the eyelet portion; Fig. 10, a sectional view of said  
25 dies; Fig. 11, a top view of the adjacent ends of the punch and anvil, Figs. 7 to 11, inclusive, enlarged.

This invention relates to a machine for  
30 forming lacing-hooks. These hooks consist of an eyelet and head, which head is bent to stand above the eyelet, forming a hook, as shown in Fig. 1<sup>b</sup>. The blanks, as shown in Fig. 1<sup>a</sup>, are formed in suitable machinery and  
35 usually placed, one at a time, in a suitable press and bent to form the complete article shown in Fig. 1<sup>b</sup>.

The object of this invention is to automatically feed the blanks and bend them; and it  
40 consists in the construction and combination of parts, as will be hereinafter described, and pointed out in the claims.

The frame of the machine consists of a head A and bearing B, which are connected by a  
45 web C.

D is the driving-shaft, supported in the head and bearing B and driven by a pulley E.

F is a hopper mounted on the upper part of the web, in which is an agitator G, mounted  
50 on a shaft H, which extends beyond the hopper, where it is connected with the upper end of a link I. The lower end of the link is ec-

centrically connected to the rear face of a bevel-gear J, which is operated by a bevel-gear K on the shaft D. This hopper, agitator, and driving mechanism are of usual construction, and for which any of the well-known mechanisms may be substituted. From the hopper a chute L, of proper form to conduct the blanks, extends downward and opens into a vertical slot M, formed in a guide N, extending upward from the head A. The lower end of this slot is cut away to form a bevel M'. In this slot M is a vertically-movable feeding-slide O, the upper end of which  
65 is connected with a lever P, the inner end of which is connected to the web C and the outer end to the head A by a spring Q, the tendency of which is to draw the outer end downward, and hence depress the slide O. This lever P is raised by a vertically-guided lifting-arm R, the lower end of which is provided with a roller S, which engages with the edge of a cam T, mounted on the driving-shaft D. Also mounted in the guide N is a spring-latch U, the inner end of which is rounded, and extends into the slot M, opposite and slightly below the point where the blanks are discharged from the chute, and so as to catch and hold the blank by the eyelet.  
80

To insure the lower end of the blank entering the slot M, a transverse slide V is mounted on the web and is operated by a link W, mounted on a pivot *w*. The lower end of the link W is furnished with a roller X, which engages with the cammed edge of the cam T. A spring Y connects the rear end of the slide with the face of the chute or other stationary point, the tendency of which is to throw the slide outward and hold the roller X against the  
90 cam. Mounted in the head and so as to stand within the slot M is a die *c*, the center of which is recessed and the sides of the recess rounded, as shown in Figs. 9 and 10, the distance between the sides corresponding to the external diameter of the eyelet. Mounted in the head and horizontally movable therein is an anvil *d*, the outer end of which normally stands flush with the inner wall of the slot M and is pointed, as shown in Fig. 11. The outer  
100 end projects beyond the head and is screw-threaded. Mounted in the head A is a horizontal slide *e*, which carries a punch *f*, the forward end of which is in line with the anvil

$d$  and is V-shaped, as shown in Fig. 1. This slide is operated by a lever  $g$ , the lower end of which is connected with a link  $h$ , which is operated by a cam  $i$  on the outer end of the shaft D. In the forward end of the slide  $e$  a sliding gate  $e'$  is arranged, which will, when the slide moves forward, close the lower end of the slot M and prevent the escape of the blanks. Between the slide  $e$  and gate  $e'$  is a spring  $j$ , which yields, permitting the punch to be moved into the slot M against the blank therein. Also mounted on the head is a stripper  $k$ , which extends across the path of movement of the punch  $f$ . Connected to the outer end of the anvil  $d$  is a shaft  $l$ , which extends across the machine and is formed at its opposite end with an arm  $m$ , which carries a bolt  $n$  in position to be engaged by the end of the slide  $e$ . On this shaft  $l$  is a stop  $o$  in position to engage with a lever  $p$ , mounted on the inner face of the head. The upper end of this lever is connected to the shaft by a spring  $q$ , and its lower end is connected to the head by a spring  $r$  and so that as the punch is moved forward and forces the anvil rearward the shaft which is connected with the rear of the anvil will also be moved rearward, the spring  $r$  yielding to permit it so to do. As the slide is moved backward it will engage with the bolt  $n$  in the arm  $m$  and move the shaft forward, and hence, it being connected with the anvil, the anvil will be forced forward, so that its point will project beyond the face of the guide N, as shown in Fig. 5, the spring  $q$  yielding to permit this movement of the shaft  $l$ , which, when relieved, draws the end of the anvil flush with the face of the inner wall of the slot M.

The operation of the machine is as follows: Blanks being placed in the hopper are delivered into the chute, through which they pass into the slot M, where the eyelet is caught by the latch U, as shown in Fig. 6. Usually the lower end of the blank will fall into the slot, but to insure this position the slide V moves forward and forces the blank into vertical position, as shown in broken lines, Fig. 6, after which it is immediately retired. The feeding-slide then descends, forcing the blank past the spring-latch U downward, so that the head stands between the walls of the die  $c$ , as shown in Fig. 9, in which position the contracted portion of the blank stands in a line with the end of the anvil  $d$  and punch  $f$ . The feeding-slide in this position acts as a gate to close the lower end of the chute. At the time the feeding just described takes place the slide  $e$  moves forward, the gate  $e'$  striking the face of the guide N, so as to close the lower end of the slot M and prevent the escape of the blanks. Then as the slide continues its forward movement the spring  $j$  yields, permitting the punch to be advanced and clamp the shank of the blank between its point and the end of the anvil and forcing the blank rearward into the slot M, and so as to form an indentation in the back of the hook. The

lower end of the blank is bent by the cam M' upward against the under face of the punch. At the same time the flange of the eyelet portion is forced against the side walls of the die  $c$ , which turns the said eyelet portion forward and downward upon the upper face of the punch  $f$ , as shown in Fig. 8. At the same time the contracted portion of the shank is bent by the V-shaped end of the punch around the pointed end of the anvil to around the inner surface of the shank. The punch and slide then recede until the slide strikes the bolt  $n$  in the arm  $m$  on the end of the shaft  $l$ , which it moves forward, forcing the anvil  $d$  beyond the face of the guide, which clears the slot in the event of the eyelet sticking therein. Usually, however, the eyelet is withdrawn by the punch  $f$ , from whence it is removed by the stripper  $k$ , beneath which the end of the punch passes. At the time the punch recedes the feeding-slide O is raised, permitting another blank to pass into the slot M, ready for operation, as before described. It will thus be seen that the blanks are automatically fed and bent and the studs completed without requiring the constant attention of an operator.

By substituting varying sizes of dies, anvils, and punches the machine is readily adapted for bending various sizes of hooks.

I claim—

1. In a machine for bending lacing-hooks the combination of the frame thereof of a horizontally-movable forming-anvil, a horizontally-movable punch between the ends of which the blanks are fed and clamped to partially form the hook, a forming-die through which the blank is forced by the punch, and a shaft connected to the rear end of said anvil and extending into the path of movement of the punch, which is movable independent of it, but by which it is positively operated when the punch retires, and whereby said anvil is forced forward, substantially as described.

2. In a machine for bending lacing-hooks, the combination with the frame thereof comprising a vertical slot into which the blanks are fed, a vertically-movable slide in said slot, a horizontally-movable anvil and punch moving transversely across said slot, and between which the blanks are forced by said feeding-slide, and connection between said anvil and punch, whereby the movement of the punch operates said anvil, substantially as described.

3. In a machine for bending lacing-hooks, the combination with the frame thereof, of a vertically-slotted guide, a chute arranged to deliver blanks into said slot, a latch, the nose of which extends into said slot and forms a temporary stop for the blanks, a slide beneath said chute, a horizontally-movable anvil and punch arranged to move through said slot, a feeding-slide in said slot, and arranged to force the blanks between said anvil and punch, and connection between said anvil and punch, whereby the movement of the punch

is imparted to the anvil, substantially as described.

4. In a machine for bending lacing-hooks, the combination with the frame thereof comprising a vertical slot into which the blanks are fed, a vertically-movable slide in said slot, a horizontally-movable anvil and punch-carrying slide, moving transversely across said slot, and between which the blanks are forced by the feeding-slide, connection between said anvil and punch, whereby movement of the punch operates said anvil, and a gate in the end of said slide below said punch in position to close the lower end of said slot, substantially as described.

5. In a machine for bending lacing-hooks, the combination with the frame thereof comprising a vertical slot into which the blanks are fed, a vertically-movable slide in said slot,

a horizontally-movable anvil and punch-carrying slide, moving transversely across said slot, and between which the blanks are forced by the feeding-slide, connection between said anvil and punch, whereby movement of the punch operates said anvil a gate in the end of said slide below said punch in position to close the lower end of said slot, and a spring between said slide and gate, whereby the punch is permitted to move beyond the end of said gate, substantially as described.

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

THOS. A. PERRINS.

Witnesses:

E. D. BASSETT,  
MARGARET CURTISS.