

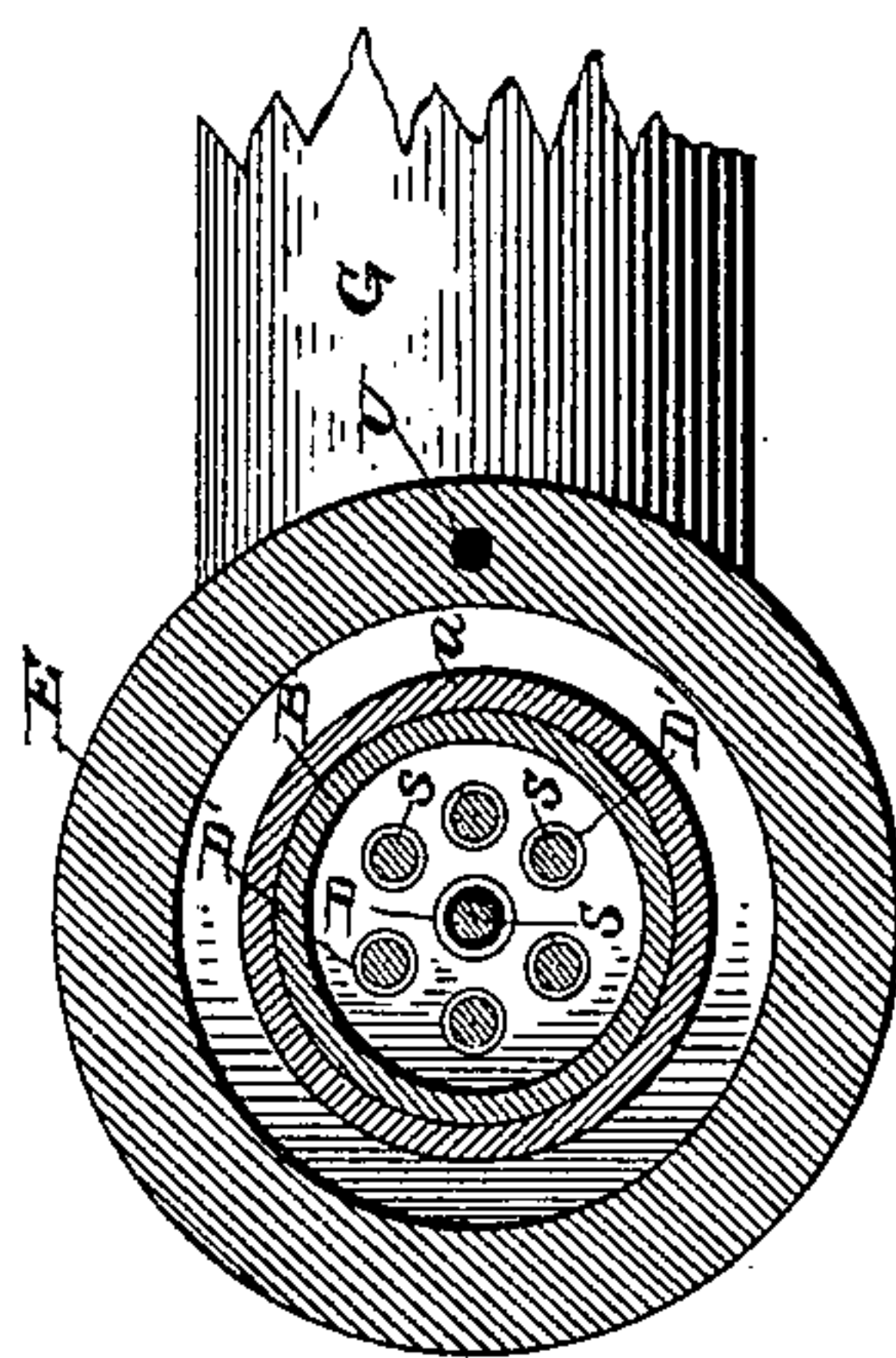
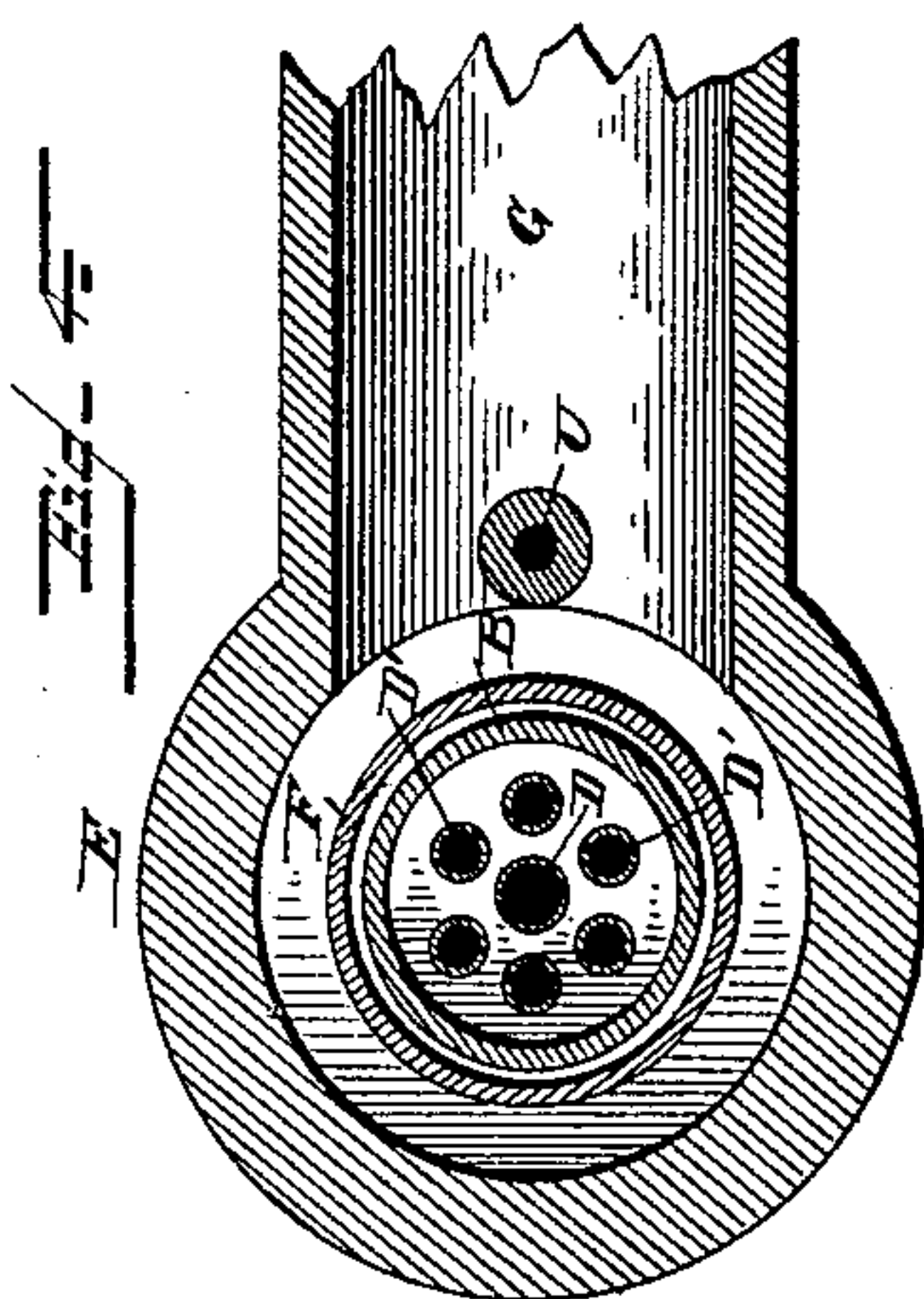
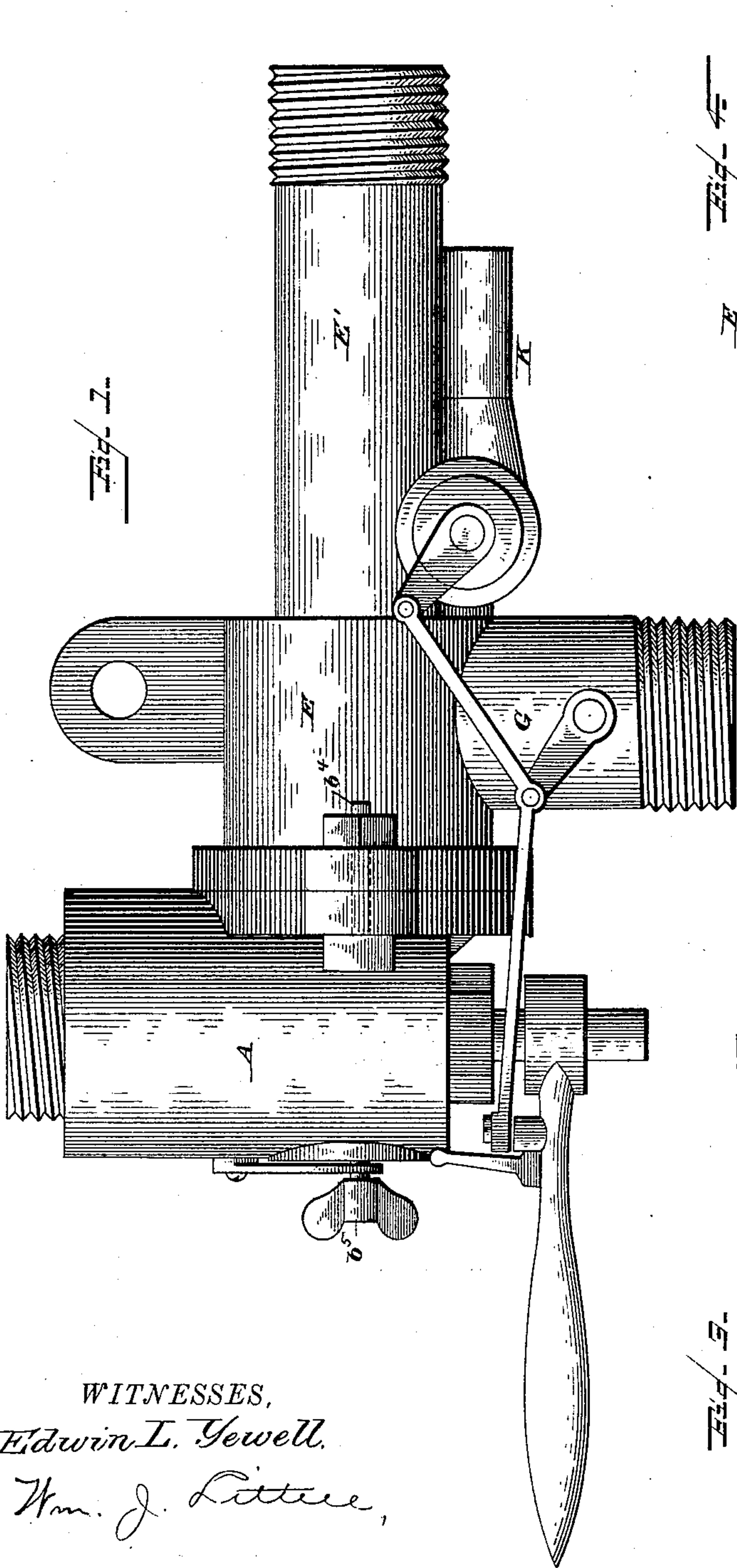
(Model.)

2 Sheets—Sheet 1.

E. WARE.
INJECTOR.

No. 390,730.

Patented Oct. 9, 1888.



WITNESSES,
Edwin L. Jewell,
Wm. J. Little,

Elijah Ware,
INVENTOR,
by J. R. Little,
Attorney.

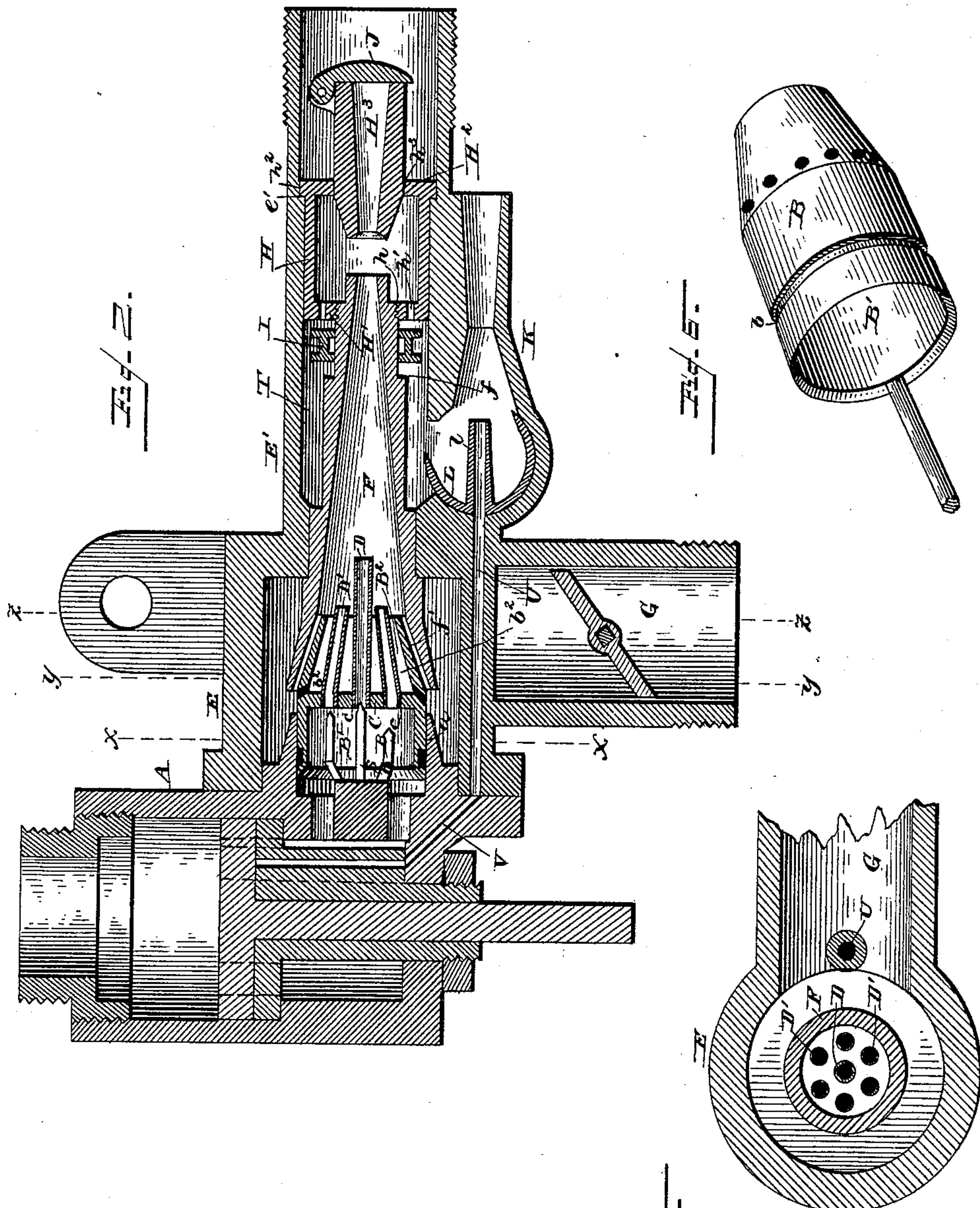
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Attorney.

UNITED STATES PATENT OFFICE.

ELIJAH WARE, OF OMAHA, NEBRASKA.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 390,730, dated October 9, 1888.

Application filed April 21, 1888. Serial No. 271,461. (Model.)

To all whom it may concern:

Be it known that I, ELIJAH WARE, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have
5 invented certain new and useful Improvements in Injectors, of which the following is a specification.

This invention relates to steam-injectors; and it has for its object to provide a simple
10 and improved device of this class in which the water and steam will be brought into instant contact and the latter instantly condensed.

A further object of my invention is to provide a steam-injector possessing advantages in
15 point of simplicity, inexpensiveness, durability, and general efficiency.

To this end my invention consists substantially in the details of construction hereinafter described and claimed.

20 In the drawings, Figure 1 is a side elevation of a steam-injector embodying my invention. Fig. 2 is a vertical longitudinal sectional view. Fig. 3 is a section on the line $x x$, Fig. 2. Fig. 4 is a section on the line $y y$, Fig. 2. Fig. 5 is
25 a section on the line $z z$, Fig. 2. Fig. 6 is a detail perspective view of the ejecting-cone.

Corresponding parts in the figures are denoted by the same letters of reference.

My present invention is designed as an improvement upon the device for which Letters
30 Patent were granted me August 23, 1887, numbered 368,798, and preferably embodies in the main the general construction therein set forth.

Referring to the drawings, A designates a
35 casing provided with a bearing, a , within which is loosely held an ejecting-cone, B, preferably provided with a circumferential groove, b , for the reception of a packing-ring. This cone has a transverse partition, C, dividing it into
40 two chambers, $B^1 B^2$, said partition being provided with a centrally-disposed hole or perforation, c , having projecting therefrom and into the chamber B^2 a steam-ejecting tube, D, at right angles to said partition. The partition
45 is also provided with a series of holes or perforations, c' , located around the hole c , having inclined steam-ejecting tubes D' , projecting into the chamber B^2 . At the inner edge of the chamber B^2 and around the same is provided
50 a series of water-inlet apertures, b^2 .

The cone B is preferably provided with a

rod, b^4 , which extends through the casing A and has a thumb-screw, b^5 . This rod is adapted to regulate the location of the cone in its bearing a . If desired, I may employ a series
55 of wires or cylindrical rods, S, pointed at their ends and of different lengths. These wires or rods are located opposite the steam-ejecting tubes D D' , and are adapted to enter them, one at a time, as the cone is drawn back into
60 its bearings to lessen the supply of steam.

E designates a casing joined to the casing A at right angles thereto, and provided with an water-inlet pipe, G. Within this casing E is located a main cone, F, provided with a conical opening, the larger end of which extends
65 over the conical walls of the chamber B^2 , leaving a narrow channel, f' , between. The cone F is provided near its smaller end with screw-threads engaging a central screw-threaded
70 opening, h , in the end wall, H' , of a cylinder, H, seated in a pipe, E' , which is connected with the casing E. Within the pipe E' the cone F is reduced, forming a channel, T, between it and the said pipe.
75

The wall H' of the cylinder H is also provided with a series of openings, h' , around the opening h , adapted to be closed by a valve, I, mounted upon and encircling the cone F, said tube being provided with a shoulder, f , to
80 limit the movement of the valve.

The cylinder H is provided at its outer end with a wall, H^2 , having a circumferential flange, h^2 , which rests against a shoulder, e' , within the pipe E' . This wall H^2 is provided with a
85 central opening, h^3 , through which extends a delivery-tube, H^3 . This tube projects about one-third its length within the cylinder H and has pivoted at its outer end a valve, J.

K designates an overflow-pipe parallel with
90 the pipe E' and opening into the channel T. A segmental valve, L, is located within the pipe and provided with an inwardly-projecting tube, l , connecting with a passage-way, U, which is connected with the steam-inlet pipe
95 V, opening into the casing A. This valve is designed to close simultaneously both connections with the overflow-pipe.

The operation and advantages of my invention will be readily understood by those skilled
100 in the art to which it appertains. The steam-inlet, water-inlet, and overflow valves are

adapted to be operated simultaneously by connections between them, and when the two former are opened the latter is closed. When the steam-inlet and water-inlet valves are
 5 opened, the steam passes through the steam-ejecting tubes D D', while the water passes through the apertures b^2 and channel f' , thus bringing the steam and water into immediate contact, and thereby instantly condensing the
 10 steam. When it is desired to decrease the steam and increase the water-supply, the cone is drawn back into its bearings by the rod b^4 , when the wires or rods S enter the ejecting-tubes one at a time and close them, while
 15 the channel f' is widened, thus accomplishing the object desired. To increase the steam and decrease the water-supply, the operation is reversed.

I claim as my invention—

20 1. In an injector, an ejecting cone comprising a shell, a transverse partition therein, a series of ejecting-tubes projecting from said partition, and a series of water-apertures provided through said casing near the inner ends
 25 of said tubes, substantially as and for the purpose set forth.

2. In an injector, the combination, with a casing provided with a series of projecting wires or rods therein, of an ejecting-cone located within said casing, comprising a shell and
 30 a partition having a series of ejecting-tubes corresponding and adapted to engage said wires or rods, substantially as set forth.

3. In an injector, the combination, with a
 35 casing provided with a series of projecting wires or rods of different lengths, of an adjustable ejecting-cone provided with a series of ejecting-tubes corresponding and adapted to engage said wires or rods, substantially as
 40 set forth.

4. In an injector, the combination, with a casing provided with a series of projecting wires or rods, of an ejecting-cone located in said casing, provided with a series of ejecting-
 45 tubes corresponding and adapted to engage said wires or rods, a series of water-apertures in the cone, and an adjusting-rod for adjusting the latter, substantially as set forth.

5. In an injector, the combination, with a
 50 casing having water and steam inlet pipes and an outlet-pipe connected therewith, of an over-

flow-pipe connected and parallel with said outlet-pipe, and a valve located in the overflow-pipe segmental in cross-section and provided with an inwardly-projecting tube
 55 adapted to connect with a passage-way connected with the steam-inlet valve, substantially as set forth.

6. In an injector, the combination, with the casing, of a main cone and an ejecting-cone
 60 projecting therein, comprising a shell, a series of ejecting-tubes, and a series of water-apertures in said shell, substantially as set forth.

7. In an injector, the combination, with a casing and an outlet-pipe connected therewith,
 65 of a main cone located in said casing, a cylinder located in said pipe and connected at one end with said cone, said end being provided with a series of holes, a valve upon said cone for closing the same, a delivery-tube at the
 70 other end of the cylinder provided with a valve, and an ejecting-cone projecting into the free end of the main cone, substantially as set forth.

8. In an injector, the combination, with the
 75 casing, of an outlet-pipe connected therewith, a cylinder located in said pipe provided at its inner end with a series of holes and a valve for closing the same, a delivery-tube connected with the outer end of said cylinder, and a
 80 valve thereon, substantially as set forth.

9. In an injector, the combination, with a casing, of an adjustable ejecting-cone having bearing therein provided with a partition, a
 85 series of ejecting-tubes projecting therefrom, a series of water-apertures opening into the space between the latter, and a circumferential groove adapted for the reception of the packing, substantially as set forth.

10. In a steam-injector, the combination,
 90 with the overflow-pipe and the steam-inlet passage-way opening therein, of a valve located therein provided with an inwardly-projecting apertured tube, substantially as set forth.

In testimony whereof I affix my signature
 95 in presence of two witnesses.

ELIJAH WARE.

Witnesses:

CLEVELAND H. WARE,
 EUGENE L. WARE.