

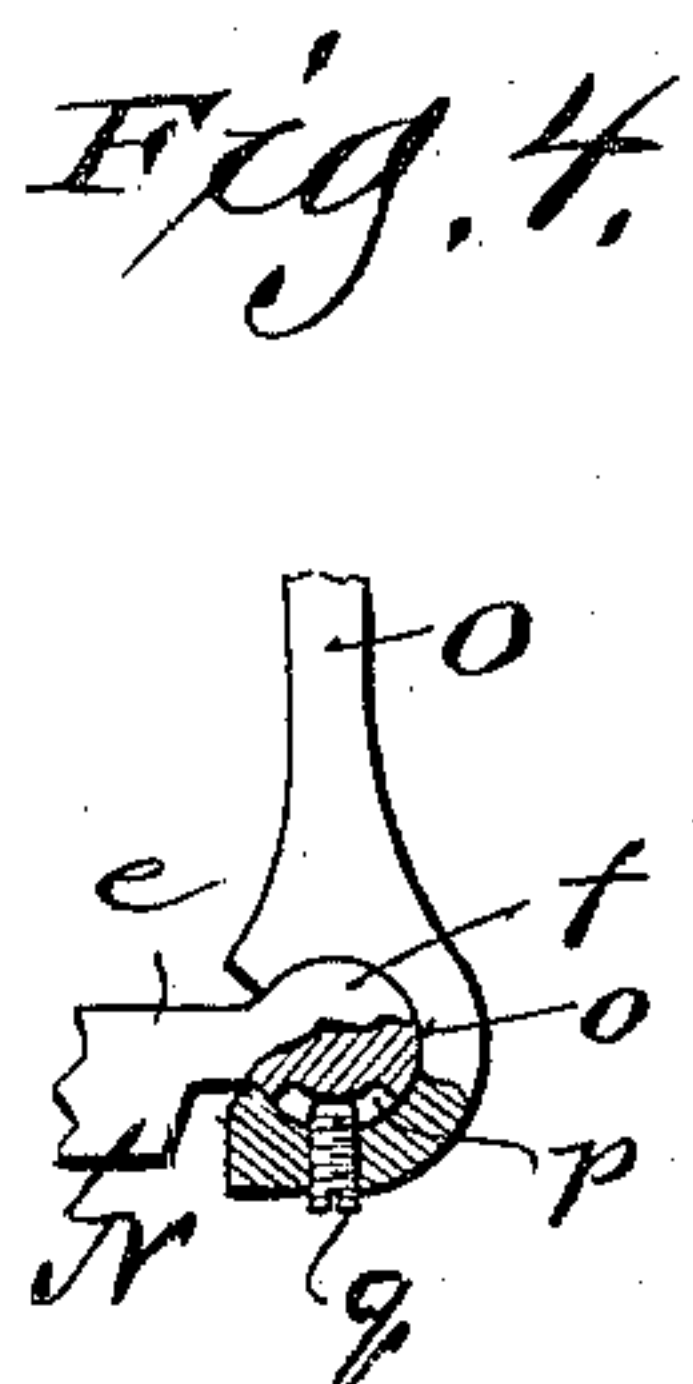
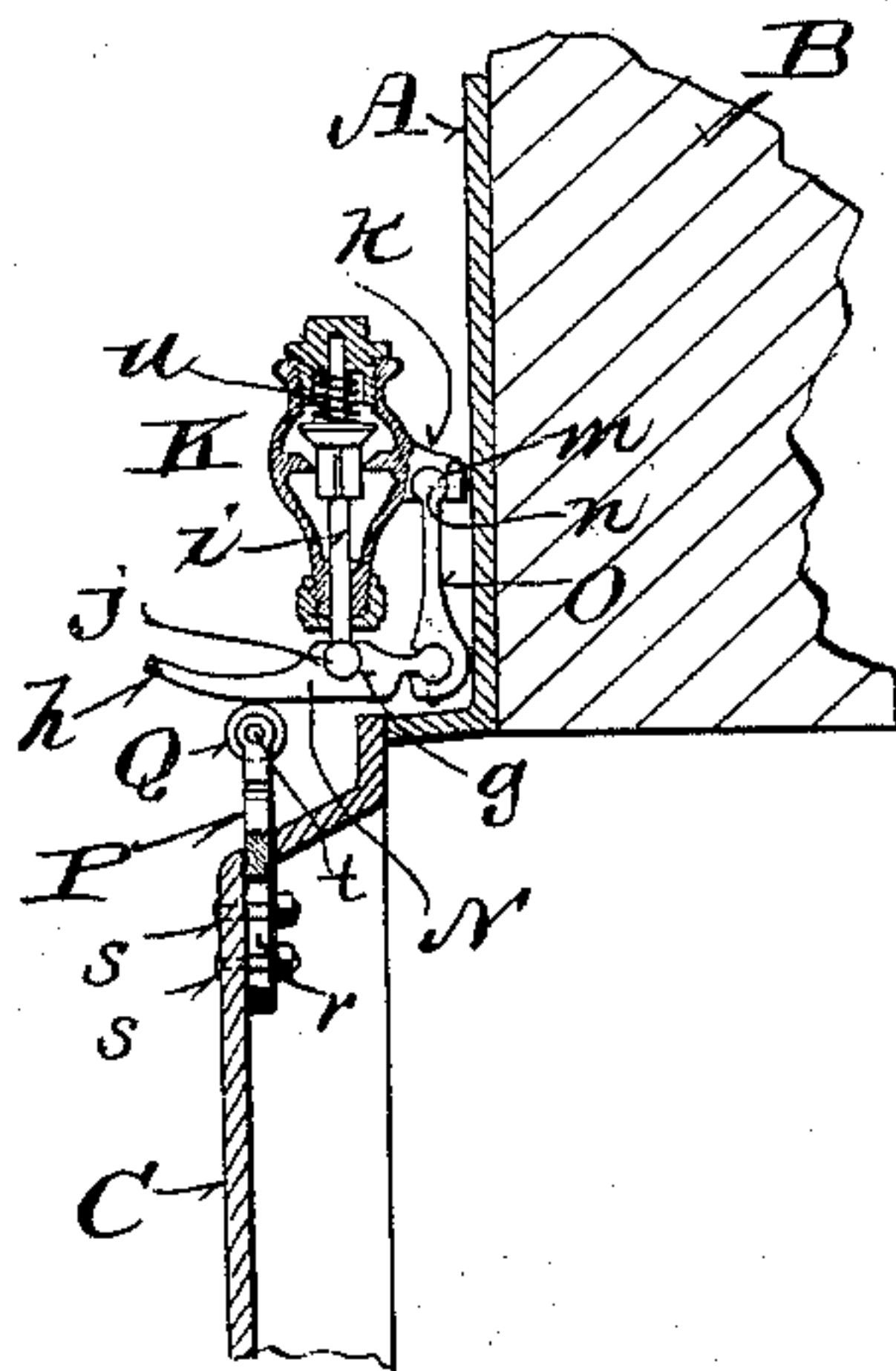
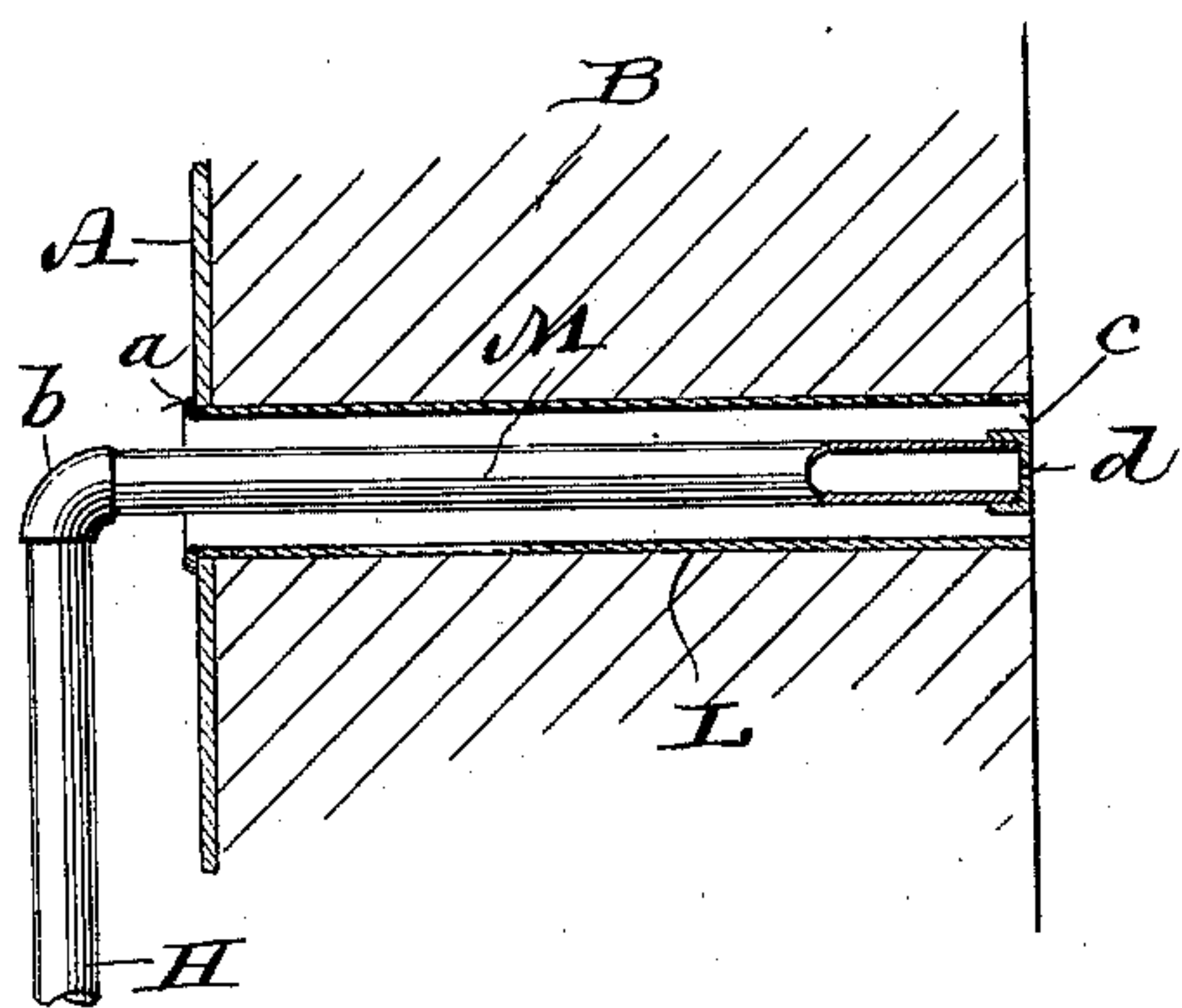
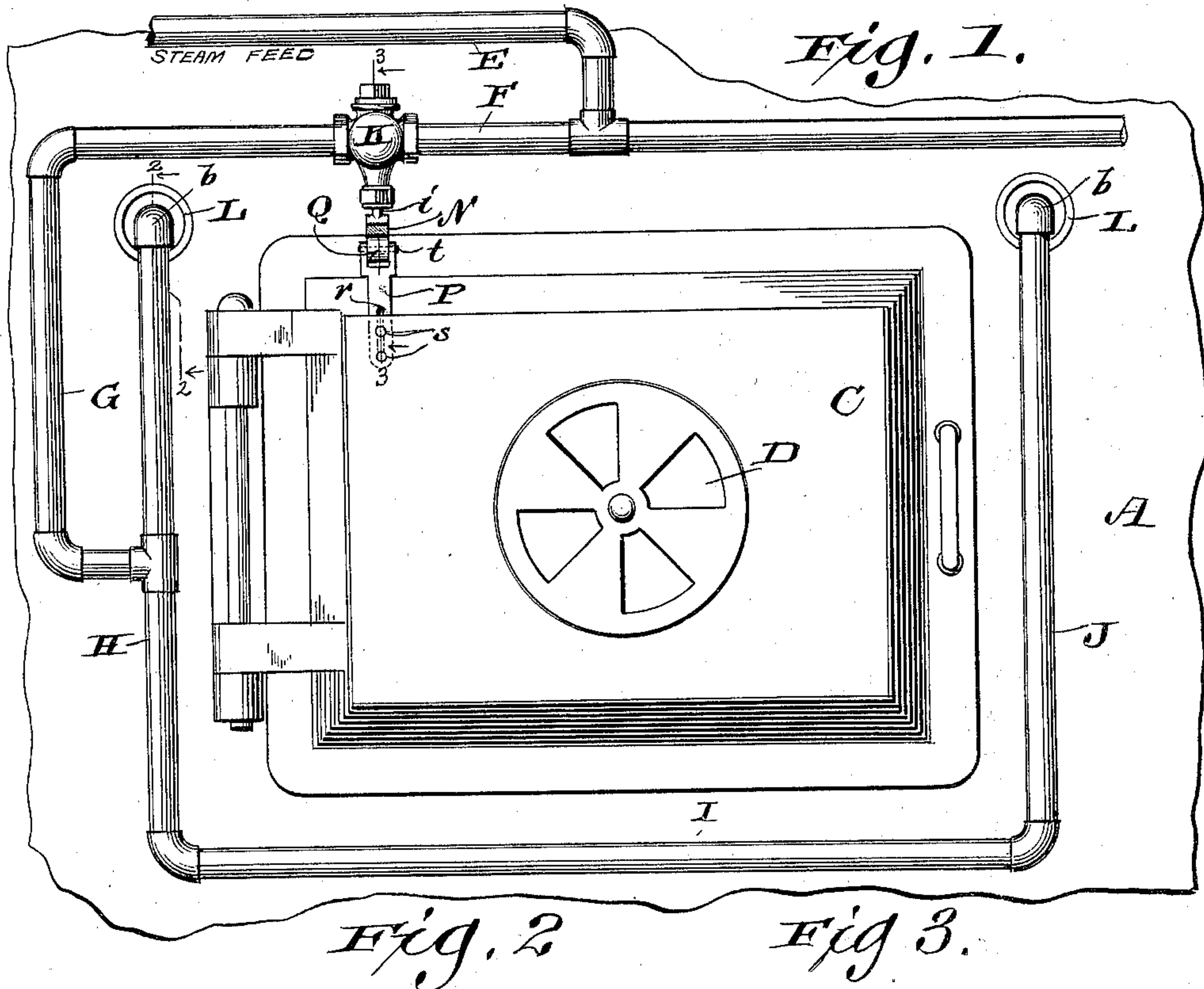
No. 609,051.

Patented Aug. 16, 1898.

G. W. SANHUBER.
SMOKE CONSUMING FURNACE.

(Application filed Sept. 7, 1897.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE W. SANHUBER, OF MILWAUKEE, WISCONSIN.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 609,051, dated August 16, 1898.

Application filed September 7, 1897. Serial No. 650,745. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. SANHUBER, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Smoke-Consuming Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to devices for aiding the consumption of smoke in furnaces; and it consists in certain peculiarities of construction and combination of parts, as will be fully set forth hereinafter and subsequently claimed.

In the drawings, Figure 1 is a front elevation of a portion of a steam-boiler furnace provided with my improved attachment. Figs. 2 and 3 are detail vertical sectional views on the lines 2 2 and 3 3, respectively, of Fig. 1. Fig. 4 is a detail partly-sectional view drawn to an enlarged scale and illustrating a valve-lever joint or hinge forming part of my said invention.

Referring to the drawings, A represents the furnace-front, and B the brickwork of the front wall of the furnace, which latter may be of any ordinary construction.

C represents one of the doors of the furnace through which the fuel is introduced, and this door is shown provided with a damper-regulated opening D, the damper-openings of said doors being arranged in any desired or usual manner.

E represents a steam-pipe leading from a suitable source of supply (not shown) and connected by suitable elbow and T joints to a system of pipes surrounding the described fuel-doors of the furnace, as shown by the pipe branches F G H I J, there being always a free passage-way for the steam through this pipe system from the source of supply, except when interrupted by the action of the valves K in opening the fuel-doors, as hereinafter described, although of course stop-valves can be introduced at any points in the pipe system to provide for emergencies, if desired.

The front wall B and furnace-front A are perforated on each side of each fuel-door for the reception of tubes L, whose inner ends come just flush with the inner line of the said

front wall B and whose outer ends are flanged outwardly against the furnace-front A, as shown at *a*, in the same way that the ends of boiler-tubes are flanged against the heads of tubular boilers, and the upper ends of the longest vertical branches of the pipe system described (being the branch pipes H J in the present illustration) are united by elbows *b* to horizontal pipes M, extending into and along the entire length of said tubes L, these pipes M being closed at their inner ends by caps *c*, having central perforations *d*, the outer surface of said caps *c* coming just flush with the ends of the tubes L and inner surface of the front wall B of the furnace and there being an open air-passage through each tube L from outside to the furnace-chamber, thereby increasing the draft of the furnace and constituting an air-jacket always around each pipe M. The said pipes M, with the described perforated caps *c d*, serve to permit the steam in said pipes to be forcibly ejected through the said openings *d* in jets over the top of the burning fuel within the furnace-chamber, drawing in the air through the openings in the fuel-doors and through the tubes L, thereby creating a most intense and direct draft, which air will be drawn by the steam over the burning fuel, whereby the smoke arising therefrom will be consumed and the gases ignited before passing over the furnace bridge-wall, while at the same time by the absence of any projecting nozzles, such as are common in smoke-consuming furnaces, there is no danger of the intense heat generated by the steam-jets injuring or destroying the jet-forming ends of the steam-pipes, which latter are still further protected by the described air-jackets surrounding them within the open-ended tubes L.

It will be apparent that it is not desirable to have jets of steam injected into the furnace-chamber when the fuel-doors are open, and to obviate the necessity of shutting off the steam-supply by independent manipulation of the valves I have devised the arrangement and construction of parts illustrated in the drawings in connection with the valves K, as follows: These valves, excepting the peculiar lever joints or hinges to be presently described, are of ordinary and well-known

construction, a vertical sectional view of one of them being given in Fig. 3.

N is a lever formed with a reduced neck *e* and rounded head or rear end *f* and with a rounded socket *g* in its upper surface adjacent to said neck. The foot end *h* of this lever is curved upward, as shown. The valve K has a downward-projecting stem *i*, terminating in a rounded lower end *j*, which just slips laterally within the described socket *g* in the lever, the said socket-walls forming about three-fourths of a circle, so that when the end *j* of the valve-stem is in place it cannot be removed vertically, but will permit a ball-and-socket motion of the lever as the latter is raised or lowered, as hereinafter described. The valve K is held in place by the ends of the pipe F, to which it is coupled, as shown in Fig. 1, and the valve-casing has a rearward-projecting lug *k* with a socket *m* in its under side of similar formation to the socket *g* in the lever N.

O is a link having a rounded head *n*, fitting within the socket *m* in the valve-lug *k*, in which it must be laterally inserted, and the lower end of this link is formed with a rounded socket *o* on its outside to receive the rounded head *f* of the lever N, which head must also be laterally inserted to place.

In order to prevent the accidental separation of the described parts, the head *f* of the lever N is formed with a short peripheral groove *p* therein, and a screw *q* is run through the lower end of the link O, so that its point will project within said groove, as clearly shown in the enlarged detail view, Fig. 4, and the head *n* of said link O is similarly grooved, and a like screw is run in through the end of the lug *k*.

P is a vertical standard having a slot *r* through its lower part, whereby it is adjustably secured by set-bolts *s s* to the fuel-door C, near the hinge end thereof, (preferably against the inner surface of the door, as shown in Fig. 3, in which event the upper flange of the door would be perforated for its passage therethrough,) and the upper part of this standard is preferably forked to receive a roller Q, horizontally supported on a shaft *t*, journaled in said forked end of the standard P, said roller being in engagement with the under side of the lever N when the door C is closed. Of course this standard could be secured against the outer side of the door if necessary or desirable, it being only important that it should engage, as stated, with the lever N, and the described adjustment permits the valve K to be either wholly or partially open, as desired, when the door C is closed. As the said door C is swung open the roller Q is carried away from contact with the lever N, and the valve is closed by the valve-spring *u* and gravity of the lever N and the steam thereby shut off in pipe F, and as the door is again closed the roller Q again engages with said lever N and raises the same,

thereby lifting the valve-stem *i* and opening the valve, permitting the steam to flow from pipes E F to and through pipe M, and from the end thereof to again jet into the furnace-chamber, as already described.

It is obvious that my device would operate if the lever N was in contact with any portion of the door C and the described roller Q was omitted, but I prefer to employ said roller, as thereby wear and friction are obviated.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a smoke-consuming furnace, the combination with the front wall thereof, and a fuel-door hinged to the outer front of said wall, of a series of pipes leading from the source of steam-supply and extending horizontally above said door and thence passing transversely through the said front wall, a valve located in said horizontal portion of said pipes above said door and adjacent to the hinged end thereof, a lever linked to the casing and valve-stem of said valve and projecting outwardly over said door for engagement therewith, whereby when the door is closed, the lever will be raised by said door and the valve raised from its seat and the steam-passage in the pipes opened, and when the door is opened the said lever will fall, or be forced downward, and the valve be thereby permitted to close, shutting off the steam-passage in said pipes.

2. In a smoke-consuming furnace, the combination with the front wall thereof, and a fuel-door hinged to the outer front of said wall, of a series of pipes leading from the source of steam-supply and extending horizontally above said door and thence passing transversely through the said front wall, a valve located in said horizontal portion of said pipes above said door and adjacent to the hinged end thereof, a depending link pivoted to the valve-casing, a lever pivoted to said link and to the valve-stem and projecting outwardly over said door, a slotted vertical standard adjustably secured to said door, and a roller carried by said standard and adapted to engage with and lift said lever when the said door is closed.

3. In a smoke-consuming furnace, the combination with the front wall and fuel-door thereof, of a steam-pipe connected to the source of steam-supply and arranged horizontally above said door and thence passing transversely through the said front wall, a valve located in said horizontal portion of said pipe above said door and adjacent to the hinged end thereof and having a downward-projecting valve-stem terminating in a rounded lower end, a lug projecting from the rear of the valve-casing and having a rounded socket in its under side, a link having a rounded head fitting in said socket, and a like rounded socket in its lower end, and a lever having a rounded head fitting in the said link-socket, and a like rounded socket in its upper side for the re-

ception of the rounded end of the valve-stem,
said lever projecting outwardly above the said
door and adapted to engage with and be raised
thereby, when said door is closed, to open the
5 said valve, and to be lowered by gravity and
the force of the valve-spring, closing said
valve, when the door is opened and freed from
contact with said lever.

In testimony that I claim the foregoing I
have hereunto set my hand, at Milwaukee, in 10
the county of Milwaukee and State of Wis-
consin, in the presence of two witnesses.

GEORGE W. SANHUBER.

Witnesses:

H. G. UNDERWOOD,

B. C. ROLOFF.