

B. B. CULVER.
 WATER HEATER FOR RANGES AND STOVES.
 APPLICATION FILED APR. 30, 1908.

907,469.

Patented Dec. 22, 1908.

3 SHEETS—SHEET 1.

Fig. I.

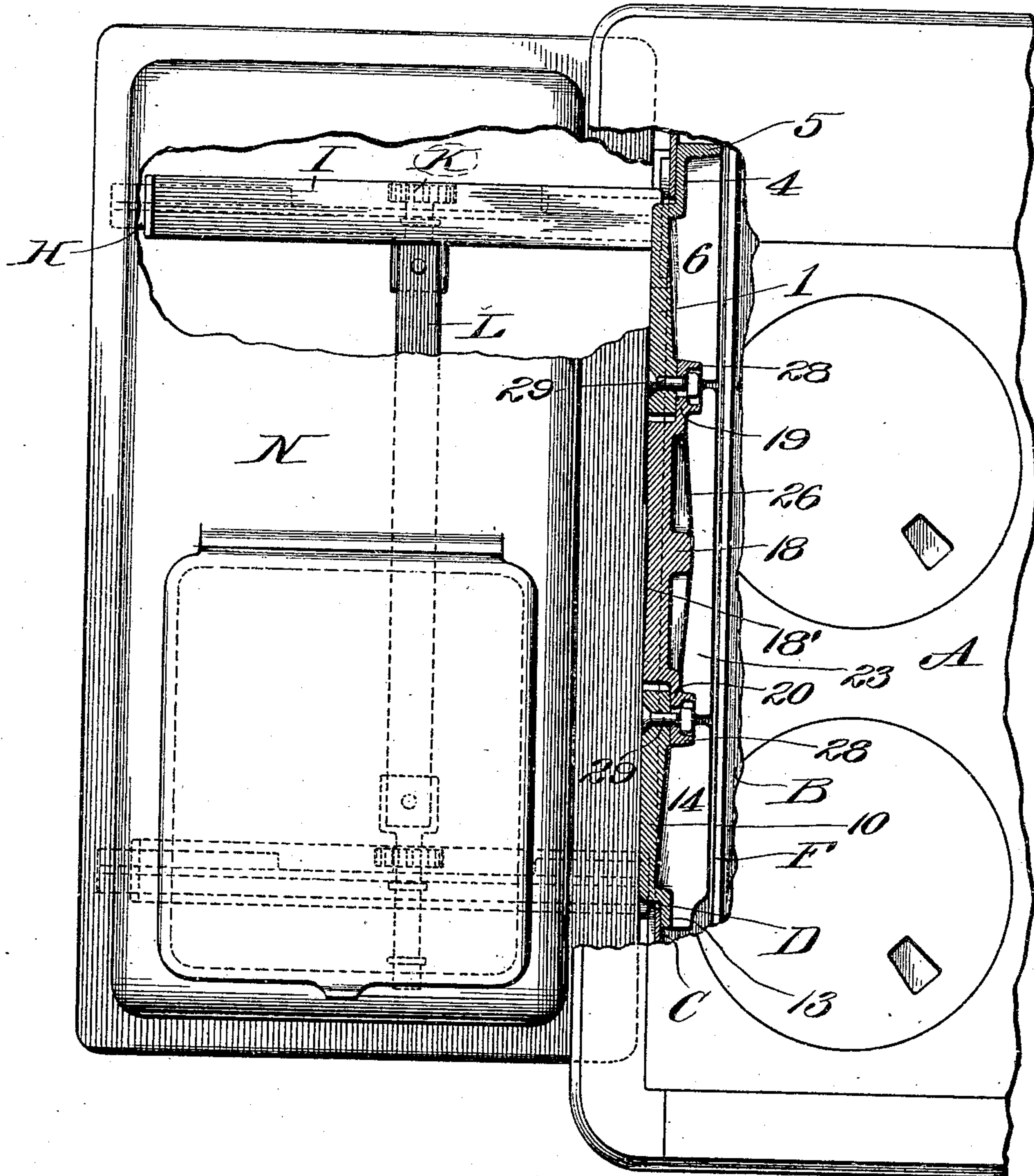


Fig. II

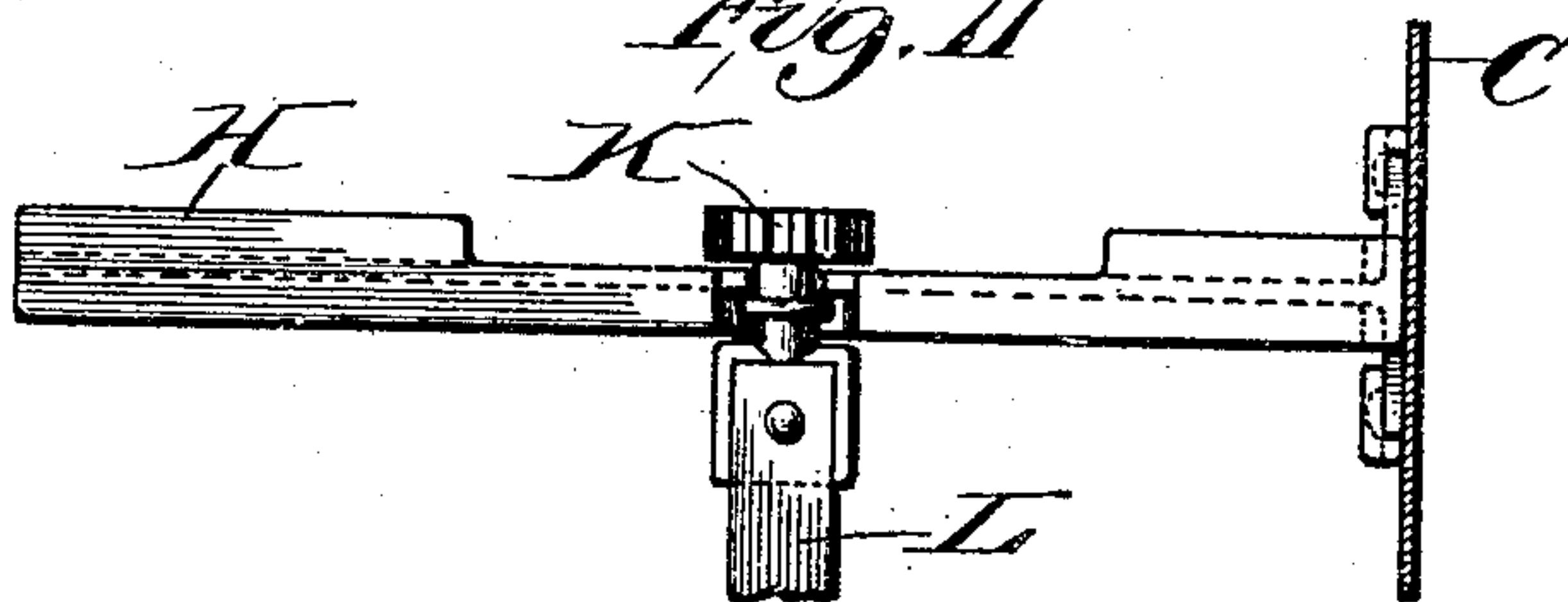
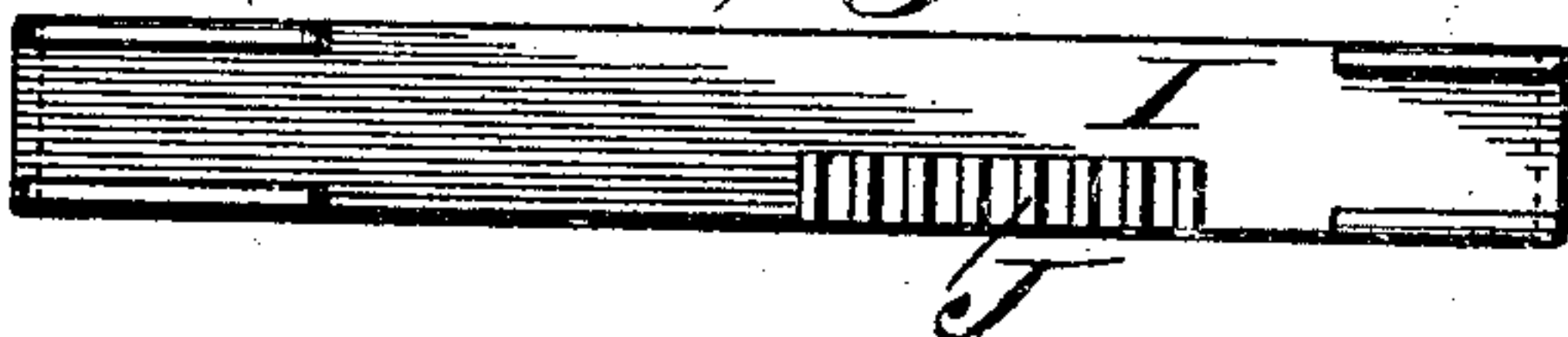


Fig. III.



Attest:
Blanche Hagen

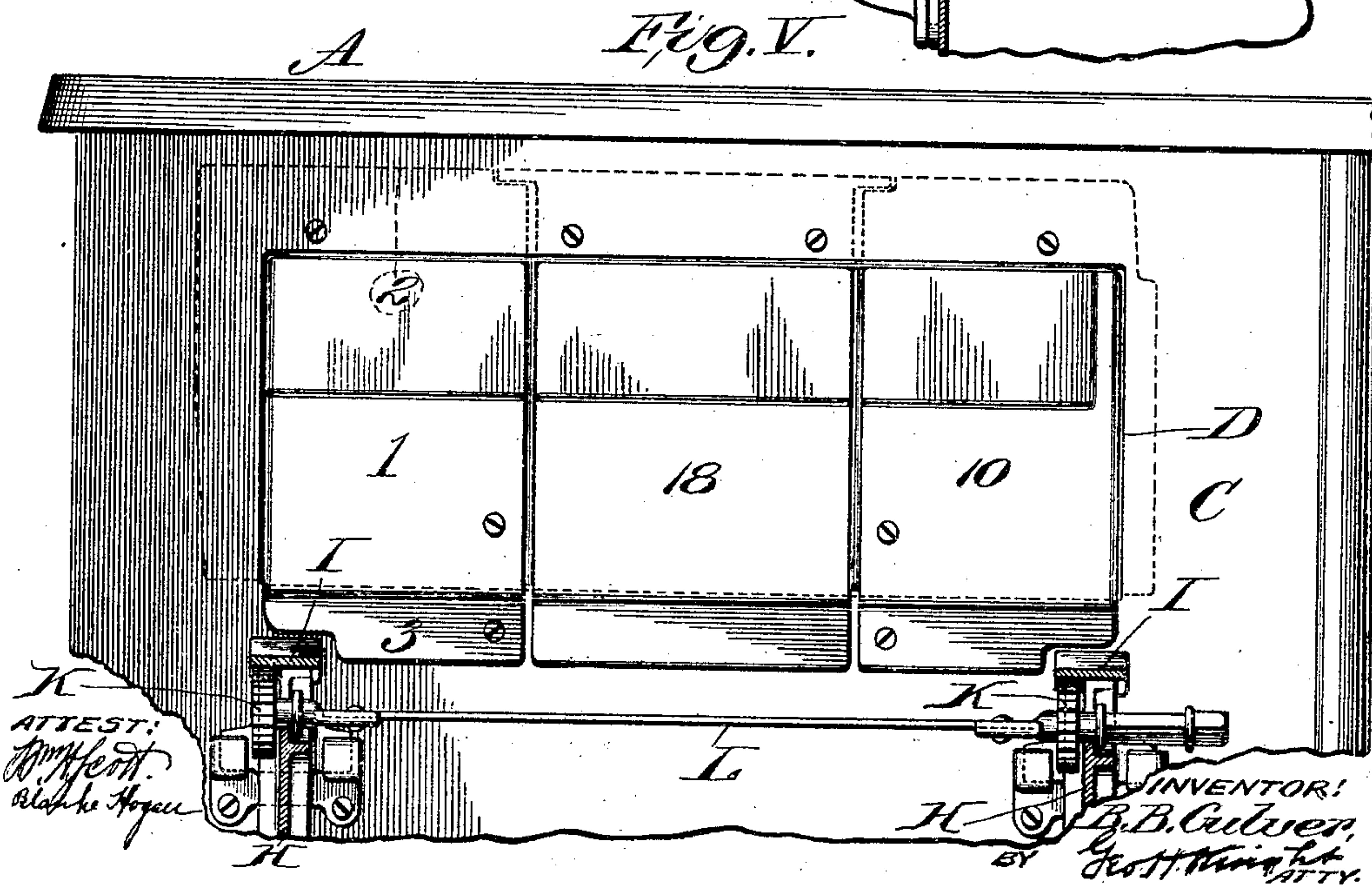
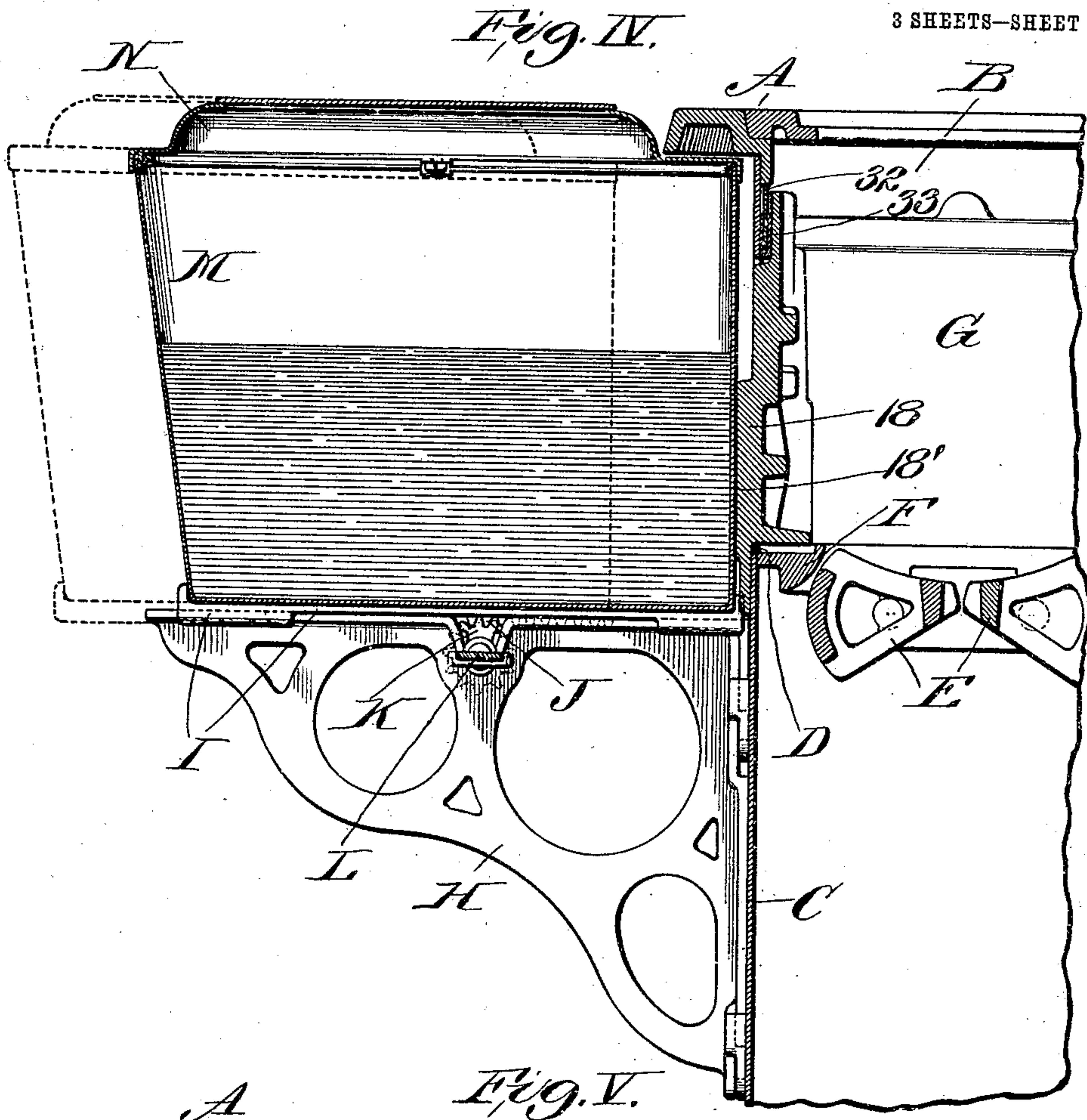
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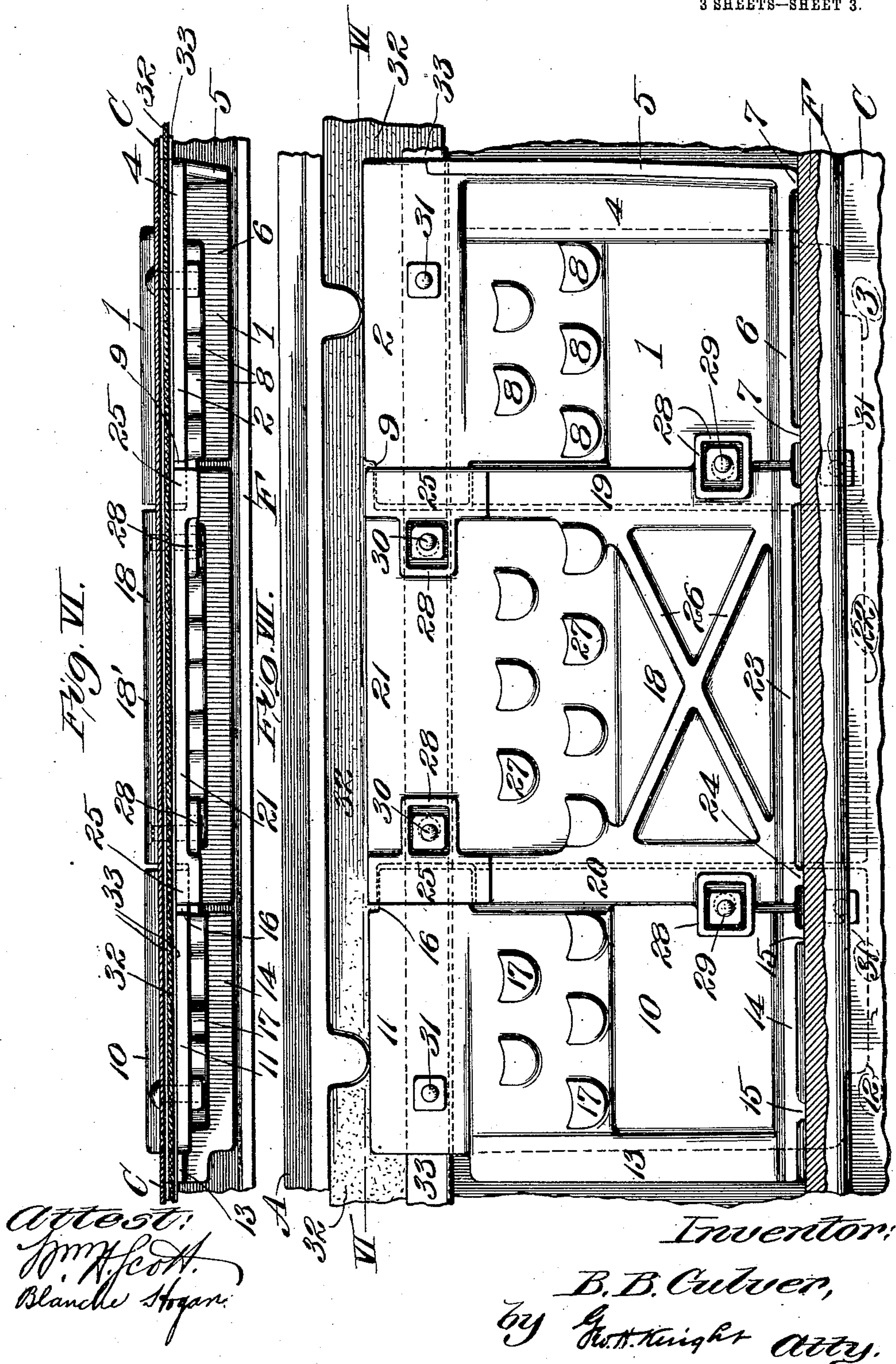


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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

BERTRAM B. CULVER, OF ST. LOUIS, MISSOURI.

WATER-HEATER FOR RANGES AND STOVES.

No. 907,469.

Specification of Letters Patent.

Patented Dec. 22, 1908.

Application filed April 30, 1908. Serial No. 430,199.

To all whom it may concern:

Be it known that I, BERTRAM B. CULVER, a citizen of the United States of America, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Water-Heaters for Ranges and Stoves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of water heaters used in stoves and ranges, and which include outer fire box walls and water reservoirs that are adapted to contact with said fire box walls in order that water placed in the reservoirs may be heated.

It has, in the past, been the common practice to construct single piece fire box walls of the kind named with pockets extending backwardly in the walls, and to provide the reservoirs with extensions that enter into said pockets for contact with the fire box walls. This method of making fire box walls and reservoirs is an objectionable one for several reasons, the more important of which are the following: The fire box walls have been commonly made in single pieces of cast metal, and when the metal becomes heated, expansion occurs to a greater degree at the center of the wall than at any other point with the result of causing the wall to either become broken, or to be bulged outwardly or inwardly. In the event of the wall becoming broken, one or more crevices are produced therein, through which the fire burning in the fire box passes to come into direct contact with the reservoir to the injury thereof, especially if water is not present in the reservoir at the point struck by the fire. In the event of the fire wall being bulged outwardly or inwardly, the desired contact with the reservoir is lessened. Another disadvantage in the method of constructing water heaters in the manner recited, lies in the fact that the production of extensions upon the water reservoirs adds materially to the expense of manufacturing the reservoirs and these extensions are moreover extremely liable to become leaky, due to injuries, or due to solder in the seams of the extensions being melted by the heat from the fire when the quantity of water in the reservoirs is low.

In my present improvement, I overcome the objectionable features mentioned by employing a water reservoir that is adapted to

contact directly with the fire wall without the use of an extension, and make the outer contact fire box wall so that it is yielding and the expansion of the metal does not act detrimentally upon the fire wall in the manner previously pointed out.

My fire box wall comprises a plurality of sections which are preferably three in number, viz: a central section and two outer sections. These sections are mounted in an opening in the wall of a range or stove at the outside of the fire box and to permit of the expansion of the central section, which becomes the hottest when subjected to heat from the fire box, I provide clearance between the central sections and the outer sections.

Figure I is in part a top or plan view of an end portion of a range or stove and a water reservoir, the reservoir being partially broken away, and in part a horizontal section of my fire box wall. Fig. II is a top or plan view of one of the reservoir supporting brackets and one of the members by which the reservoir is shifted. Fig. III is an inverted view of one of the carrier bars on which the reservoir is mounted. Fig. IV is a vertical cross section through the fire box of a range or stove including my fire box wall, and through the water reservoir. Fig. V is an end elevation of a range or stove and my fire box wall, and the water reservoir shifting means. Fig. VI is a horizontal section taken on line VI—VI, Fig. VII. Fig. VII is a rear elevation of the fire box wall and the protective members above this wall.

A designates a range or stove containing a fire box B and having an outer wall C that extends vertically at the end or side of the range or stove at which the fire box is located. The wall C is provided with an opening D located at the side of the fire box and which receives my fire box wall to be herein described.

E is a grate at the bottom of the fire box, and F the grate bed or frame.

G is the rear end lining member of the fire box.

H designates brackets secured to the range or stove wall C beneath the opening D therein and I are carrier bars loosely fitted upon these brackets and provided at their bottoms with rack teeth J. The carrier bars are adapted to be moved upon the brackets and relatively to the wall C by pinions K

that mesh with the rack teeth J and are carried by a rotatable rod L, loosely seated in the brackets.

M is a water reservoir seated in the carrier bars I and movable therewith relative to the wall C of the range or stove.

N is a cover fitted to the water reservoir and the top surface of which is preferably flush with the top surface of the range or stove. This cover is so constructed that it will fit partially beneath the top rim of the range or stove, as seen in Figs. I and IV, to lessen the liability of waste of heat by passing upwardly at the rear of the reservoir alongside of the outer wall of the fire box.

Having now described the general construction of the stove or range adjacent to and including the fire box, and the construction of the water reservoir and the means by which said reservoir is supported and moved relative to the fire box, I will proceed to the description of the fire box wall with which said reservoir is adapted to contact and to which my present invention relates.

1 designates the rear section of the outer fire box wall which is provided with a top flange 2 that is located at the inner side of the wall C above the opening D therein, and a bottom flange 3 that is located at the exterior of the wall C beneath said opening. This section is also provided with a side flange 4 located at the interior of said wall C and provided with a vertical rib 5 adapted to fit against the rear end lining member G of the fire box, thereby dispensing with the use of any separate joint piece between the rear section 1 and said member G.

6 is a bottom flange extending rearwardly from the rear section over the grate bed F and which is provided with depending legs 7 that rest upon said grate bed.

8 are protuberances upon the upper portion of the rear section 1.

9 is a notch at the upper and forward corner of the section 1.

10 designates a forward fire box wall section that is complementary to the rear section 1 and is provided with a top flange 11, located at the interior of the wall C, above the opening D therein, a bottom flange 12 located exterior of said wall and beneath said opening, and an inner side flange 13. This forward section is also provided with a rearwardly extending bottom flange 14 that projects over the grate bed F and has depending legs 15 that support said flange.

16 is a notch in the upper and rear corner of the forward section.

17 are protuberances upon the upper portion of the rear surface of the forward section.

18 designates a central fire box wall section interposed between the rear and forward sections 1 and 10 and provided with side flanges 19 and 20 that respectively over-

lap the rear and forward sections. The central section has a top flange 21 in alinement with the top flanges 2 and 11 of the sections 1 and 10, and a bottom flange 22 in alinement with the bottom flanges of the other sections. It also has a bottom rearwardly extending flange 23 projecting over the grate bed and provided with depending legs 24, and top flanges 25 at its ends that occupy the notches 9 and 16 in the sections 1 and 10, so as to overhang the joints between the central and rear and front sections.

26 are reinforcing ribs intersecting each other and located upon the lower portion of the central section 18. Upon the upper portion of said central section at its rear surface are protuberances 27. At the rear of the central section and surrounding bolt holes therein that receive bolts to be hereinafter more particularly mentioned, are ribs 28.

The central section of my fire box wall is separated at its sides from the rear and forward sections 1 and 10 in order that, when expansion occurs in said central section, the section will not be restrained from expanding to any necessary extent and will therefore not be caused to bulge, due to resistance to its expansion. The central section is connected to the rear and front sections by bolts 29 which pass through holes in the sections 1 and 10 and holes in the flanges of the central section, and to provide for the freedom of the central section to permit expansion thereof, the holes in either the forward and rear sections, or the central section, are made larger than the bolts, as seen in dotted lines, Fig. VII. The central section is connected to the range or stove wall C above the opening D therein by bolts 30 that pass through said wall and the central section, the holes in either the wall or the central section being larger than the bolts. The heads of the bolts 29 and 30 are countersunk into the central section, at its exterior surface, thereby causing them to be flush with said exterior surface and the nuts upon the bolts are confined within the ribs 28, so that they are protected by said ribs from fire burning in the fire box.

The rear and forward sections 1 and 10 are attached to the range or stove wall C by bolts 31 that extend through their top and bottom flanges and said wall above and beneath the opening D in the wall.

The several sections 1, 10 and 18 of my contact fire box wall are made with lower portions against which the water reservoir is adapted to contact as seen most clearly in Fig. IV, while the upper portions of the sections recede from the lower portions and do not contact with the reservoir. By making the sections as stated, so that the upper portions are offset from the lower portions, I provide for heat being transmitted to the reservoir throughout its lower portion in order that the reservoir may not be injured by

a high degree of heat, if the quantity of water therein is insufficient to fill the reservoir. The central section 18 is provided at its outer surface with a concavity 18', see Figs. I and IV, which is located in the lower portion of said section. This concavity is produced in the section in order that the portion of the section in which it is located may bulge outwardly if the heat to which the section is subjected causes such bulging, without the reservoir contacting portion of the section being thrown out of alinement with the outer sections of the fire box wall. The concavity furthermore permits of the presence of a small quantity of air between the lower portion of the central section and the water reservoir to lessen the liability of injury to the reservoir by excessive heat in said wall section. The reinforcing ribs 26 upon the rear of the lower portion of the central fire box wall section serve to strengthen said portion and materially lessen the liability of said section becoming warped by heat.

The protuberances 8, 17 and 27 upon the upper portions of the fire box wall sections 1, 10 and 18, which serve to strengthen said portions, produce better heating results and also serve to prevent fuel, such as wood, from lying directly against the rear surfaces of the sections, in order that the hot air and products of combustion may rise in the fire box in direct contact with the upper portions of the sections. The bottom rear flanges 6, 14 and 23 of the fire box wall sections, by projecting over the grate bed F afford protection for said grate bed and these flanges being supported above the bed by the legs beneath them are so supported from the bed as to permit ingress of ashes beneath them for the further protection of said grate bed. To provide against the upper portion of the range or stove wall C which is located above the outer fire box wall becoming injured by the transmission of heat thereto from the fire box wall sections, I interpose between said upper portion of the wall C and the fire box wall sections a strip 32 of asbestos which serves to insulate the wall from the fire box sections. This strip of asbestos is preferably incased throughout its lower portion in a folded strip 33 of sheet metal, which serves to support the asbestos.

I claim:

1. In a range or stove, a sectional fire box wall exposed at the exterior of the range or stove, and having upper portions receding at the exterior of the range or stove from the lower portions of the sections, substantially as and for the purpose set forth.

2. In a range or stove, an exterior wall

provided with an opening at the location of the fire box, and an outer fire box wall comprising sections located in said opening and having sides thereof spaced apart from each other, one of said sections being provided with an upper portion receding from its lower portion, substantially as and for the purpose set forth.

3. In a range or stove, an exterior wall provided with an opening at the location of the fire box, and an outer fire box wall comprising sections located in said opening and having sides thereof spaced apart from each other, one of said sections being provided at its exterior surface with a concavity, substantially as and for the purpose set forth.

4. In a range or stove, an exterior wall provided with an opening at the location of the fire box, and an outer fire box wall comprising sections located in said opening and having sides thereof spaced apart from each other, one of said sections comprising a lower portion having a concavity at its exterior surface and an upper portion receding from said lower portion, substantially as and for the purpose set forth.

5. In a range or stove, a fire box having a grate bed, an exterior wall provided with an opening at the location of the fire box, and an outer fire box wall comprising sections located in said opening and having sides thereof spaced apart from each other; said sections being provided with bottom flanges extending rearwardly over the grate bed of the fire box and having legs adapted to rest on said grate bed, substantially as and for the purpose set forth.

6. In a range or stove, an exterior wall provided with an opening at the location of the fire box, and an outer fire box wall comprising sections located in said opening and having upper portions receding at the exterior of the stove or range from their lower portions; said sections being provided with protuberances located upon their upper sections at the rear sides thereof, substantially as and for the purpose set forth.

7. In a range or stove, an exterior wall provided with an opening at the location of the fire box, and an outer sectional fire wall in said opening, and insulating material between the upper ends of the sections of said fire box wall and said exterior wall, substantially as and for the purpose set forth.

In testimony whereof, I have hereunto set my hand this 25th day of April, 1908.

BERTRAM B. CULVER.

In the presence of—

BLANCHE HOGAN,
H. G. COOK.