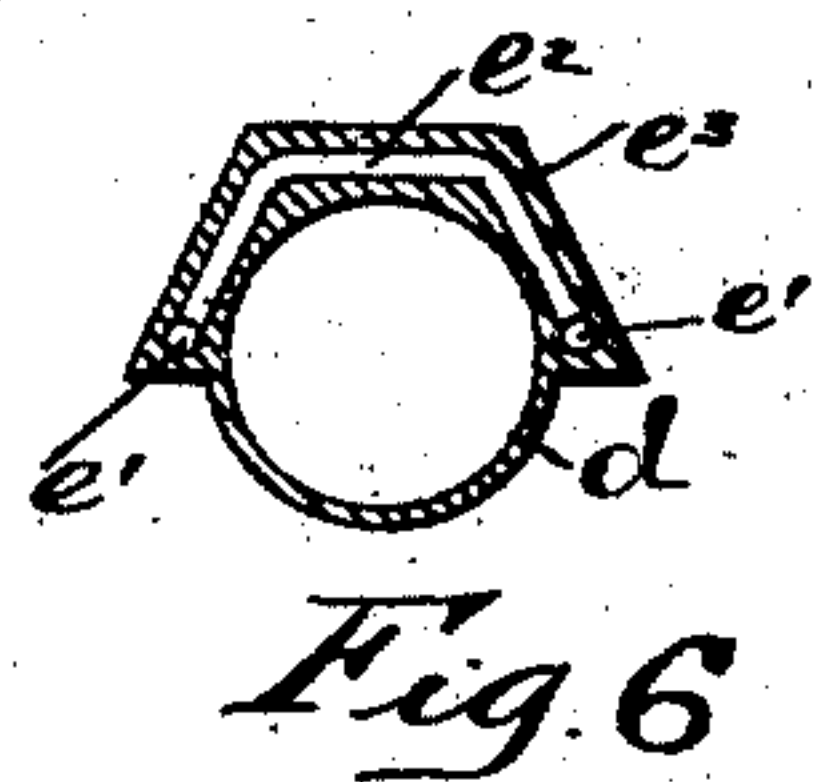
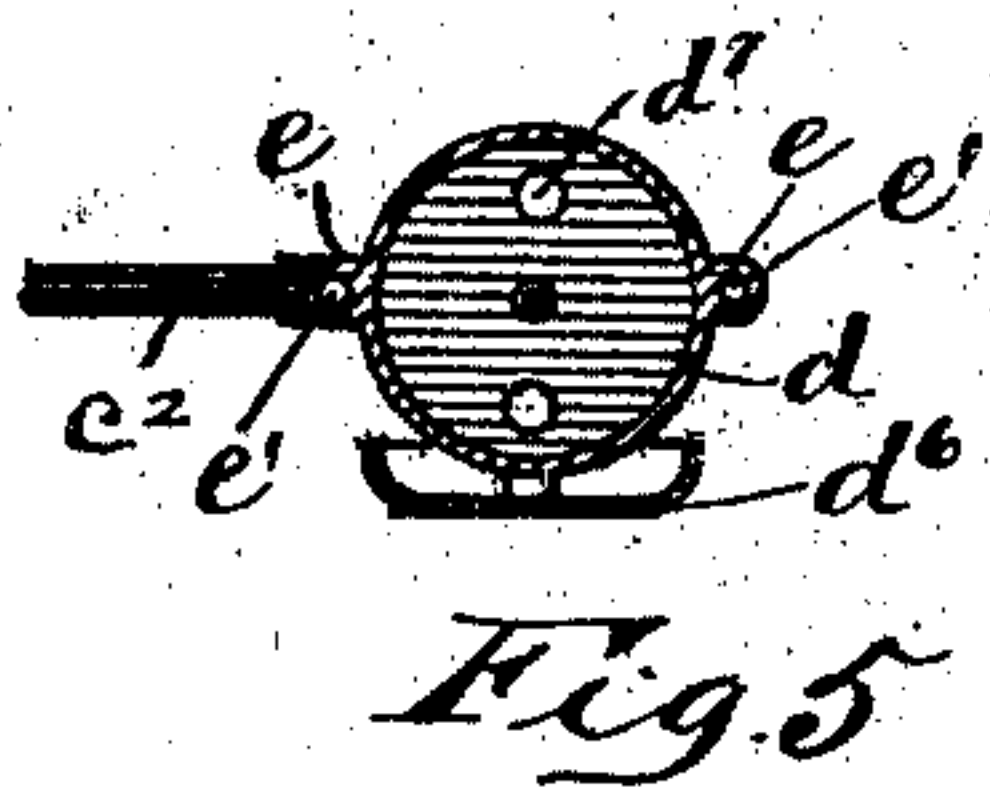
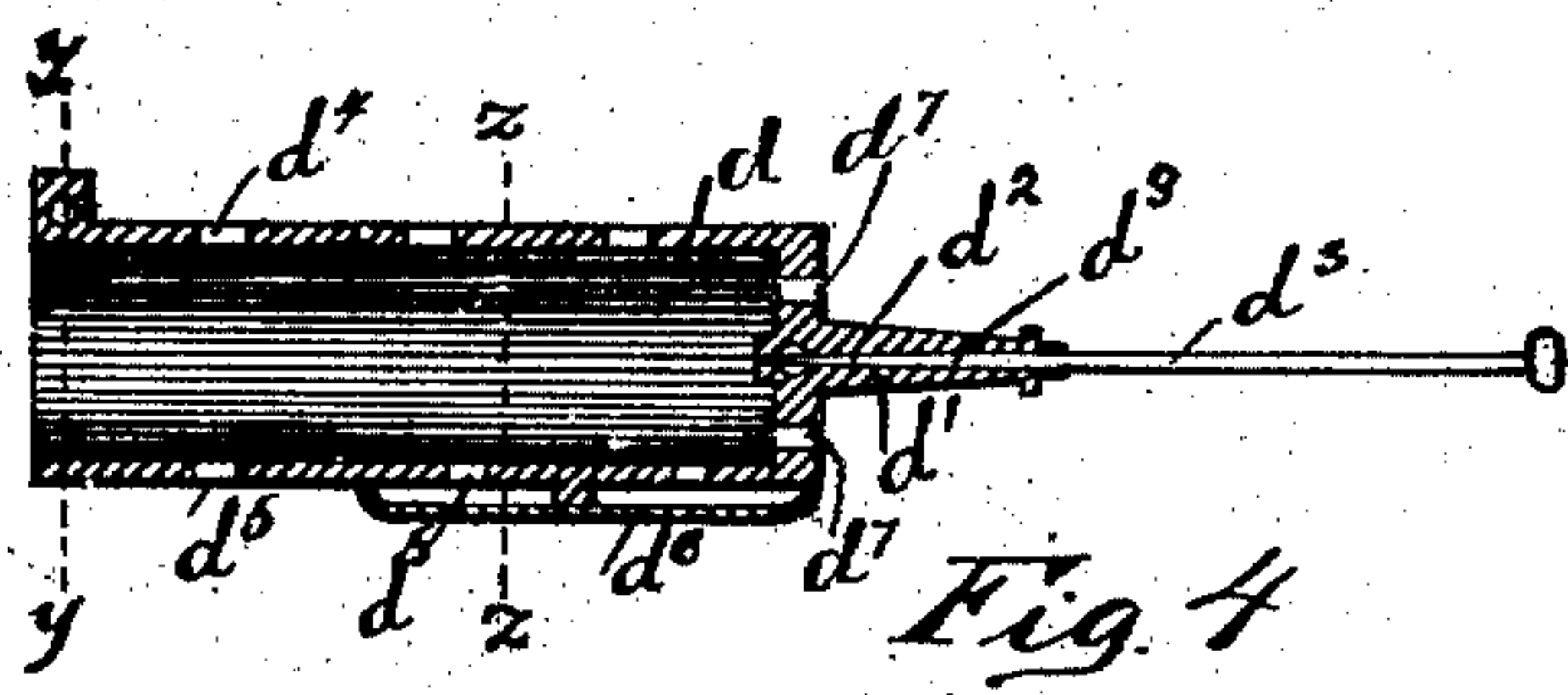
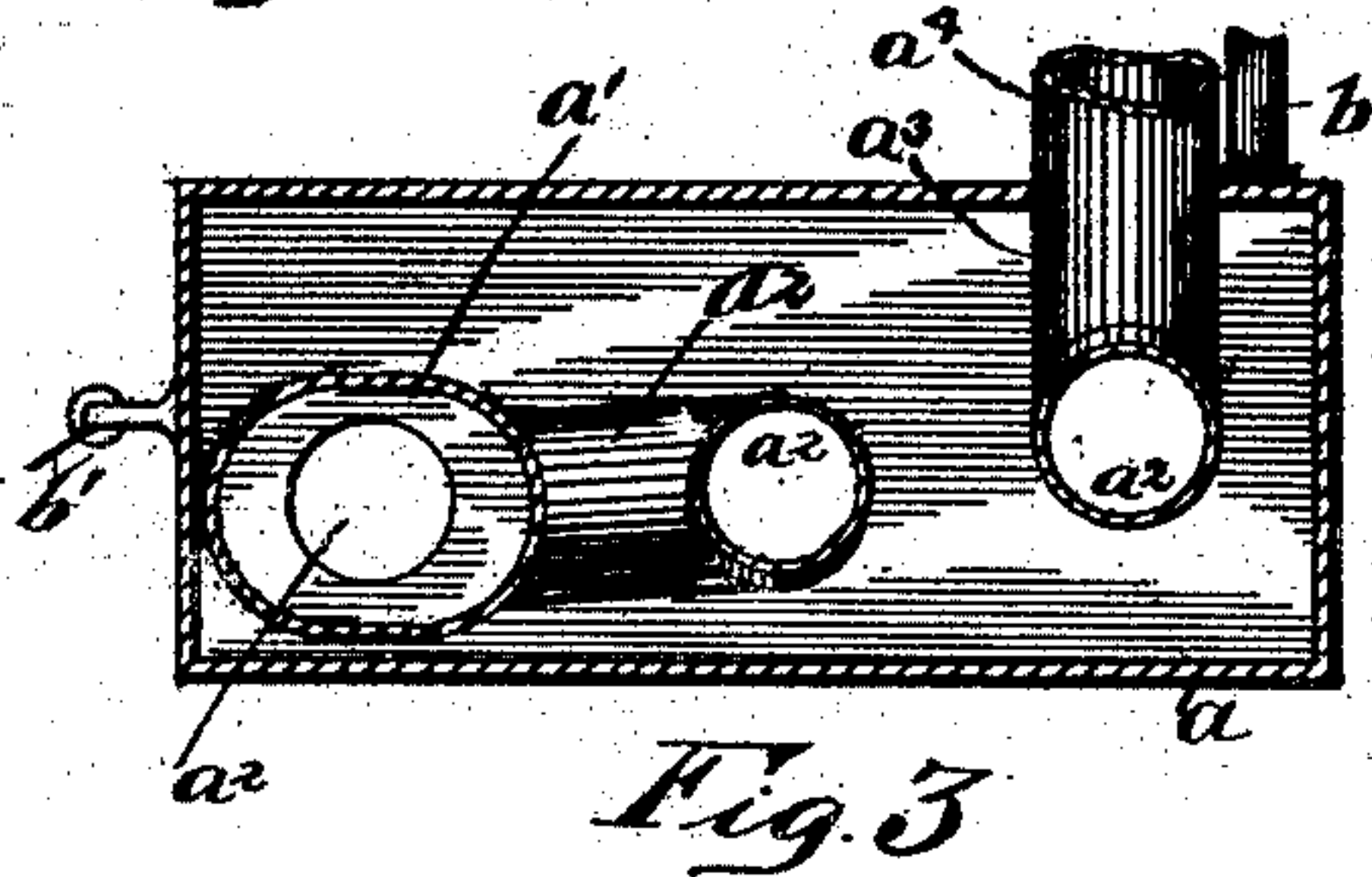
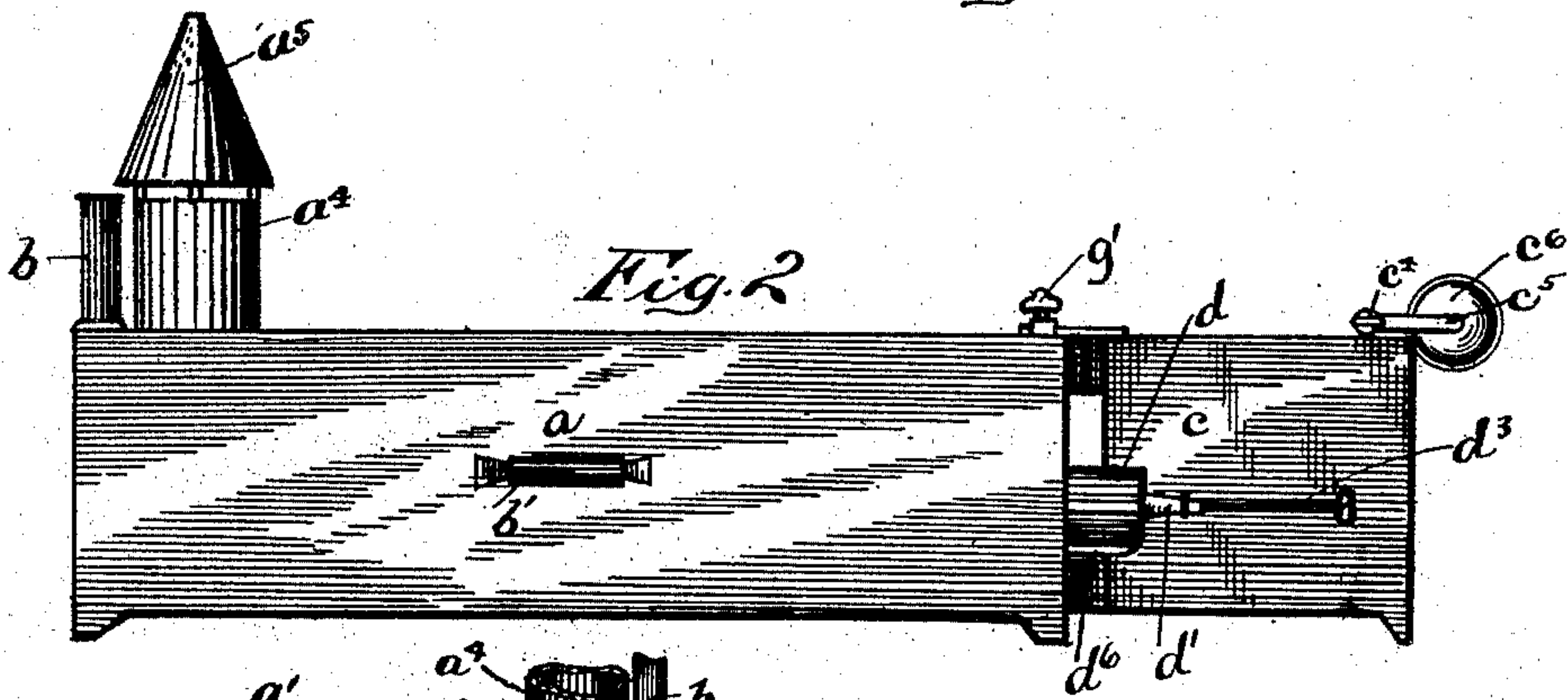
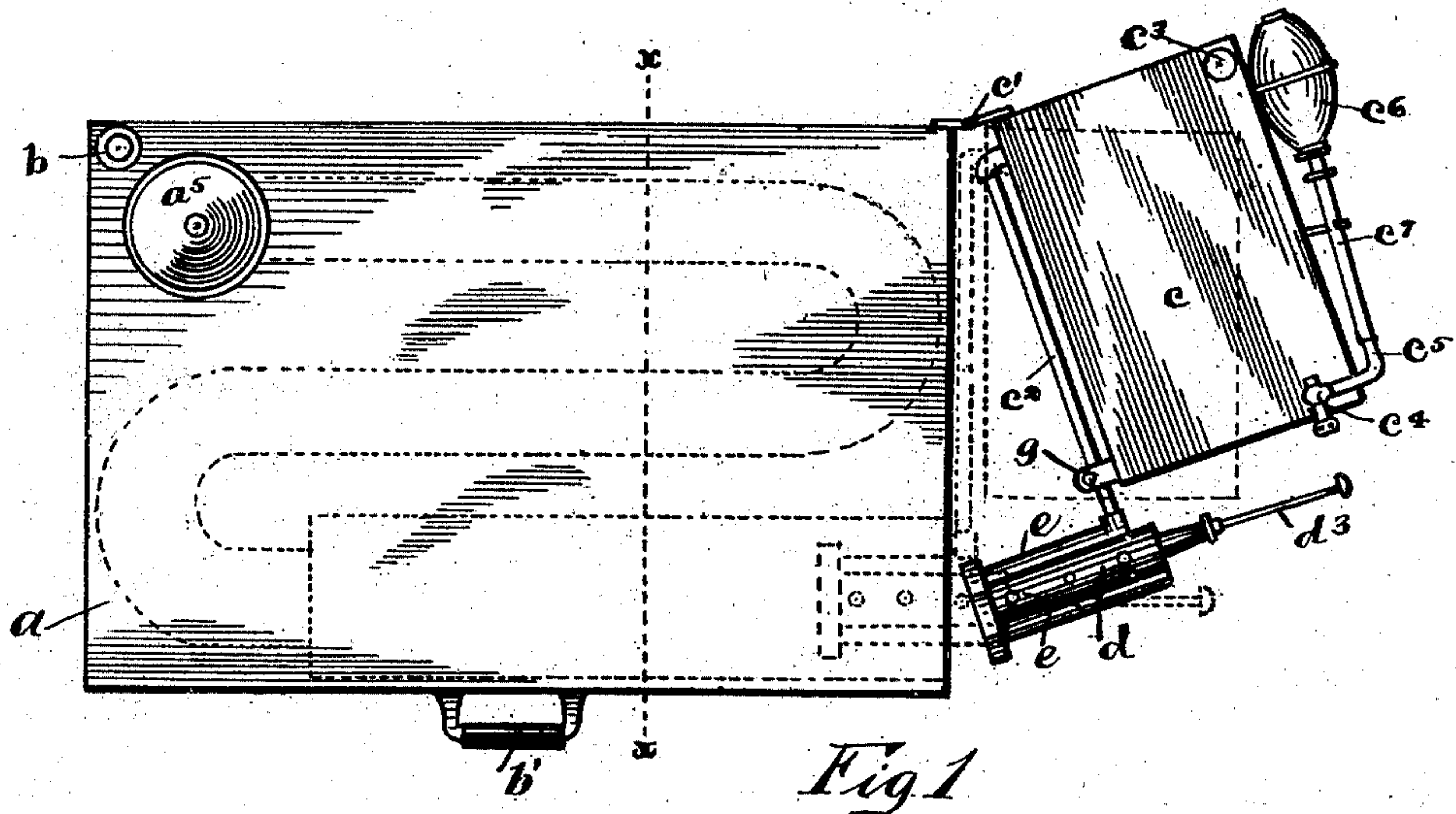


(No Model.)

F. LIED.
WARMING DEVICE.

No. 502,370.

Patented Aug. 1, 1893.



Witnesses
H. B. Bradshaw
C. E. Holdsworth

Inventor
Fred Lied
By his Attorneys
Staley and Shepherd

UNITED STATES PATENT OFFICE.

FRED LIED, OF COLUMBUS, OHIO.

WARMING DEVICE.

SPECIFICATION forming part of Letters Patent No. 502,370, dated August 1, 1893.

Application filed October 19, 1892. Serial No. 449,406. (No model.)

To all whom it may concern:

Be it known that I, FRED LIED, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Warming Devices, of which the following is a specification.

My invention relates to the improvement of portable foot-warmers and the objects of my invention are to provide a simple, reliable and effective device of this class of such construction and arrangement of parts as to admit of the same being conveniently carried or located; to provide in connection therewith an improved burner and to produce other improvements which will be more specifically pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of my improved warming device, showing in full lines the position of the burner and oil reservoir when swung outward from the heat reservoir, and showing in dotted lines said parts in position for use. Fig. 2 is a side elevation of the same showing the oil tank and burner in position for use. Fig. 3 is a transverse section on line *xx* of Fig. 1. Fig. 4 is a central longitudinal section of the burner body. Fig. 5 is a transverse section on line *zz* of Fig. 4 and Fig. 6 is a transverse section on line *yy* of Fig. 4.

Similar letters refer to similar parts throughout the several views.

a represents an oblong box or reservoir, which as hereinafter described, is adapted to expel the desired heat for warming purposes. Entering this reservoir *a* at one end thereof, which for convenience I will term the rear end and adjoining one side thereof, is a flame tube *a'* which extending to a point in the forward portion of the box has leading from said inner termination a smaller heat flue or pipe *a²*. This pipe *a²* as shown in dotted lines in Fig. 1 of the drawings and in section in Fig. 3 thereof, is made to pass back and forth or double upon itself the desired number of times within the remaining portion of the reservoir, preferably terminates near the diagonally opposite corner of said box from the entrance of said flame tube. At this inner termination, said pipe *a²* is provided with an upward extension *a³* which passes outward

through the box top in the form of a tubular chimney *a⁴*. This chimney *a⁴* is preferably provided as shown in the drawings, with a conical hood *a⁵* which is suitably supported above the outer end of said chimney. At a point adjacent to the chimney *a⁴*, I provide the box *a* with a short vertical inlet *b* which communicates with the interior of said box.

b' represents a suitable handle projecting from one of the longer sides of the box.

c represents an oil tank of less dimensions than the box *a*, but which is preferably of substantially the same height. This oil tank is adapted as shown, to be supported in a position adjacent to the rear end of the box *a* and has one of its ends jointedly connected with said box *a* through the medium of suitable hinge-plates *c'*.

c² represents an oil pipe which leads from the tank *c* and runs parallel with the inner side of said tank to a point past the unhinged end of the same, as shown. At a suitable point in the upper side of this tank, I provide an inlet opening *c³* while at a point *c⁴* in said tank, I provide a suitable valve from which leads outward an air pipe *c⁵*, the latter being connected with a bulb *c⁶* of the usual form through the medium of a tube *c⁷*. Upon the outer projecting end of the oil pipe *c²* is supported a burner body *d*. This burner body which has a general tubular form and is open at its forward end, is provided in its rear end with a rearwardly projecting stem *d'* through which is formed a longitudinal needle valve opening *d²* which leads to the interior of said burner.

d³ represents a needle valve, the point of which is adapted to regulate the flow of oil or gas which is fed into said valve opening in the manner hereinafter described. This burner body is provided on its upper and lower side with suitable openings indicated at *d⁴*, *d⁵* and has suspended from its under side in communication with a portion of the opening *d⁵*, a suitable drip or lighting cup *d⁶*. Said burner body is also provided in its rear end with suitable openings indicated at *d⁷*. In the construction of my improved burner, I provide said body with oppositely located lateral ribs or flanges *e* which extend substantially throughout the length of said body. Throughout these lateral projections, I pro-

vide channels or conduits e' which are made to communicate at the forward end of the body through a connecting conduit e^2 which passes through an enlargement or head e^3 formed over or upon the forward end of said burner body. The rear end of the outer conduit e' communicates as shown at f in Fig. 4 of the drawings, with the valve opening d^2 of the burner. The oil pipe c^2 enters as shown in the drawings, the rear end of the inner conduit e' thus forming a communication between the tank c and the needle valve way, along the sides and over the burner body.

Projecting from the unhinged end and forward side of the tank c is an ear or lug g through which is adapted to pass as shown in the drawings, a suitable set-screw g' , said ear being adapted when said tank is swung in the position shown in dotted lines in Fig. 1 or in a position parallel with the rear end of the box to overlap the rear end of said box and admit of its being secured thereto by turning the set-screw g' . When the oil tank is swung into this last named position, the greater portion of the burner body is as shown in the drawings, inserted within the mouth of the heat tube or flue a' .

The manner of utilizing and operating my improved warming device is as follows: Through the inlet b a suitable or desired amount of water is passed into the box or reservoir a , the water filling the space about the pipe contained therein. The oil tank c is swung outward as shown in full lines in Fig. 1 of the drawings, the valve c^4 opened and sufficient air injected into said tank by the usual operation of the bulb c^6 to produce the desired pressure. Said air valve being closed the needle valve is turned outward sufficiently to admit of a small portion of the oil contained within the pipe c^2 and conduits $e' e^2$ to pass into the burner body and thence through the openings d^5 into the cup d^6 . The oil thus contained in said cup being lighted, sufficient heat is imparted to the burner body and to the oil conducting flanges e , to generate gas from the oil contained therein. The needle valve is then opened and the gas allowed to escape into and through the burner body, where it is ignited. The tank c is then swung to the position shown in dotted lines in Fig. 1, until the burner body is within the heat flue of the box, resulting as will readily be seen in the flame which is driven outward from the forward end of the cylindrical burner being confined within said heat flue and extended by the draft therein toward the inner end of said flue. From the heat tube a' , the

heat is carried through the pipe a^2 and thence outward through the extension a^3 and chimney a^4 . In order to facilitate the outward passage of the hot air thus generated, I preferably cause the pipe a^2 to gradually incline toward its outer termination. The passage of the hot air through the pipe a^2 must result as will readily be seen in the thorough heating of the water contained in the box about said pipe, and the water thus heated will serve to impart to said box a desirable heat which may be readily utilized as a foot-warming device or for other warming purposes.

From the construction herein shown and described, it will be seen that not only is a simple, reliable and effective means provided for imparting heat to the water contained in the box, but that my improved burner is of such construction and arrangement as to admit of the production of an elongated and forcible flame which will impart a high degree of heat. The perfect character of the flame produced by my improved burner is greatly enhanced by the fact, that the oil conducting conduits are arranged so as to pass not only along the sides of the burner body, but over said burner body, thus admitting of a high degree of heat being imparted to the gas contained in said conduits and in said gas being conducted to the needle valve in a perfectly dry condition.

It will be observed that in the construction herein shown, the entire body of the flame within the box or reservoir body and that the end and wall openings of the burner will serve as inlets for the proper amount of air to produce perfect combustion.

It is obvious that my improved warming device may be utilized for many purposes, and that the same may be produced and operated at an exceedingly small expense.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

In a foot warmer the combination with the water reservoir and heat conducting pipes passing therethrough, of an oil reservoir hinged to said water reservoir as described and an oil burner supported from and fed from said oil reservoir, said burner adapted to be projected into the mouth of the heat conducting pipe of the water reservoir by swinging said oil reservoir inward substantially as described.

FRED LIED.

In presence of—

C. C. SHEPHERD,
EMILY E. BRAGG.