

No. 680,744.

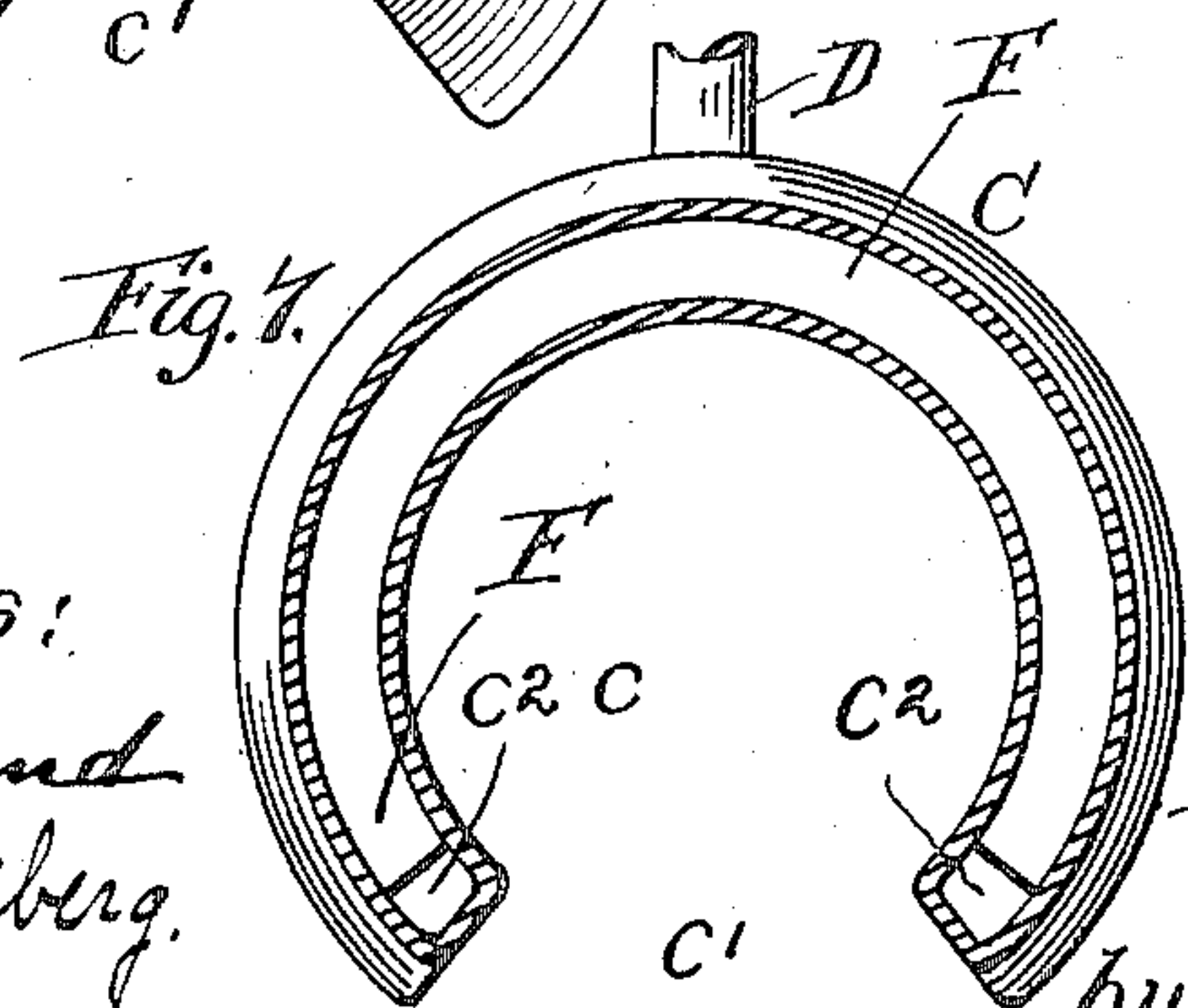
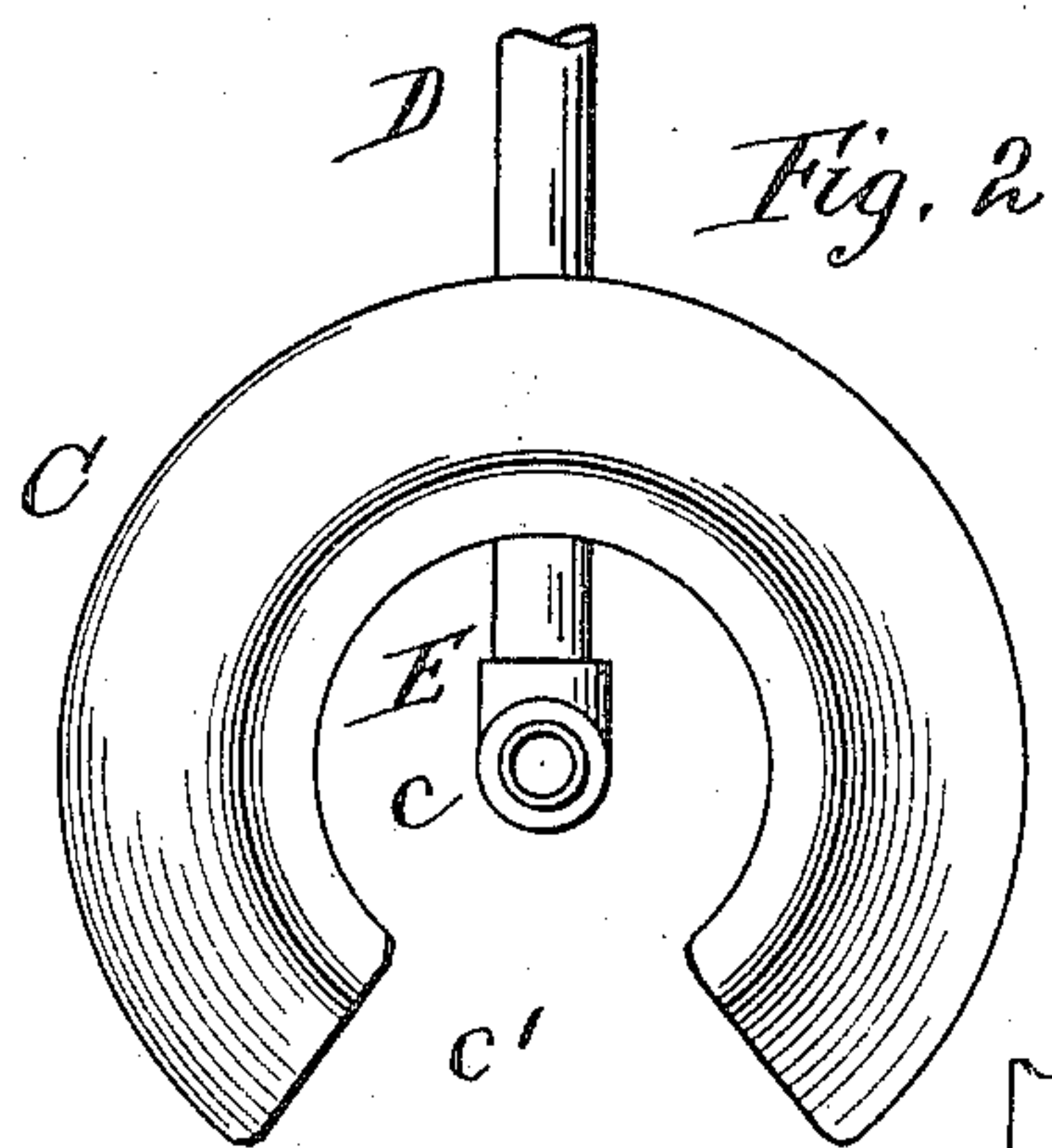
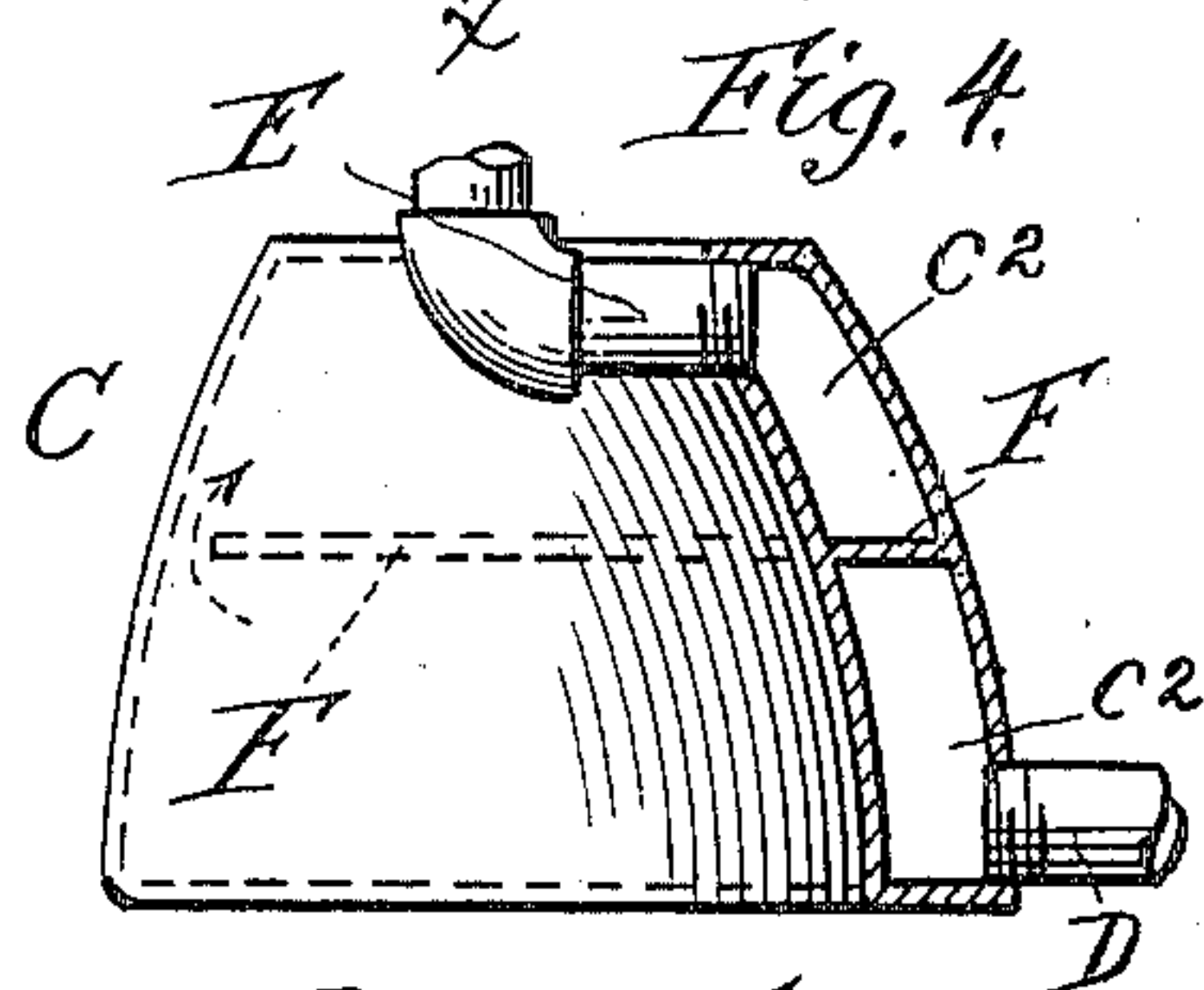
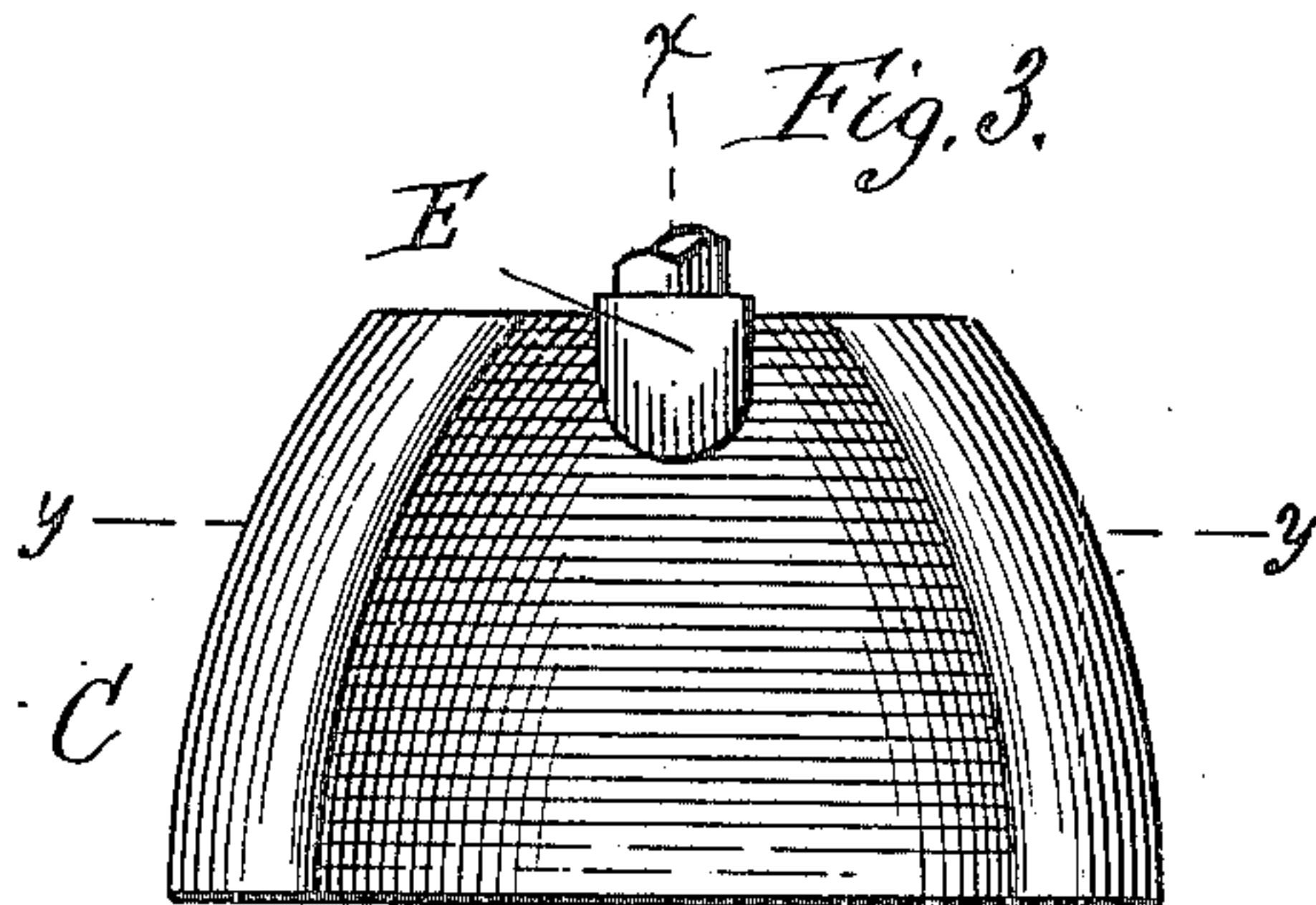
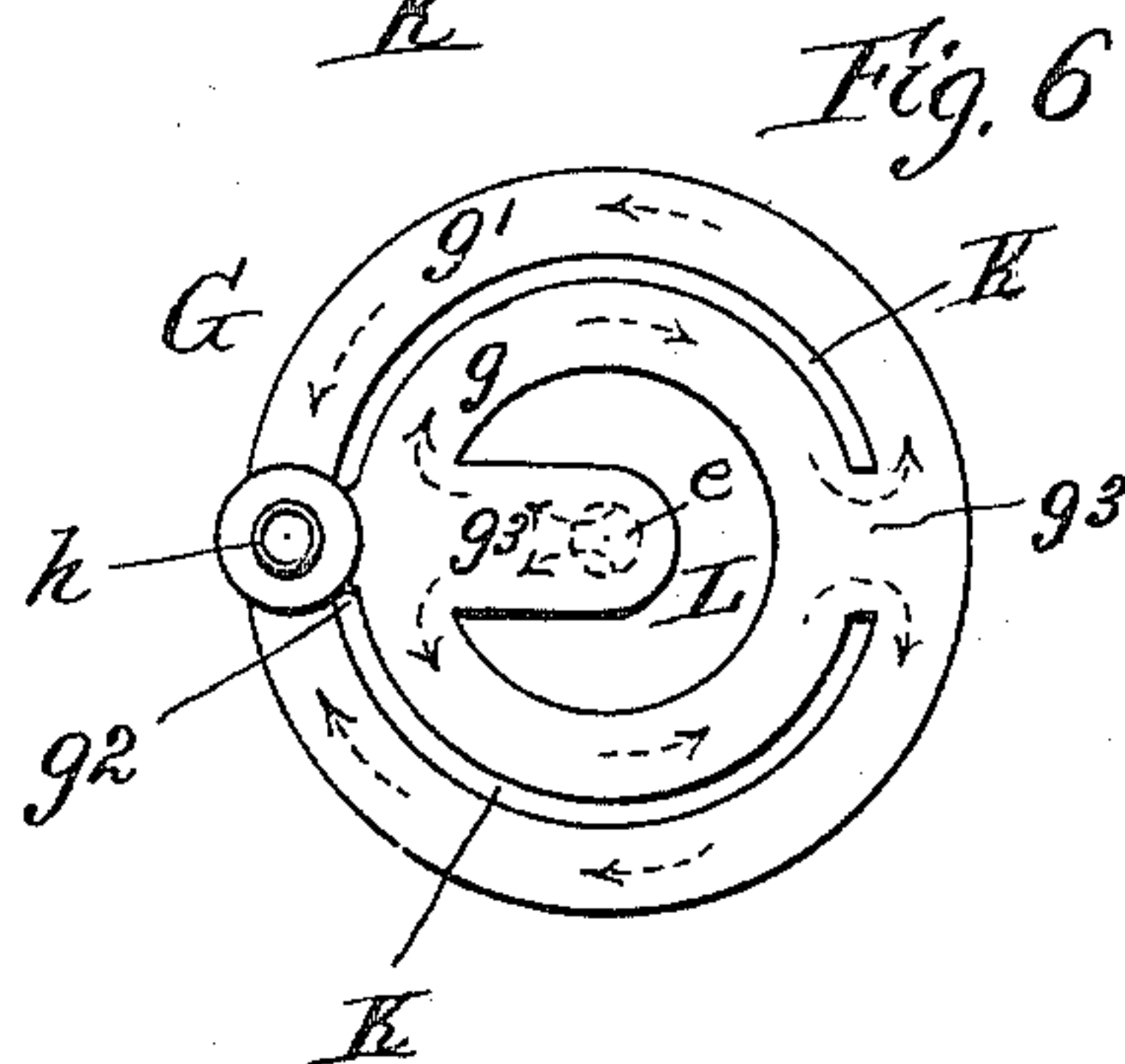
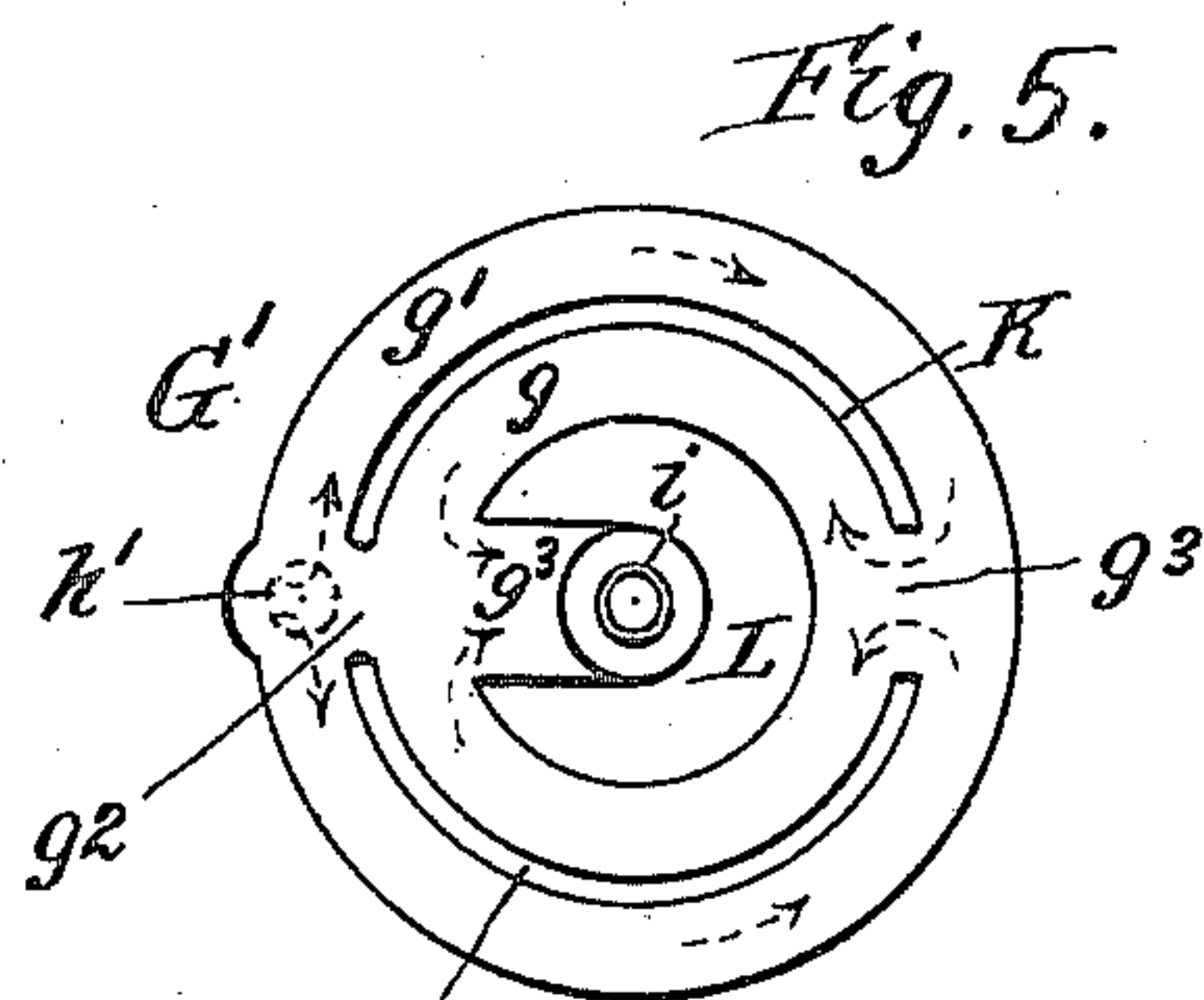
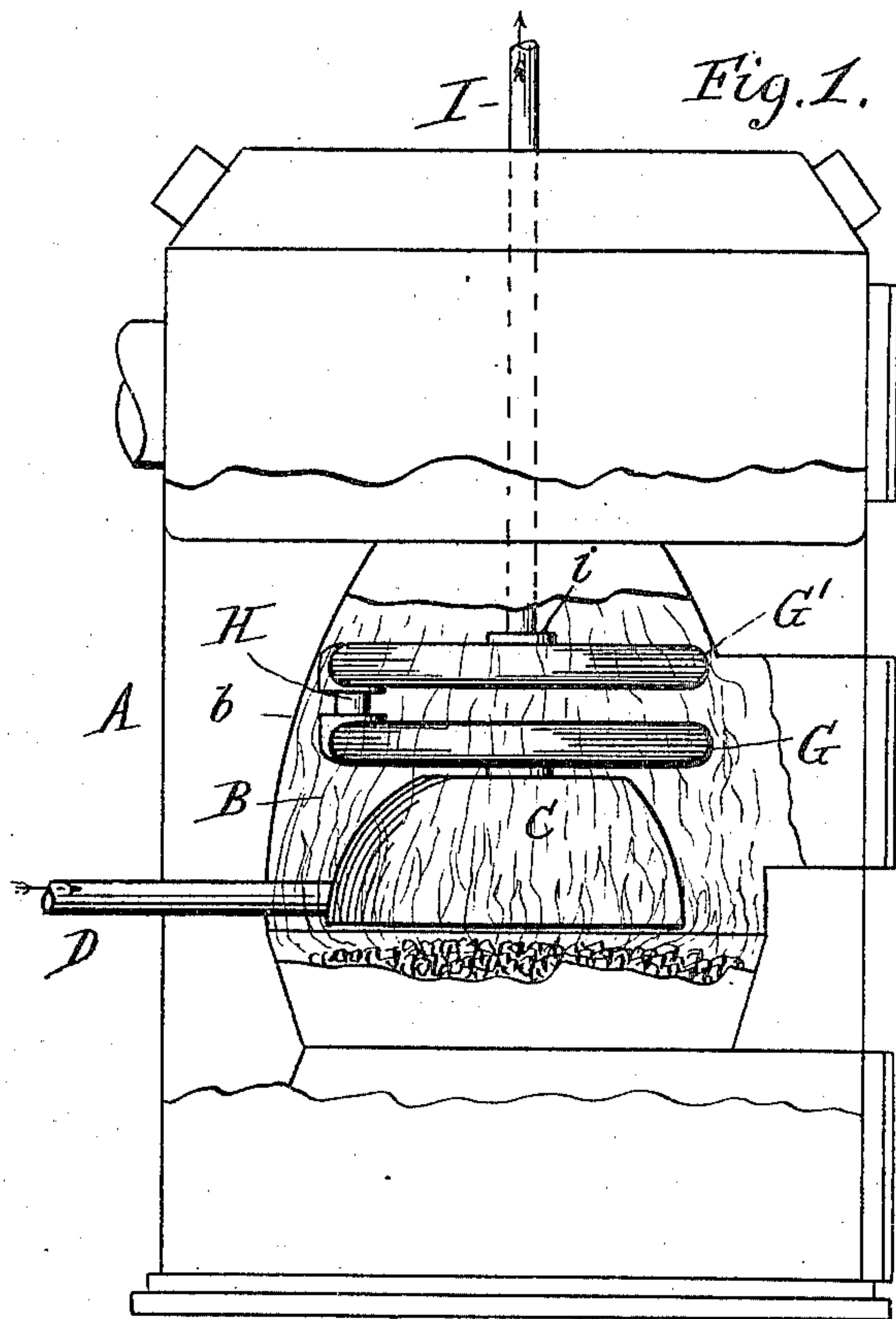
Patented Aug. 20, 1901.

F. D. STOLZ.

HOT WATER HEATING ATTACHMENT FOR FURNACES.

(Application filed Dec. 28, 1900.)

(No Model.)



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HOT-WATER HEATING ATTACHMENT FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 680,744, dated August 20, 1901.

Application filed December 28, 1900. Serial No. 41,317. (No model.)

To all whom it may concern:

Be it known that I, FRANK D. STOLZ, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have
5 invented a certain new and useful Improvement in Hot-Water Heating Attachments for Furnaces, of which the following is a specification.

Prior to my invention it has been proposed
10 to provide as an auxiliary to a combination-furnace adapted for supplying hot air to registers and hot water to radiators or other parts of a hot-water heating system a hollow casting arranged within the combustion-
15 chamber in position over the fire and having inlet and outlet connections.

Objects of my invention are, first, to provide a construction of hot-water heating attachment adapted as a whole for arrangement within the combustion-chamber and at
20 the same time composed of component members which can be placed and used either separately or in combination within the combustion-chamber not only of a "combination"
25 "hot-water and hot-air furnace, but also in any ordinary or suitable hot-air furnace; second, to effectively, economically, and advantageously utilize heated products from the fire and secure decided advantages from existing heat radiation; third, to provide a large
30 area of water-heating surface, to bring the same within compact form, and to expose such surface in a manner to utilize existing heat without interfering with the process of combustion; fourth, to avoid all interference with
35 the process of firing or shoveling coal or other fuel into the furnace; fifth, to avoid dampening the fire; sixth, to materially avoid lodgment for ashes and the like and to provide a
40 practically self-cleaning construction, and, seventh, to provide for an effective circulation of water.

To the attainment of the foregoing and other useful ends my invention consists in
45 matters hereinafter set forth.

In the accompanying drawings, Figure 1 represents in side elevation a furnace partly broken away in order to expose the hot-water heating means or attachment embodying
50 principles of my invention. Fig. 2 is a top plan view of the portion of the attachment hereinafter referred to as the "water-heat-

ing" attachment in contradistinction to the superposed water-heating coils. Fig. 3 shows said water-heating attachment in front elevation. Fig. 4 shows said attachment partly in
55 elevation and partly in section on line *xx* in Fig. 3. Fig. 5 is a top plan of one of the coils. Fig. 6 is a top plan of another one of the coils. Fig. 7 is a section on line *yy* in Fig. 3.

The furnace A is provided with any preferred or ordinary construction of combustion-chamber B and is understood to be adapted for supplying heated air to one or
60 more flues or pipes, which conduct the same to any desired point or points. A hot-water heating system is also combined with the furnace, whereby the fire can be used for a twofold purpose.

In order to economically and effectively
70 utilize the primary heating agent as a means for heating the water and at the same time avoid interference with the firing of the furnace and the process of combustion, I provide a water-heating attachment C, which is
75 adapted to be arranged within the combustion-chamber in position to place its base over and not far above the usual top level of the ignited fuel, substantially as illustrated in
80 Fig. 1, it being understood that the space below the device or attachment C is the space within an ordinary fire-pot which when the furnace is in use contains the fire-bed, as illustrated, it being also observed that this fire-
85 pot space or chamber is practically a lower extension of the combustion-chamber B or that the combustion-chamber B is practically an upward extension of the space within the fire-pot. This attachment is made hollow, so as
90 to form a water-chamber having a lateral inlet at the base portion of the attachment and an outlet at the upper portion thereof. The water-chamber is supplied by a laterally-extending water-supply pipe D, which passes
95 through the rear side wall *b* of the combustion-chamber and connects with the lower portion of the water-chamber. The water-chamber also connects with an outlet-pipe E at its upper portion. The side walls of the chamber extend upwardly from its bottom
100 and are segmental or substantially so in horizontal section, so as to provide a transversely-segmental chamber, which partially surrounds or encircles a central space or passage

c, which extends vertically through the attachment and which opens laterally through the portion of the attachment opposite the furnace-door F. This lateral opening (indicated at c') permits the furnace to be fired or supplied with fuel without interference and at the same time permits a large area of heat-absorbing surface to be provided and exposed within the combustion-chamber. As a preferred construction and matter of further improvement the attachment C is formed substantially as a hollow truncated cone open through one side, as at c' , and adapted to provide a horizontally-segmental water-chamber between its inner and outer sides, it being understood that while the form shown involves sides which curve inwardly toward the upper portion of the attachment the attachment as a whole approximates to or is substantially a truncated cone having, however, a general or approximate transverse sectional conformity to the inner wall of the combustion-chamber. The horizontal diametric measurements of the attachment C are such as to leave draft and combustion space between the attachment and the surrounding wall of the combustion-chamber, so that when in use flame and heated products from the fire-bed can pass up and around the attachment and also pass up through its upwardly-extending central space or passage. In this way a large area of heating-surface is exposed within the combustion-chamber without interfering with combustion, draft, and firing, and by thus providing the attachment with nearly upright inner and outer sides a lodgment for ashes and the like will be avoided; also, the water-chamber can be readily flushed and freed from sediment by reversing the direction of the flow of water—that is to say, by permitting the water in the hot-water system employed to run off through the lower inlet-pipe and, if desired, by further supplying the upper pipe E from any available source.

In order to cause the water to circulate within the attachment C, so as to more effectively heat the water therein contained and more fully utilize the primary heating agent, the chamber within such attachment can be divided into a plurality of upper and lower communicating chamber portions, a simple and effective arrangement being to construct or cast such attachment with an internally-arranged horizontal partition F, which, as illustrated in Fig. 4, (partly in full and partly in dotted lines,) divides the water-chamber into upper and lower chamber portions c^2 . With this arrangement the ends of the partition F terminate short of ends of the horizontally-segmental water-chamber, so as to leave spaces through which one chamber portion can communicate with the other chamber portion, as indicated by the arrow in Fig. 4.

As a further attachment for heating and utilizing the primary heating agent I provide one or more, but preferably a plurality, of hol-

low coils, which may connect with the pipe D where it is desired to omit the attachment C or connect with the upper pipe E of such attachment where it is desired to employ the same in conjunction with one or more superposed coils.

As illustrated, two coils are provided in conjunction with the water-heating attachment C and arranged in series over the attachment C and as a continuation of the same in varied form. The coil G, arranged first above the attachment C, comprises hollow casing $g g'$, whereof one is arranged within the space bounded by the other. These hollow casing portions $g g'$ are relatively spaced or set apart, so as to provide intervening space or passageway for the circulation of heated products of combustion, and are connected together by short hollow necks $g^2 g^3$, whereby communication is established between the water-chambers formed within such hollow casing portions. The form of these casing portions can be varied in accordance with need or fancy, a simple and preferred form being substantially a couple of concentric tubular casings or castings connected together by radially-arranged tubular necks $g^2 g^3$. The coil G' (shown in Fig. 5) corresponds with the coil G, (shown in Fig. 6,) with the exception that in Fig. 6 the inlet is central, while in Fig. 5 the inlet is at one side, and, further, in Fig. 5 the outlet is central, while in Fig. 6 the outlet is at one side. Thus in the coil G of Fig. 6 the inner annular tubular portion g has a short hollow neck g^3 , which projects laterally inward or toward the center of the coil, and this neck is adapted in its under side to couple with the upper pipe E of the attachment C. With such arrangement the outer annular tubular portion g' of coil G', Fig. 5, has its under side portion adapted to couple with the under side portion of the outer annular tubular portion g' of coil G, Fig. 6, by a suitable coupling connection H, as best shown in Fig. 1. The coil G' has a hollow neck portion g^3 , corresponding with the neck portion g^3 of the coil in Fig. 6 and adapted to couple with a pipe I of the hot-water system. It will be obvious, however, that as these superposed coils lie in horizontal planes more than two of such coils could be employed and coupled together according to the space afforded by the combustion-chamber.

With the arrangement shown water circulates within the attachment C as indicated by the arrows in Fig. 4 and through the coils as indicated by the arrows in Figs. 5 and 6, it being seen that in Fig. 6 the circulation is outwardly from the center, while in Fig. 5 a relatively reverse circulation takes place; also, that the arrangement of the coils and connecting necks and couplings serves to insure circulation through the coils.

The space between the inner and outer parts of a coil such as shown provides passage portions K for the heated products of

combustion. The central space L of each coil also registers with the central space c of the attachment C, whereby an upright central passage is practically provided and suitable updraft insured.

The several members thus described can be readily assembled and removed, as may be desired, and by arranging such members substantially as set forth full advantage can be taken of all effects of radiation and heat-absorbing surfaces.

From the matters hereinbefore described and illustrated in the drawings it will be seen that the construction involves as features of detail a double-walled shell or casing C, which partially surrounds a vertical flue-passage having a lateral opening opposite the door or fuel-supply passage through which fuel is fed into the furnace. This vertical flue-passage contracts towards its upper end and has its lower larger end over, directly opposite, and exposed to such fire-bed as may be within the fire-pot, so that it takes the heated products from the central portion of the fire-bed and conducts same to the portion of the combustion-chamber which is above the attachment C, it being seen that this vertical passage extends through the top and bottom of the upwardly-tapered attachment C. By the arrangement of said attachment C the heated products from the remaining portion of the fire-bed pass upwardly through a space or passage between the outer wall of the water-chamber and the wall of the combustion-chamber and then enter the portion of the combustion-chamber above the attachment C. The arrangement of the said attachment C also places the bottom of the water-chamber directly over and exposed to the fire-bed. It will also be seen that with the coils composed of tubular casings such coils can be connected by intervening supporting-couplings and be arranged in horizontal or substantially horizontal planes.

What I claim as my invention is—

1. The combination with a furnace having a fire-pot and a combustion-chamber forming an upward extension of the fire-pot space or chamber; of a water-heating attachment comprising a double-walled shell formed substantially as a truncated cone having a central

passage opening at its top and bottom and also laterally open opposite the door or fuel-supply passage of the furnace, said substantially trunco-conical shell being constructed with a water-chamber having inlet and outlet connections, and being suspended within the combustion-chamber at a point over the fire-pot space, and having its greatest extent of external circumferential area of surface less than the corresponding area of the wall of the combustion-chamber so as to provide between the said shell and the wall of the combustion-chamber an annular space or passage which extends upwardly from the space within the fire-pot and merges into the upper portion of the combustion-chamber which is above the shell and with which the upper end of the central passage of the shell communicates.

2. The combination with a furnace having a combustion-chamber arranged over the fire-pot; of a water-heating attachment C formed substantially as a hollow truncated cone and supported within and free from the wall of the chamber by pipes D and I; the hollow water-heating attachment being formed with a horizontally-segmental water-chamber partially subdivided by a partition and having a central passage which is laterally open opposite the furnace-door or fuel-supply passage; said water-heating attachment having its sides, top and bottom exposed within the combustion-chamber.

3. The combination with the combustion-chamber of a furnace, of an inclosed water-heating attachment formed substantially as a hollow, truncated cone having a water-chamber formed between its inner and outer walls, and open through its side which is opposite the furnace-door; and one or more superposed hollow water-heating coils connecting with the water-chamber of said attachment and each constructed with inner and outer connected hollow members, adapted for coupling and circulation substantially as described.

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