

961,854.

Patented June 21, 1910.

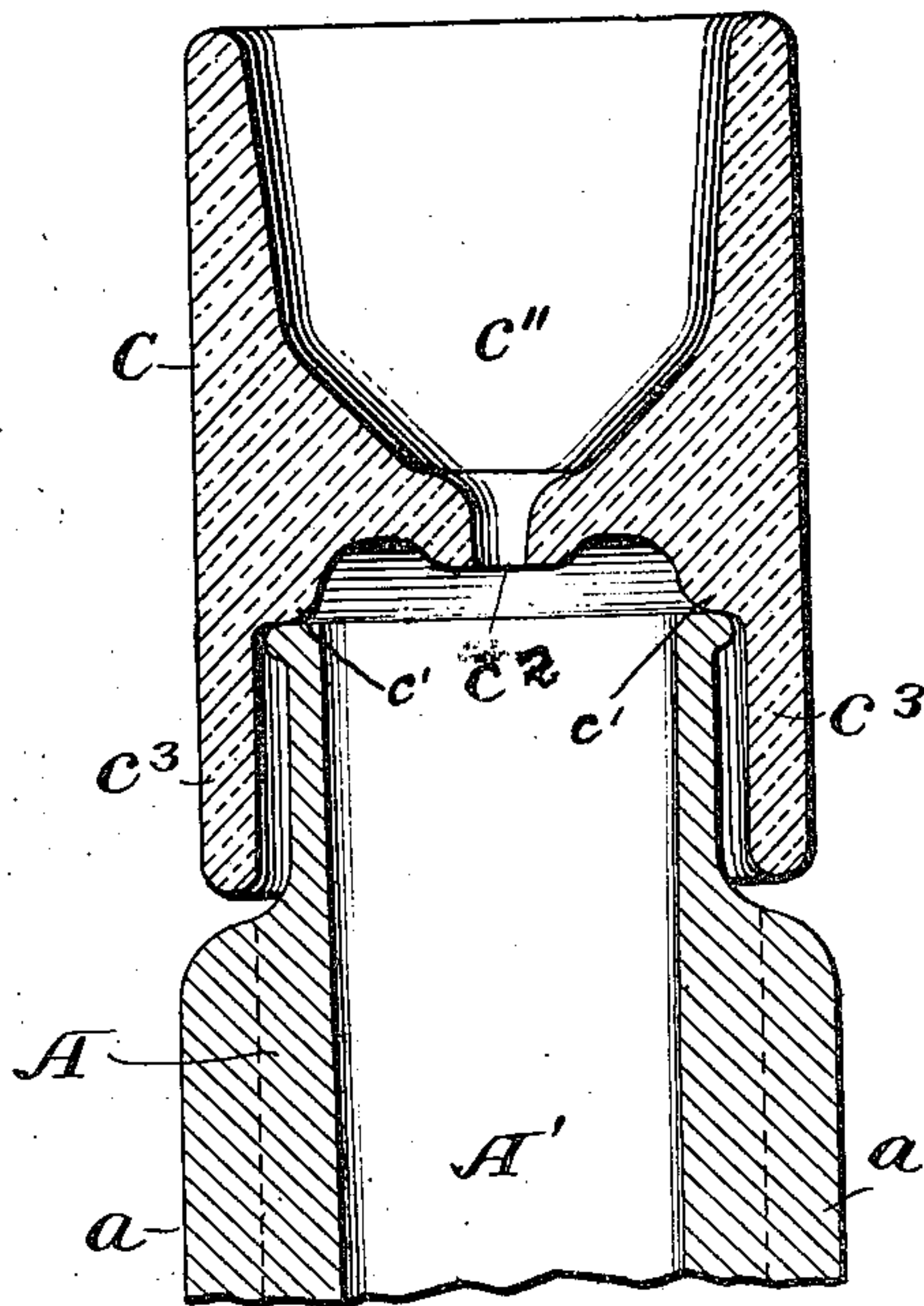
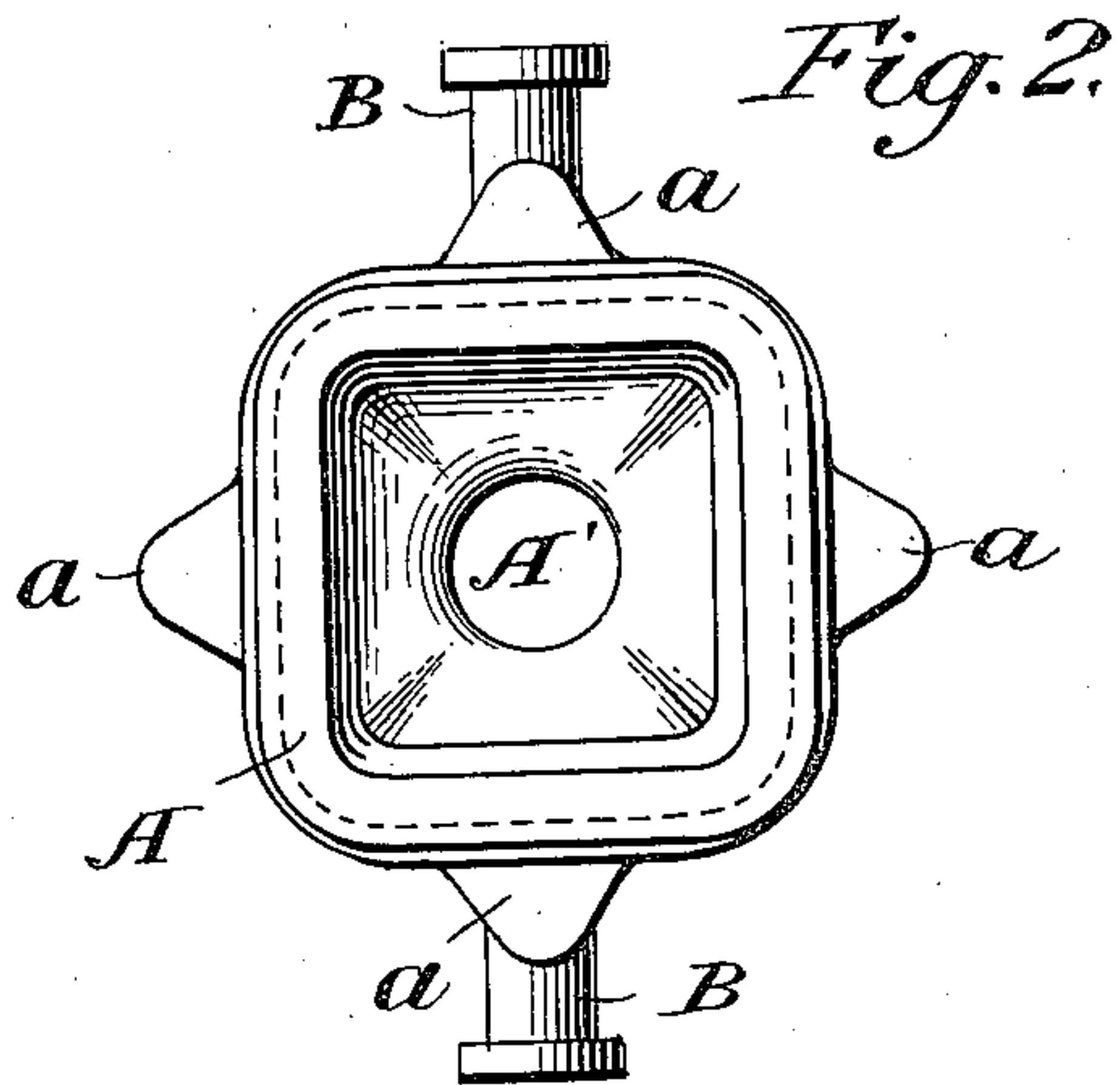
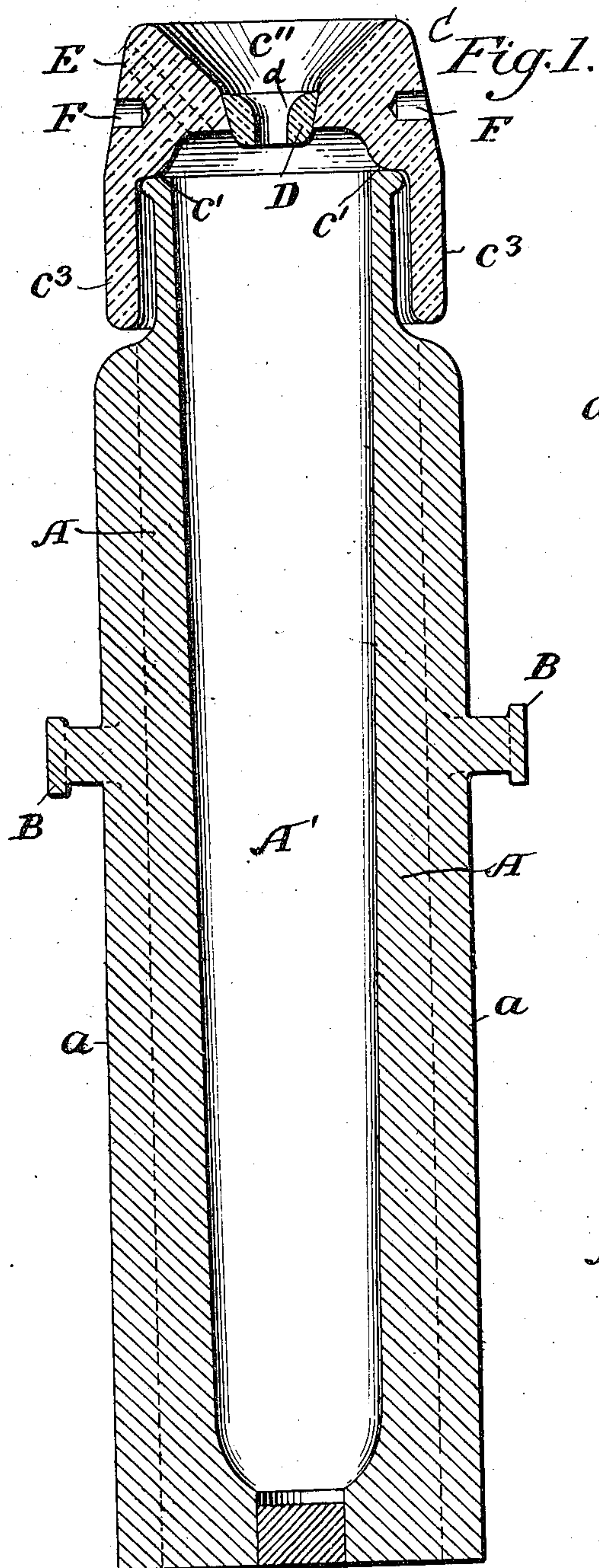


Fig. 3.

Witnesses.

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INGOT-MOLD.

961,854.

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To all whom it may concern:

Be it known that I, EMIL GATHMANN, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Ingot-Molds, of which the following is a specification.

My invention relates particularly to molds for casting steel ingots, but may be used in connection with molds of other kinds.

In my U. S. Patents No. 921,972 of May 18th and No. 940,386 of November 16th, 1909, I have shown molds for casting steel ingots in which provision is made for accelerating heat radiation and thus favoring the cooling of the molten mass to a greater extent at the bottom and lower part of the mold than at the upper part thereof, which upper part is provided with means for conserving the heat of the adjacent molten mass within the mold. By those improvements the formation of pipes and blow holes in the ingot was greatly reduced. I have now found that improved results are obtained by providing means for limiting the size of the stream of molten metal as it is teemed or poured into the mold from a ladle or crucible and for so directing this stream that it will be prevented from splashing against the relatively cold walls of the mold and thus forming what are called "cold shuts".

In carrying out my invention I preferably form the main body of the mold in the manner described in my patents above mentioned, but it may be formed in other suitable ways, and I provide a combined hood and funnel which is so constructed as to perform three functions, viz., to retain or conserve the heat of the molten ingot in the upper part of the mold while the ingot is being formed, to limit the size of the stream of metal while it is entering the mold, and to direct said stream in such manner that it will not splash against the walls of the mold. Preferably the mold is constructed to perform all these functions, but so far as I am aware it is new with me to provide a removable hood of heat insulating material adapted to inclose the upper part or neck of the mold and to cover the top or mouth thereof so that heat is prevented from escaping upwardly and is compelled to pass downward and radiate in a sidewise direction.

In the accompanying drawings, Figure 1 shows a vertical central section through an ingot mold with my improved hood applied.

Fig. 2 shows a plan view of the mold with the hood removed. Fig. 3 shows in vertical section the upper part of the mold with a modified form of hood.

The body A of the mold may be constructed in the manner shown in my before mentioned patents, or in any other suitable way. As shown, it is formed with vertical ribs α to accelerate heat radiation. Four such ribs are shown but this number may be increased or varied. The ribs preferably extend from the bottom of the mold to the neck thereof in such manner that the line of rapid cooling of the ingot extends to about 85% of the vertical mass of the ingot when in a molten or liquid state, and the upper part or neck of the mold is reduced in thickness to decrease the absorption power of the metal at the neck of the mold and to thus retain or conserve the heat of the upper part of the molten ingot and cause it to remain in a liquid condition until the lower part of the metal has frozen or hardened. The chamber A' of the mold is smaller in diameter at the bottom than at the top and gradually tapers from the top. Trunnions B may be provided for supporting the mold and permitting it to be turned for stripping.

C indicates the combined hood and funnel which performs the three functions before mentioned. It is preferably made of fire-clay, graphite or other suitable heat insulating material. The upper part of the hood is adapted to cover the mouth of the mold and it has an annular shoulder c' adapted to rest on the top of the mold. A recess c'' is formed in the hood which is of large diameter at the top and gradually tapers to the bottom where the opening is relatively small and which latter opening preferably receives a plug D of fireclay or similar material. This plug has a relatively small opening d through which the molten metal passes. The plug is removable and may be replaced when worn out, but this plug may be omitted and the hood itself may be formed with an opening c^2 of proper size, as shown in Fig. 3.

E indicates an observation opening which may be employed for inspecting the molten metal while being poured and while freezing.

F indicates recesses in the hood to receive lifting devices.

The lower part c^3 of the hood is annular and surrounds the neck or upper portion of the mold. It serves to reduce the heat ra-

diation and to thus cause the heat of the ingot to be retained or conserved so that the latter may remain fluid long enough to prevent the formation of pipes and blow holes in the manner described in my before mentioned patents.

By my improvements I provide a very economical and efficient way of conserving the heat of the ingot at the upper part of a mold and for preventing the radiation of heat upward from the mold. I also provide efficient means for so pouring the metal and filling the mold that splashing is avoided and the formation of cold shuts prevented.

The hood is especially intended for use in connection with crucible molds for casting high grades of steel, but of course is adapted for other purposes. Preferably the hood is heated before being placed on the mold and the metal is poured and cast in the manner described in my former patents. The opening in the hood should be as small as will accommodate the pouring of the ingot without undue cooling off of the last portion poured from the ladle or crucible. The pouring operation should be slow and the walls in the lower part of the mold before pouring should be relatively cold while the walls of the upper part should be relatively warm in order to produce the best results.

I claim:—

1. A removable hood for a mold made of heat insulating material, the top of which is adapted to cover the top of the mold and thus prevent the upward radiation of heat and the sides of which are adapted to inclose the upper portion or neck of the mold and prevent rapid sidewise radiation and thus conserve the heat in the upper part of the fluid ingot.

2. The combination with a mold, the

lower part of which is constructed to favor heat radiation while the upper part or neck is reduced in thickness to conserve the heat of the ingot, of a removable hood of heat insulating material, the top of which is adapted to cover the top of the mold and thus prevent the upward radiation of heat, and the sides of which inclose the upper part or neck of the mold for the purpose specified.

3. A combined hood and funnel for molds made of heat insulating material having an annular portion adapted to surround the upper part or neck of the mold to conserve the heat therein and a funnel shaped top having a reservoir for containing molten metal and a restricted opening for the passage of the molten metal into the mold.

4. A combined hood and funnel for molds having an annular portion adapted to surround the upper part or neck of the mold to conserve the heat therein, and a top portion provided with a reservoir to contain a supply of metal to feed the mold and which is formed with a restricted opening for permitting the relatively slow passage of the molten metal from the reservoir into the mold.

5. A combined hood and funnel for molds having an annular portion adapted to surround the upper part or neck of the mold to conserve the heat therein, and a funnel-shaped top provided at its inner end with a removable plug having a restricted opening for the passage of the molten metal into the mold.

In testimony whereof, I have hereunto subscribed my name.

EMIL GATHMANN.

Witnesses:

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