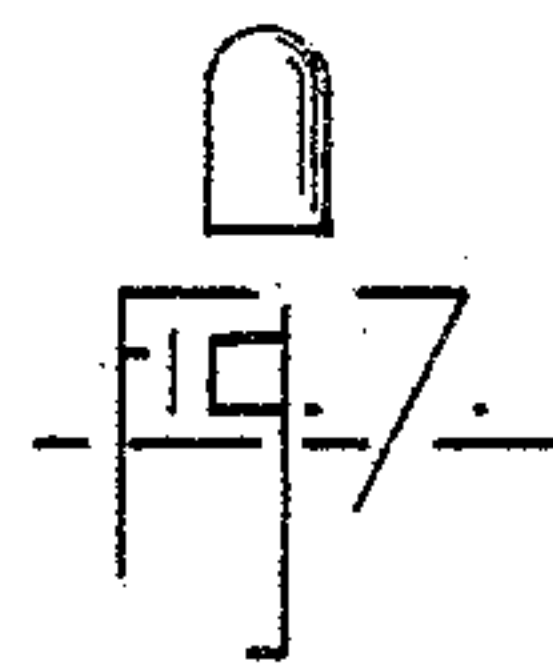
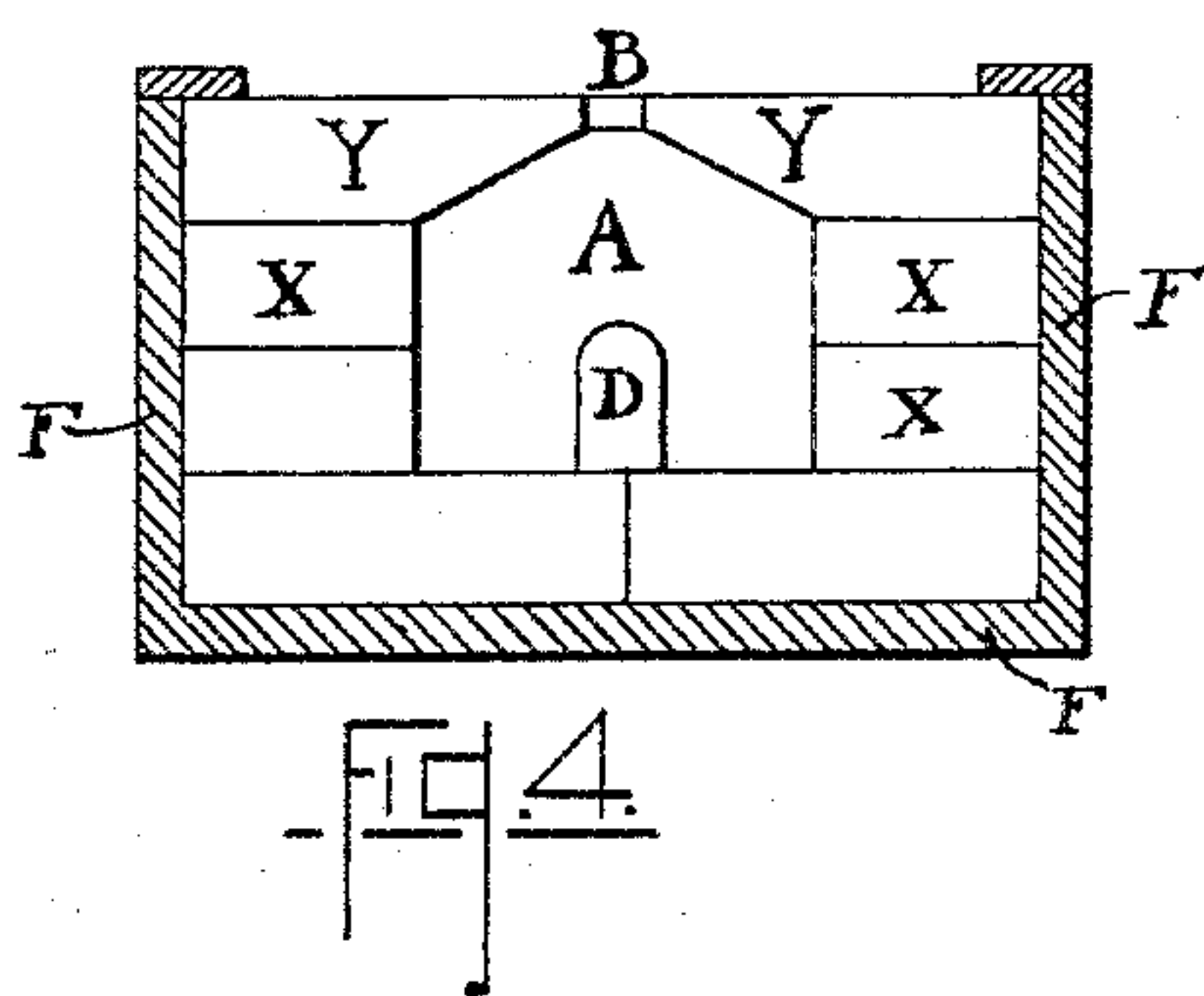
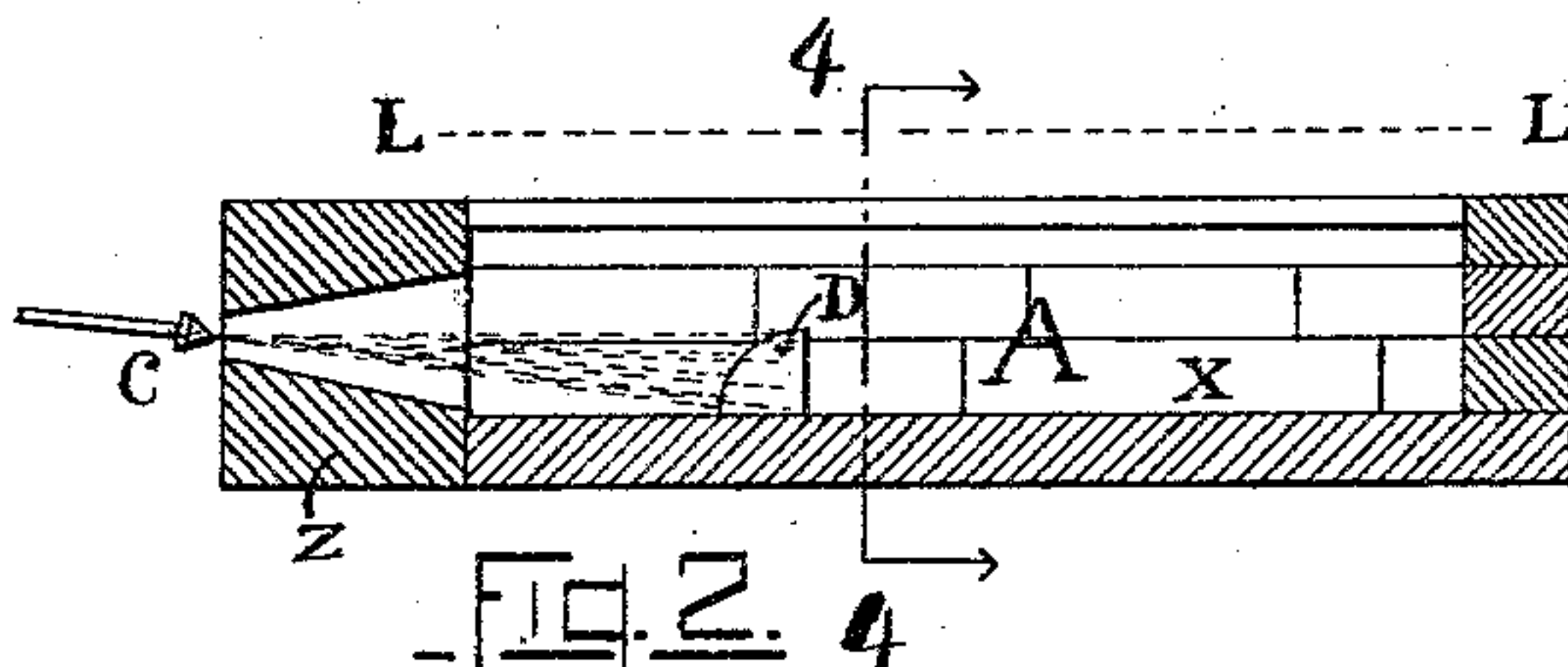
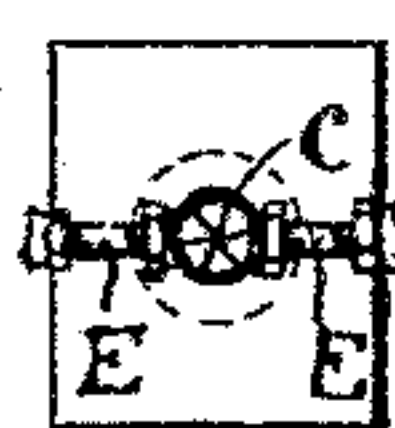
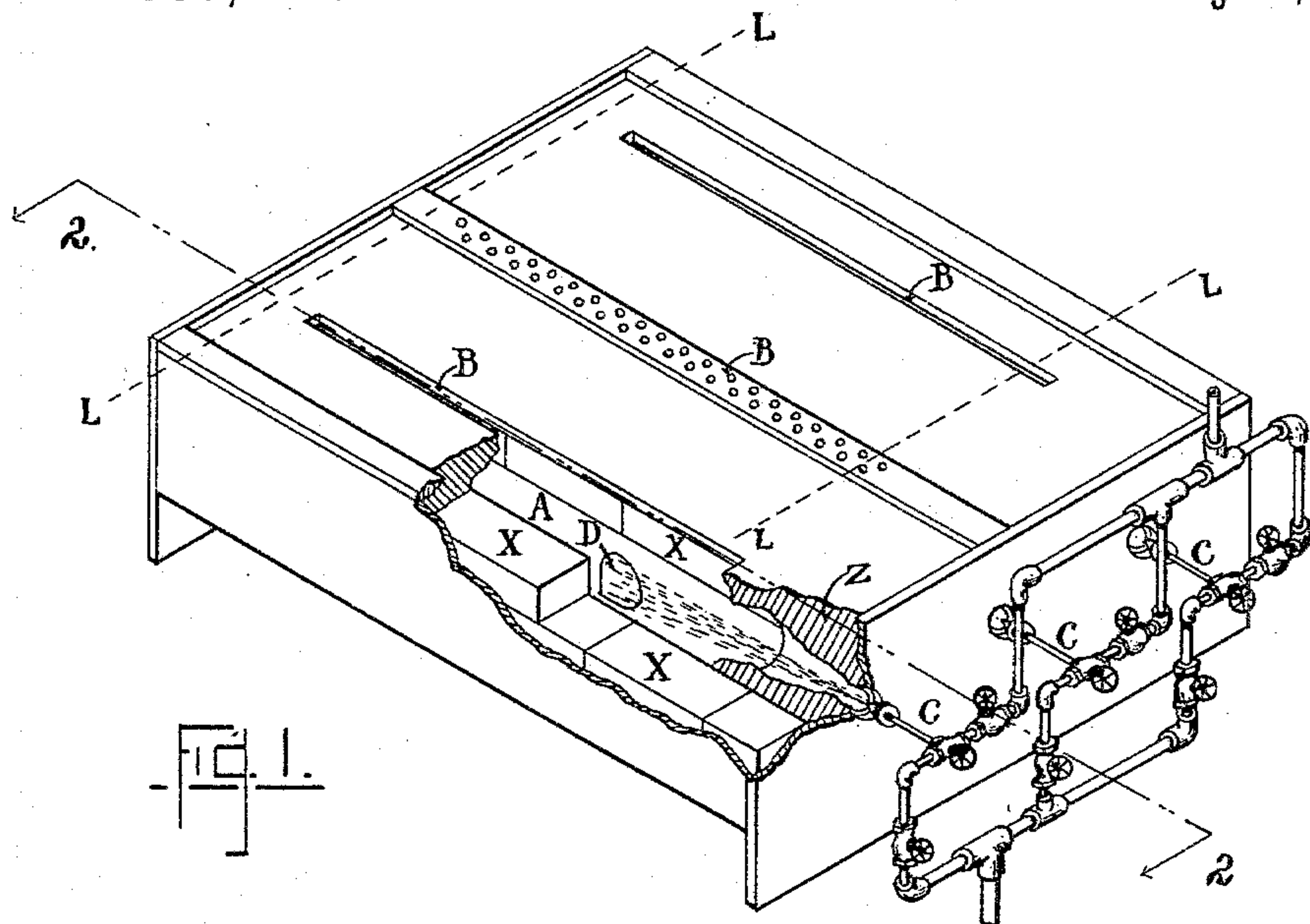


(No Model.)

H. T. SANBORN.
APPARATUS FOR SINGEING CLOTH.

No. 559,610.

Patented May 5, 1896.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HARRISON T. SANBORN, OF SOMERVILLE, MASSACHUSETTS.

APPARATUS FOR SINGEING CLOTH.

SPECIFICATION forming part of Letters Patent No. 559,610, dated May 5, 1896.

Application filed May 9, 1895. Serial No. 548,676. (No model.)

To all whom it may concern:

Be it known that I, HARRISON T. SANBORN, a citizen of the United States, residing in Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Apparatus for Singeing Cloth by Means of the Flame from Petroleum or Petroleum-Oils, of which the following, with the annexed drawings, is a description.

My invention relates to apparatus for singeing, in which the cloth passes through a flame rather than over hot plates, and to the means by which a proper flame for the purpose may be obtained from petroleum-oils or crude petroleum. Gas is ordinarily used for this purpose by being brought in pipes to a proper location relative to the cloth and there burned by means of ordinary burners, holes, or slots in the pipes. The same method has been tried with petroleum and petroleum-oils, but there are serious practical difficulties in the way of obtaining satisfactory results in this manner of using such oils, due principally to the incomplete combustion of the oil, causing smoke to blacken the cloth and unconsumed particles of oil to be thrown upon the cloth. This oil, when once upon the cloth, interferes very seriously with the subsequent manipulations in dyeing, printing, &c. For this reason it becomes practically necessary, in order to insure complete combustion, to burn such oils by atomizing them in a closed chamber in much the same manner as is done with them for various other purposes. I do not claim any invention in the mere fact that such a combustion-chamber is used by me. It is merely a necessary element of the means employed to attain the result, but the flame after being produced in the combustion-chamber must issue therefrom across the full width of the cloth to be singed and must issue evenly all the way across it, so that one part of the cloth will not be left unsinged while another is singed, nor one part be singed to a greater degree than another. It is in the means taken to produce this even flame that my invention consists.

Referring to the annexed drawings, Figure 1 is a general view of an apparatus for singeing cloth constructed according to my invention. Fig. 2 is a longitudinal sectional view

of one of the combustion-chambers on line 2 2 of Fig. 1. Fig. 3 is an end view of the outside of the chamber, showing the arrangement of the atomizer-burner. Fig. 4 is a cross-sectional view of the chamber on the dotted line 4 4 of Fig. 2; and Figs. 5, 6, and 7 show a preferable form of a deflector as hereinafter described.

A combustion-chamber A, Figs. 2 and 4, is preferably lined with fire-bricks X X X, &c., or other refractory material. This chamber must be of a length sufficient for the width of the cloth, (indicated by the dotted lines L L over it, Figs. 1 and 2,) the length of the cloth being at right angles to the length of the chambers, as in the ordinary singeing apparatus. This chamber must also be of a sufficient cross-section to permit of a thorough combustion of the oil or petroleum when injected into it. I have found that a chamber about seven to nine inches square in cross-section answers the purpose well. In the walls and lengthwise of this chamber a slot B or other equivalent orifice, as a series of holes in one or more rows, (see Fig. 1,) is formed, more usually at the top thereof, although this position is not an absolutely necessary one, since the cloth may be made to pass over it in other positions in which it may be placed. Still, for various reasons, it is preferable to place the slot at the top or near the top of the chamber. This slot or orifice is also preferably formed by placing long fire-brick beveled off on the under side, as shown at Y, Fig. 4, so as to leave a slot B of five-eighths to three-fourths of an inch, and in some cases even more, between the bricks forming the opposite sides thereof.

The petroleum or oil is supplied by an atomizer-burner C, of which there are a number upon the market which work successfully. These atomizer-burners supply the oil mingled with steam or compressed air, and always require some regulation from time to time in the relative amounts of oil or steam supplied by proper valves, as is well known to those accustomed to handle them. When properly managed, the result, however, is always to eject the oil from the burner mingled with the air or steam under considerable pressure. Because of the ease and convenience in handling these valves as required, and as

the most convenient position in which to place it, I have preferred to locate the burner at one end of the chamber and to direct it into it through a hole in one end thereof. This end of the chamber is preferably made of a cubical block Z, Fig. 2, of fire-clay or similar refractory material, with a conical hole through it, the larger end of the hole being toward the inside of the chamber. There is preferably no opening or flue in the end of the chamber opposite the burner, for, if properly regulated, practically perfect combustion takes place, and any outlet at the other end only interferes more or less with the flame issuing evenly throughout the length of the slot or orifice; but if the atomizer-burner C is simply pointed directly into the combustion-chamber A, the force of the steam or compressed air will carry the flame toward the opposite end of the chamber, where it will issue from the orifice B, leaving the end nearer the burner without any or without its full share of flame. I have discovered, however, that by directing the burner so as to cause the atomized oil and flame to strike upon some obstruction placed in the combustion-chamber about one-third the length of the chamber from the burner the flame may be equalized throughout the length of the slot, and caused to issue therefrom to practically a uniform extent throughout its entire length.

I prefer to use a deflector D, of the shape shown in Figs. 5, 6, and 7. (See also Figs. 2 and 4.) This is made of an ordinary fire-brick or piece of one rounded off on one end thereof, as shown, Fig. 6 being a side view of it, Fig. 7 a view of the end placed toward the burner, and Fig. 5 a plan view from the top. By means of such a deflector placed in the transverse middle of the chamber, and approximately one-third the length of the chamber from the burner, the flame and oil may be made to strike upon it and the adjacent floor of the chamber at a variety of angles by changing very slightly the direction the burner is pointing, and by observing the intensity of the flame issuing from various parts of the slot the latter may in the same way be equalized in amount. Some little skill and experience are required to adjust the parts properly at first in each individual chamber; but when once adjusted they require little further attention beyond seeing that the fuel is properly atomized by the burner, as in case of its use for any other purpose. I do not mean to confine myself, however, to a deflector of the shape shown, for other shapes will answer the purpose to a greater or less degree, and in some instances the floors or sides of the combustion-chamber will alone be sufficient to accomplish the same purpose. Some obstruction is always necessary, however.

The deflector thus placed and the surface of the floor or sides appear to perform a two-fold object—to deflect the flame already produced and to obstruct the flight of those particles of oil not yet ignited and give them the

opportunity to burn before they go too far down the chamber to produce a flame which will issue from the slot at the end near the burner. Certainly by its use I am enabled to equalize the flame throughout the length of the slot, where otherwise the greater portion of the flame would issue from the farther end only.

The distance between the deflector and the burner, above stated to be approximately one-third of the length of the chamber, will probably prove to be variable to a greater or less degree under various circumstances, varying, perhaps, with different lengths of chamber for cloth of different widths, and perhaps also with the height of the burner above the floor of the combustion-chamber. I have heretofore placed the burner about half the distance from the floor to the top of the chamber, and if placed higher than this position the location of the deflector may well have to be changed from the position indicated.

Some means of changing the direction in which the burner C points is necessary to cause the fuel to strike the obstruction placed in its way in just such a manner as to produce the desired result. In ordinary cases this is readily accomplished by placing the burner upon a horizontal piece of pipe E E, Fig. 3, with screw-threads at each end, which permit it to be turned slightly in a vertical plane. If it is desired to make the flame and oil strike upon either side of the chamber, as might under certain conditions be necessary, the position of this pipe may be changed from a horizontal to a more or less perpendicular position, and, if necessary, other means—as a universal joint, for instance—may be substituted; but as heretofore used the pipe with threads permitting it to be turned slightly is sufficient.

In the actual work of singeing it is usual to pass the cloth through more than one flame, and accordingly more than one combustion-chamber with its accompanying burner is ordinarily required, and such an arrangement is shown in Fig. 1. For the purpose of constructing these the means shown by William S. Granger in his patent, No. 506,395, of October 10, 1893, is well adapted. In that patent combustion-chambers lined with fire-brick are built in metal troughs or boxes, of which a singe-plate forms the top or cover, and these troughs or boxes are then built into detachable sections. The same means may be advantageously used in constructing a singeing apparatus of these chambers, the singe-plate being replaced by the slot from end to end of the chamber, as shown in Fig. 4, where F represents the iron trough or box into which the brick lining is built; or, if desired, a combination of chambers, some with singe-plates and some with the slots for flames, may be combined together in the same machine. The apparatus is then fitted with the same means for feeding the cloth, drawing it through, and winding it up that are usual in this class of

machines, and the cloth is run over the slots from which the flame issues, as in any other flame singeing apparatus.

I have above stated that I have heretofore preferably placed the burner at one end of the chamber on account of the ease of handling and controlling the flame from that position. If it were not for this ease of handling, and were there but one chamber or sufficient room for the burners between the chambers, the more natural position would be in the middle of the length of the chamber; but were the burner placed in that position it should be located in the side of the chamber if the orifice for the exit of the flame is at the top and not upright through the floor, and the flame from the burner would necessarily then strike upon and be deflected from the opposite side of the chambers, assisted, if need be, by a properly-arranged deflector, for otherwise the flame from the burner cannot be equalized throughout the length of the slot, and in whatever position the burner is placed it will be found that the deflection and obstruction of the flame and oil in some way or other after it is injected into the chamber will be necessary in order to equalize the flame issuing from the slot, and thus singe the cloth equally throughout its width.

The term "obstruction" in the claims is to be understood as including the interior surface of the combustion-chamber, whether used with a distinct deflector, such as is shown in D, or alone without any deflector; and it is also to be understood that where the term "slot" is used in the following claims I mean to include within it any equivalent orifice, such as one or more rows of holes the length of the chamber through which the flame may issue.

What I claim is—

1. A cloth-singeing apparatus consisting of a combustion-chamber with a slot in one side and lengthwise of said chamber, a burner constructed to inject petroleum or petroleum-oils into said chamber for combustion, and an obstruction located on one of the other sides of the chamber and between the ends thereof upon which said oil and the flame therefrom will strike after being injected into said chamber, substantially as and for the purpose described.

2. A cloth-singeing apparatus consisting of a combustion-chamber with a slot in one side and lengthwise of said chamber, a burner constructed to inject petroleum or petroleum-oils into said chamber for combustion, means for varying the direction of said burner relative to said chamber, and a deflector such as D placed on one of the other sides of the chamber and between the ends thereof in the path of the oil and the flame therefrom after being injected into said chamber, substantially as and for the purpose described.

3. A cloth-singeing apparatus consisting of a combustion-chamber with a slot in one side and lengthwise of the chamber, a burner constructed to inject fuel into the chamber for combustion, a surface on one of the other sides of the chamber and between the ends thereof in the path of the fuel and flame therefrom when injected into the chamber, and means for directing the burner so as to cause the fuel and flame to strike upon and be properly deflected from such surface, substantially as and for the purpose described.

HARRISON T. SANBORN.

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