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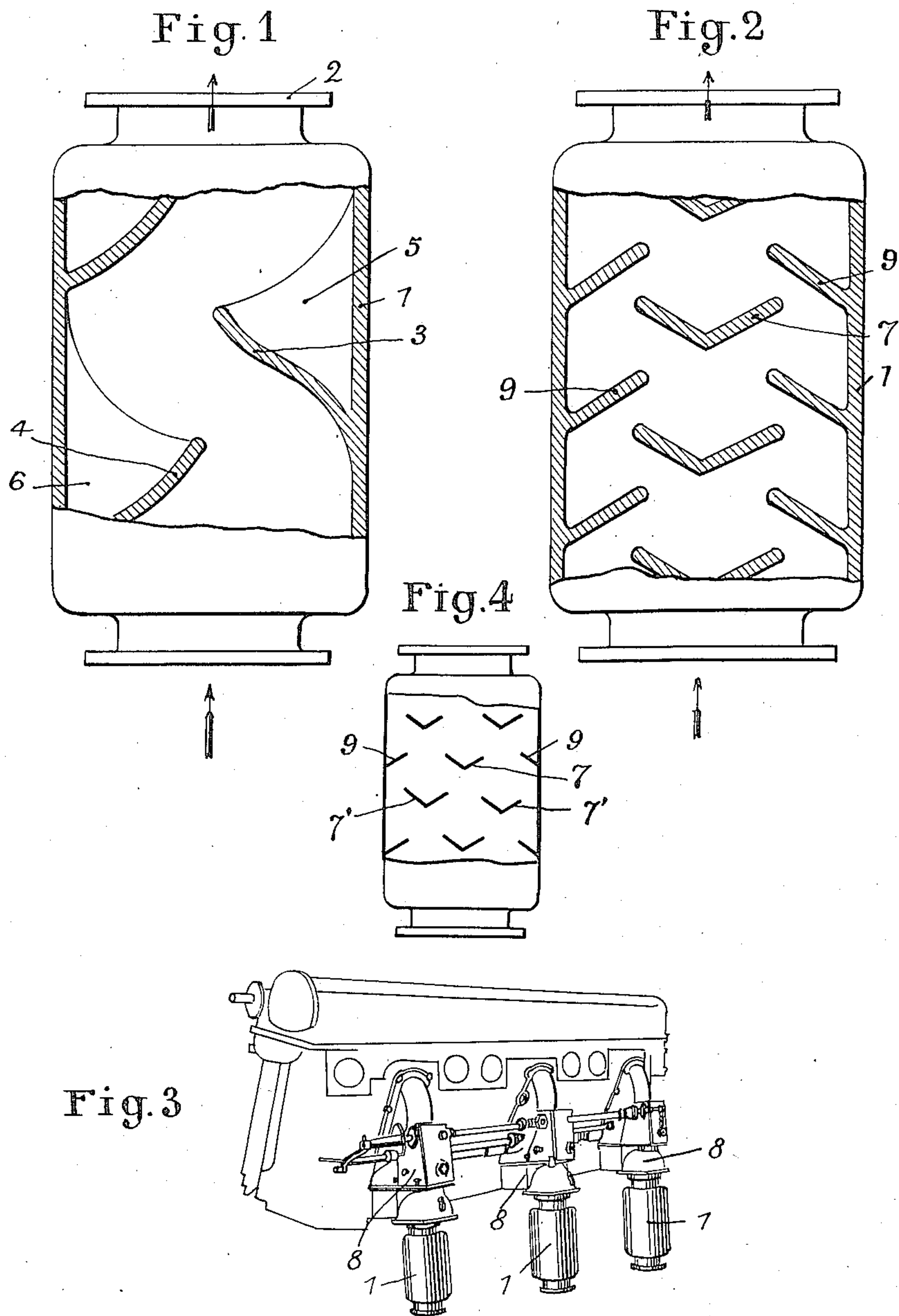
G. EYSSARTIER

2,012,000

DEVICE PREVENTING THE BACKFIRE IN INTERNAL COMBUSTION ENGINES

Filed Sept. 10, 1932

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

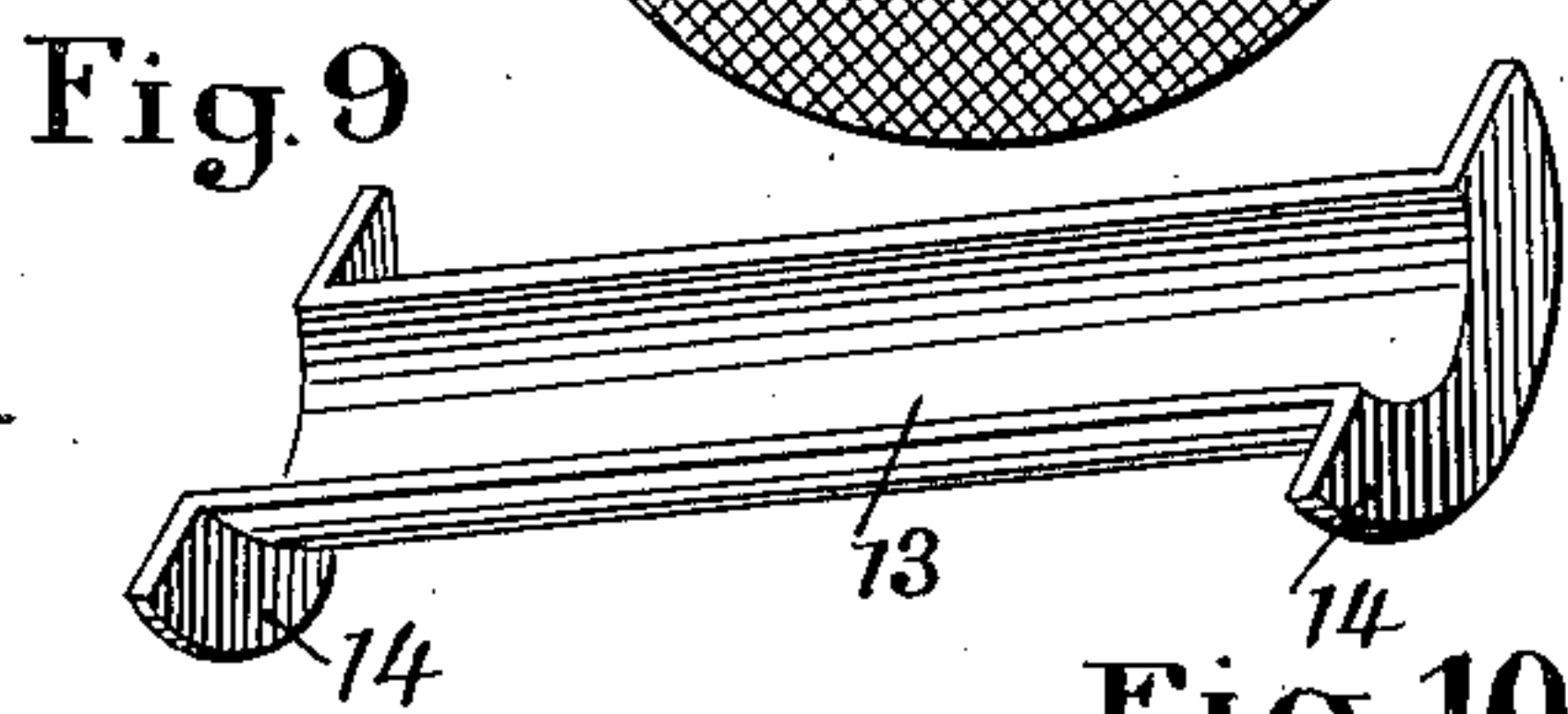
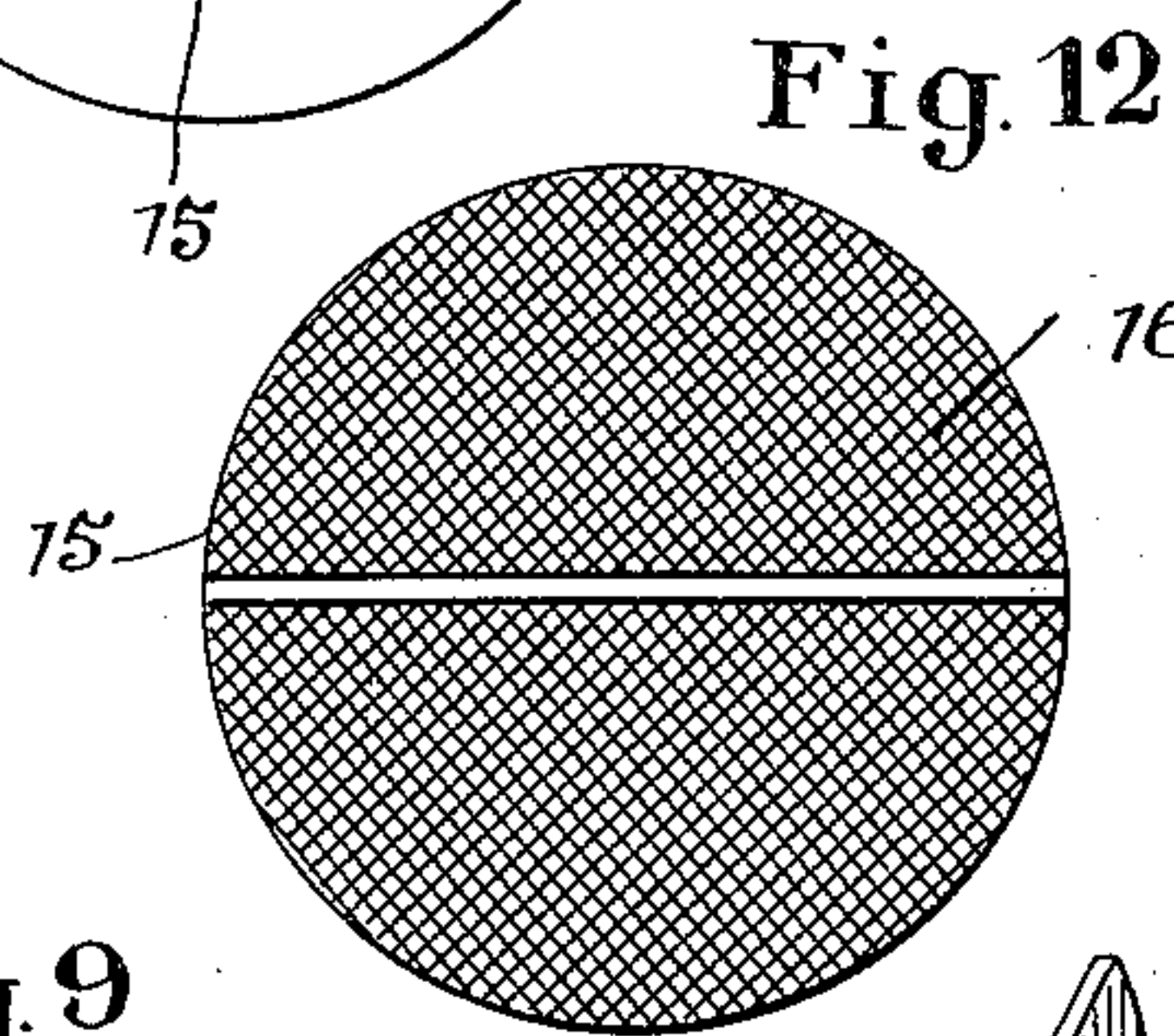
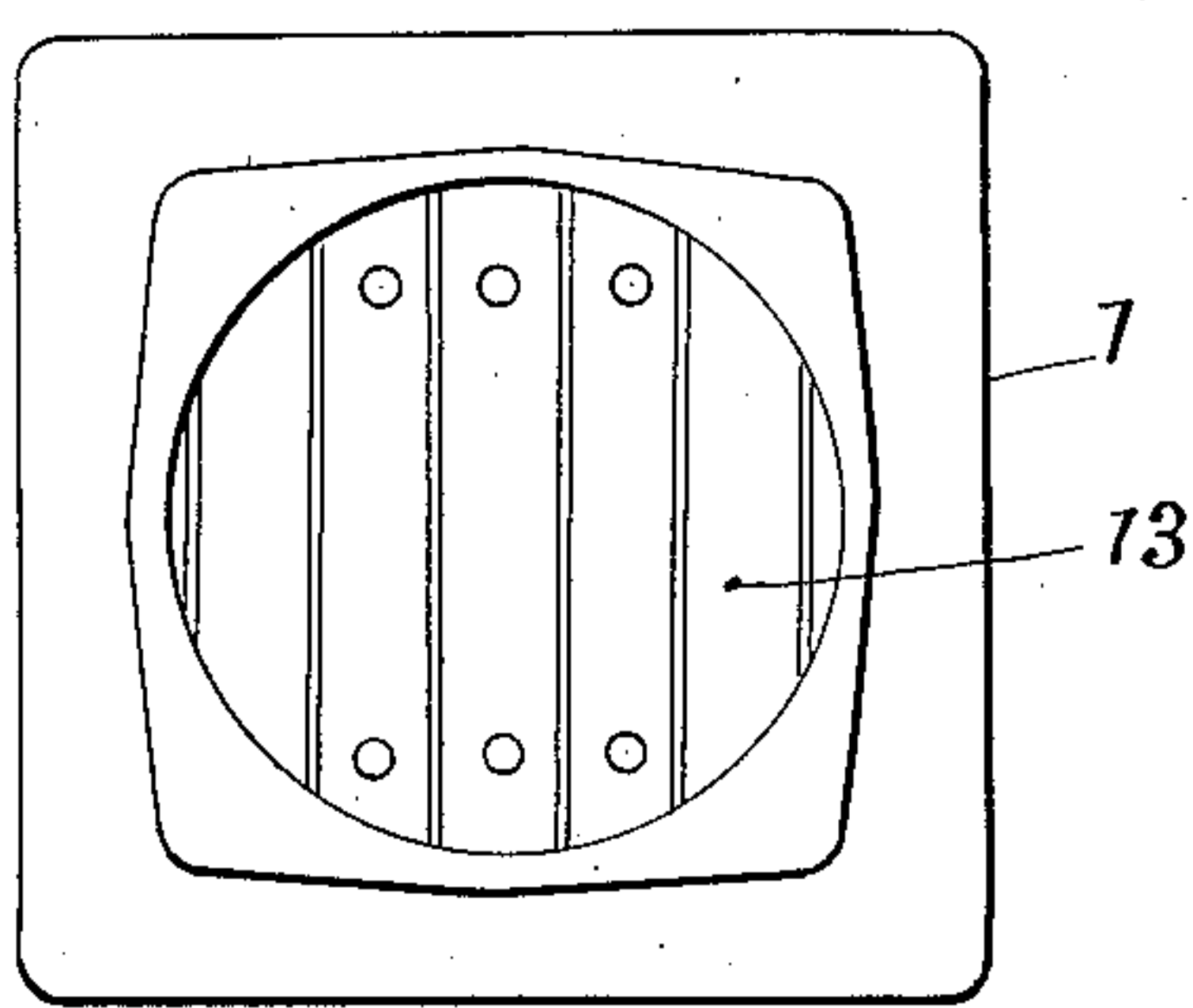
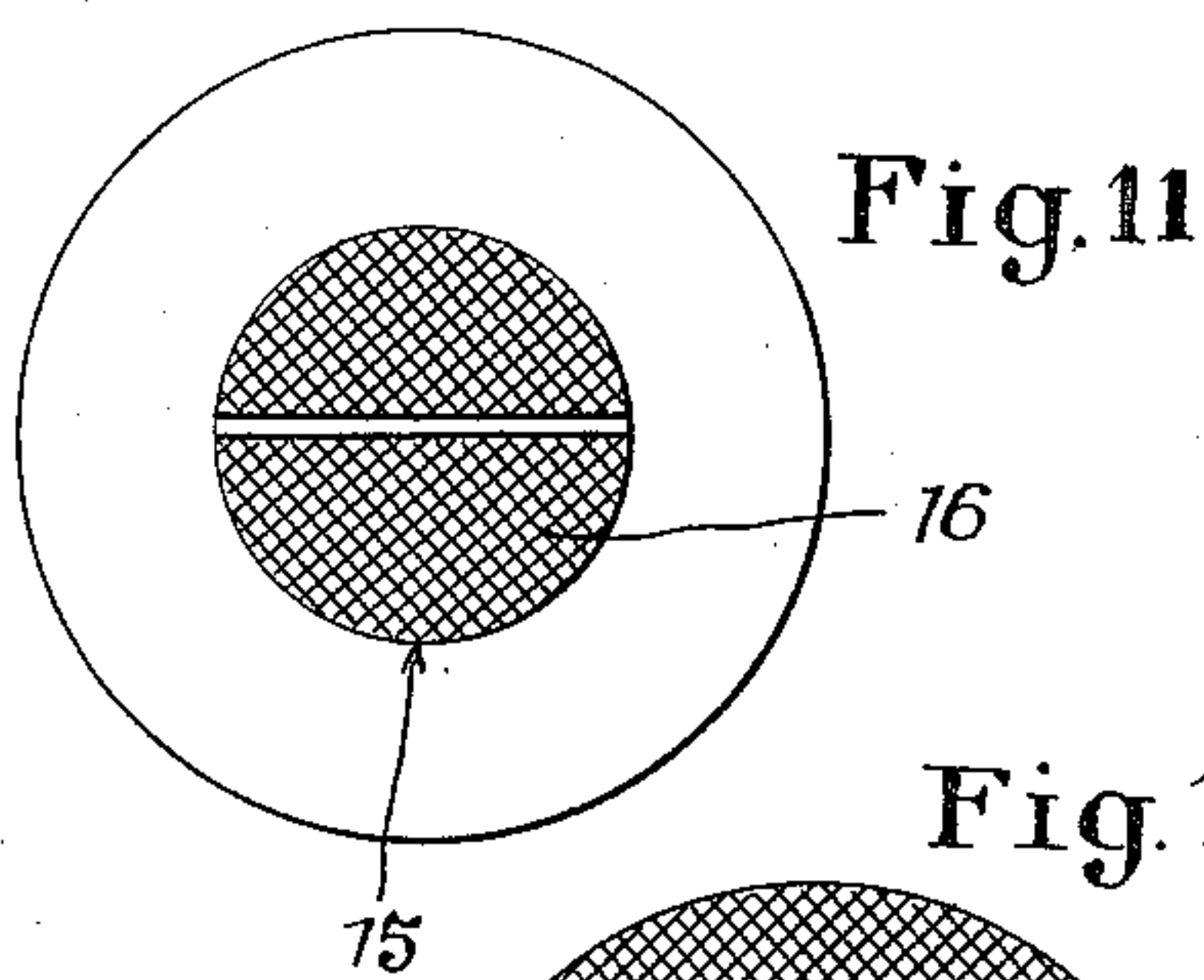
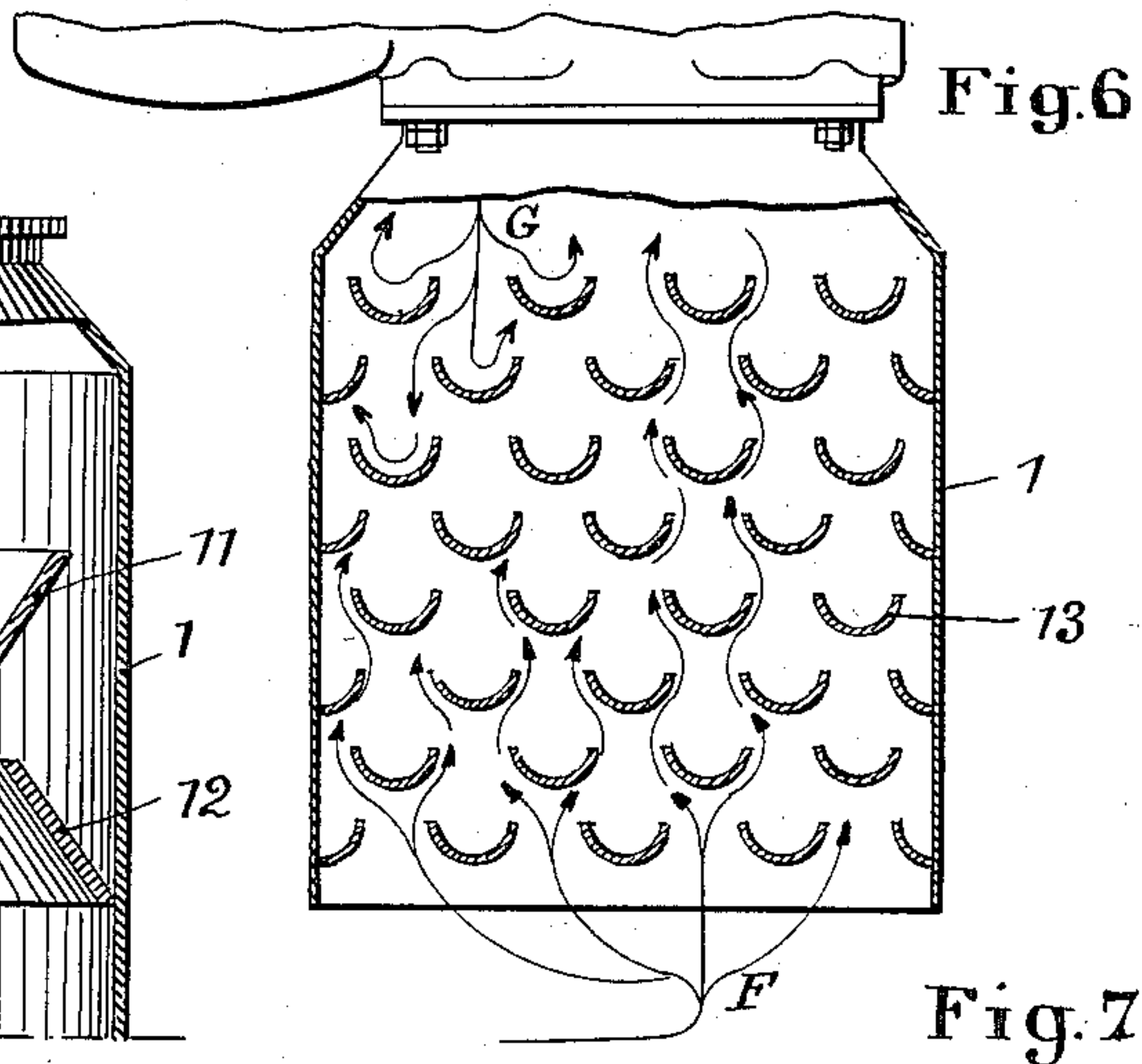
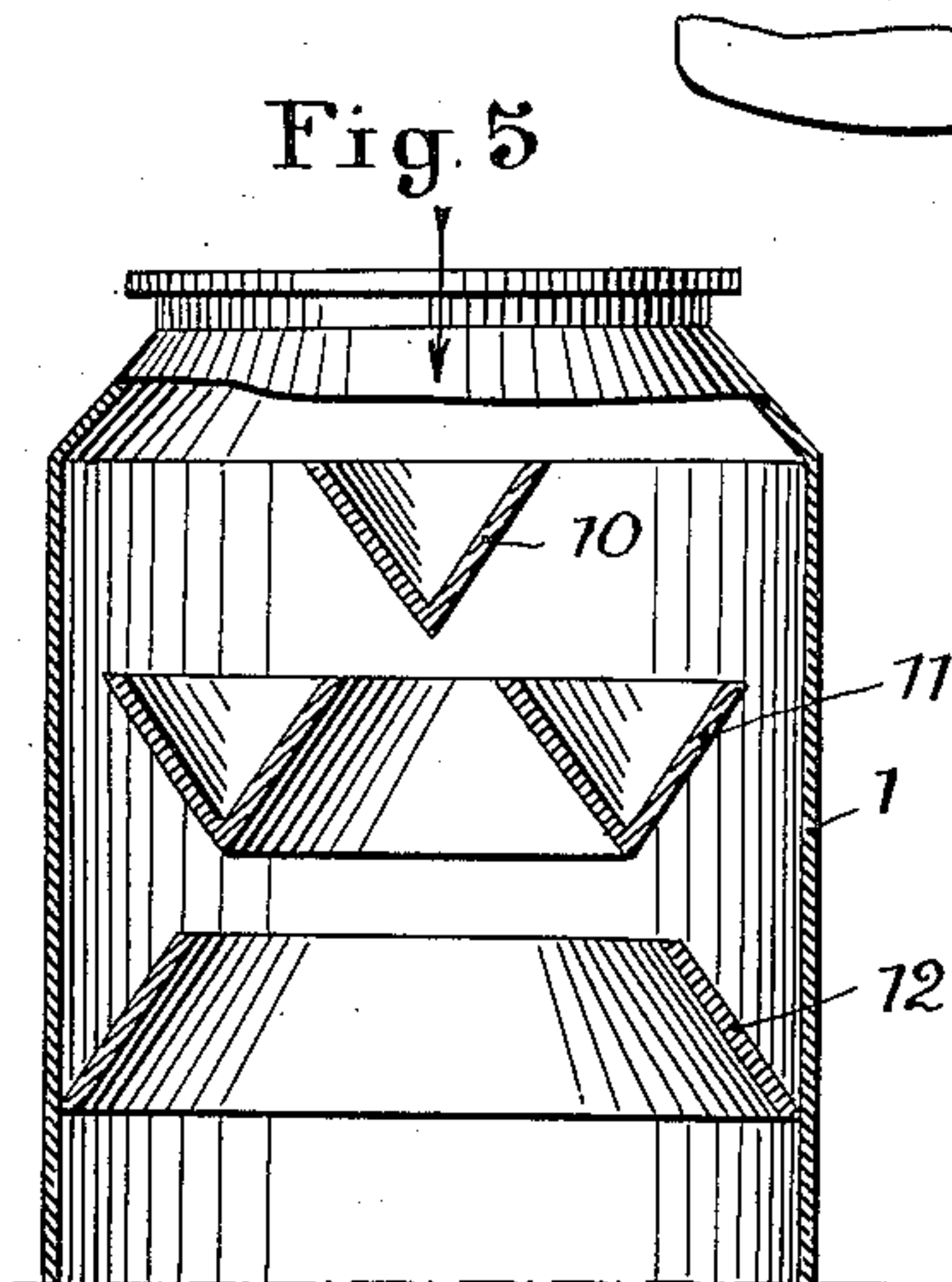
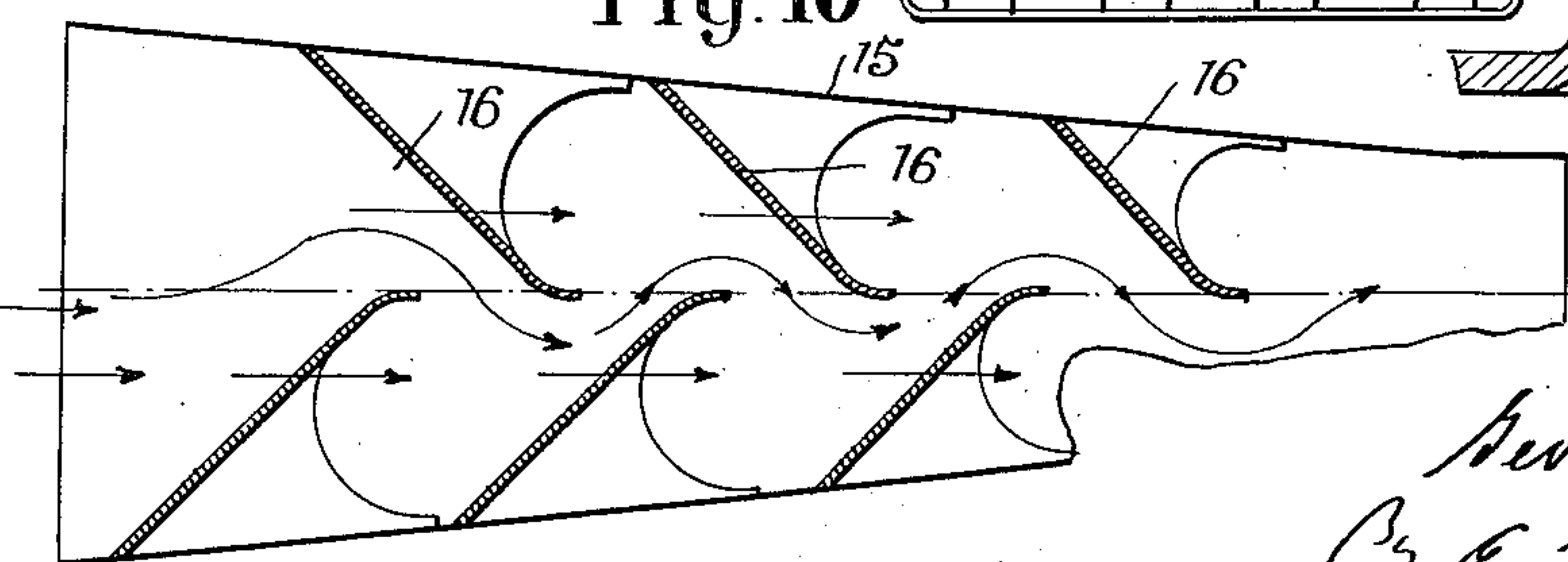
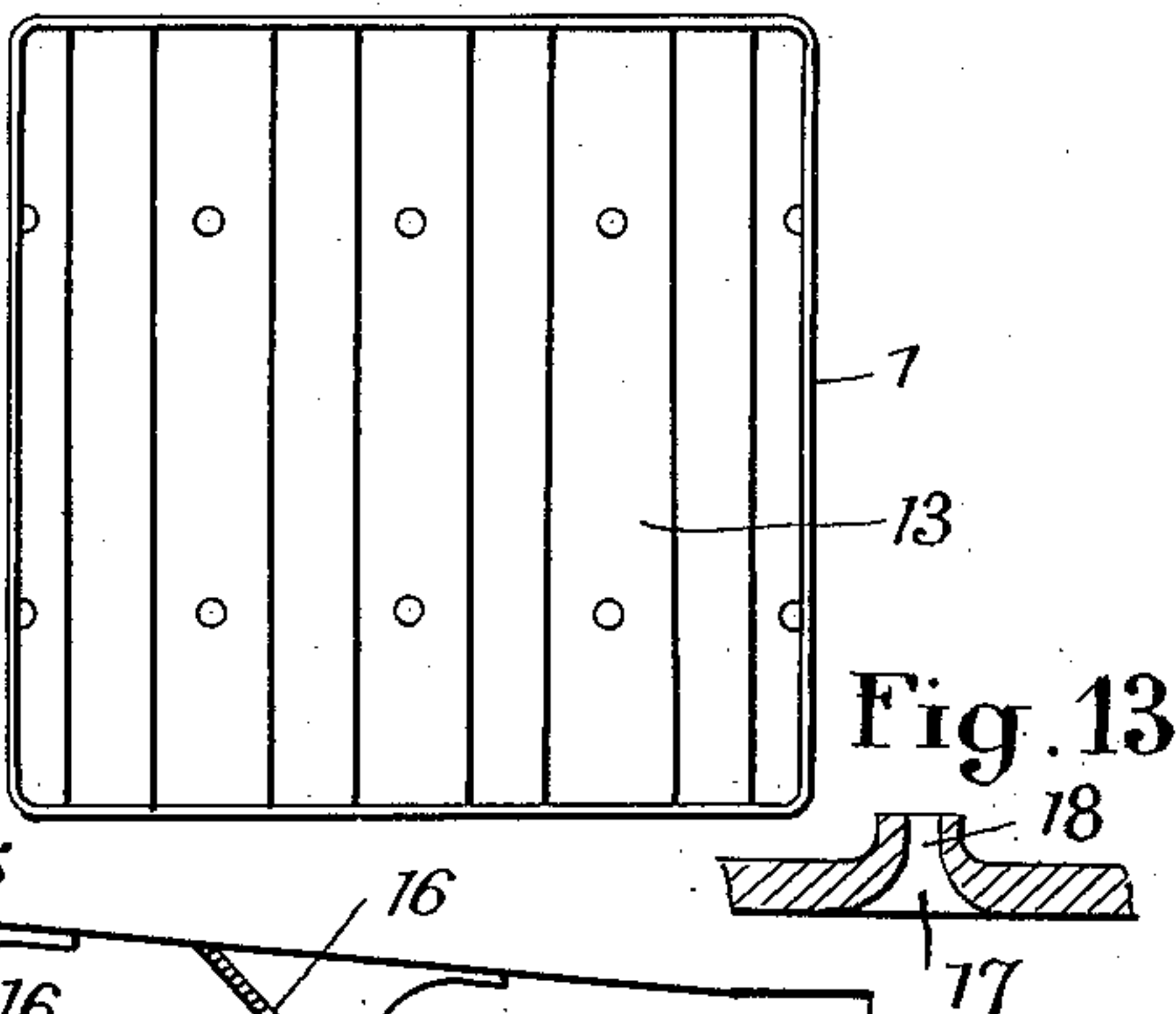


Fig. 10



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UNITED STATES PATENT OFFICE

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DEVICE PREVENTING THE BACKFIRE IN
INTERNAL COMBUSTION ENGINES

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Application September 10, 1932, Serial No. 632,616
In France October 8, 1931

1 Claim. (Cl. 123—142)

My invention relates to a device securing a convenient protection against the danger of fire which may be produced by back fires in internal combustion engines of aerial and other vehicles for any use.

It has already been proposed, in order to prevent back fires to the carburettor of internal combustion engines, to provide in the admission pipe of the motor convenient extinguishing devices which cause the burning gases to be extinguished by cooling same. It has been proposed to locate in the pipe of admission between the carburettor and the motor, baffles which are located on either side of said pipe and constitute inside said pipe true smothering devices which are in contact with the wall of said pipe and fulfill the double function of preventing the explosive wave from being propagated in its rectilinear way and of cooling burning gases in order to extinguish same. Said baffles are however separated from one another by a sufficient space for leaving a convenient sectional area for the passage of the fresh gases which feed the motor in normal operation of same. Said arrangement intended to prevent in an absolute manner the propagation of flames from the motor towards the carburettor thus securing the flight of the aircraft and, generally speaking, the normal operation of the internal combustion motors of any vehicle.

I noticed that the actual construction of carburettors, renders same sufficiently tight and sufficiently prevents said carburettors from being put in fire for instance through back fires, so that the protection of the vehicles upon which is located an internal combustion engine may be secured in a convenient manner by locating groups of baffles, not between the carburettor and air inlet, but between the carburettor and engine, thus efficiently preventing flames from going out of the air intake of the motor and thus suppressing any danger of fire caused by a back fire from the motor.

The device according to my invention thus comprises in combination with an admission collector or pipe provided with an air intake for internal combustion engines, baffles or groups of baffles in convenient contact with the wall of said intake or pipe constituting with said wall pockets or receptacles turned towards the motor between the carburettor and engine and the free ends of which join or cover each other in axial projection, said baffles being separated by sufficient intervals for securing in any condition the feeding in air of the motor without any danger of obstruction by freezing with a view thus to

secure the normal feeding of the motor in any condition of operation, while efficiently preventing the propagation outside of the vehicle of flames which could bring dangers of fire.

In the accompanying drawings which show by way of example preferred embodiments of devices according to my invention:—

Fig. 1 is a side view with parts in section of a first constructional form diagrammatically shown of a device securing the safety of aircraft during their flight against back fire.

Fig. 2 shows a modification of Fig. 1,

Fig. 3 shows by way of example a manner of securing the device upon an aircraft motor,

Fig. 4 is a diagrammatical view of a modification of Fig. 2,

Fig. 5 shows a modification of Fig. 1,

Fig. 6 shows a modification of Fig. 5, in which the pockets have a curved cross section,

Figs. 7 and 8 are views of the admission pipe of Fig. 6 seen from the upper end and from the lower end respectively.

Fig. 9 is a perspective view of a member of Fig. 6,

Fig. 10 is a longitudinal section of an intake pipe for aircraft,

Figs. 11 and 12 are views of Fig. 10 taken from the right end and from the left end of same respectively.

Fig. 13 shows in cross section a perforation of the baffles of Fig. 10.

In the constructional form of Fig. 1, the section of pipe 1 which is to be connected through its flange 2 with the usual intake air pipe of the carburettor not shown in the drawings, comprises baffles 3, 4, solid with the wall of said pipe 1 by being cast with the same or secured on said wall by any means. Said baffles thus produce pockets 5, 6, a wall of which is constituted for instance by the wall itself of the intake pipe 1.

In the constructional form of Fig. 2, the protecting device is constituted by lateral baffles 9 as in Fig. 1 and by means of central baffles 7.

The whole device is designed for being located as shown in Fig. 3 on the air intake of the carburettor 8, said carburettor being of any known or approved construction.

Thanks to this arrangement the air feeding of the motor which takes place in the direction of the arrows in Figs. 1 and 2, may be effected normally in all conditions of operation of the motor, the area of the cross section provided between the rows of baffles 3, 4 or 7, 9, being sufficient for securing a convenient passage of air for feeding the motor whatever may be the thickness of the

ice which may have been deposited upon said baffles 7, 9, owing to the atmospheric conditions, to the altitude of the flight or for any other reason.

Should a back fire to the carburettor take place, flames are arrested by the baffles which prevent said flames to be displaced in straight line while on another hand, the cooling of burning gases is efficiently produced by the contact, on the one hand, with the wall of the air suction pipe 1, which is in contact with the external air, and on the other hand, with the baffles which are in contact with the pipe wall at least at their ends.

Thanks to this arrangement, flames which occasionally come back from the motor are not permitted to make their escape out of the air intake pipe of the motor, so that any danger of fire of the vehicle carrying the motor is practically avoided.

The number and arrangement of baffles may be varied according to needs and according to particular circumstances of use, or according to the material of the device, said baffles being in some cases provided with perforations.

Said baffles may have a circular shape as in Fig. 6, or they may be rectilinear and provided in any desired number.

In order to reduce the dimension of the individual baffles it is possible, as shown in Fig. 2, to reduce the protruding of lateral baffles 9 by providing in the centre part of the pipe divided baffles, as shown in 7¹ in Fig. 4, the arrangement of the whole device being of course appropriate to any particular requirements.

In the constructional form of Fig. 5, pipe 1 contains baffles 10, 11, 12, which are concentric with the wall of pipe 1, said baffles conveniently protruding upon each other, so that if pipe 1 is looked at from one of its ends, all visual rays parallel to the axis of said pipe 1 are met with one or the other of baffles 10, 11, 12. This arrangement thus constitutes an efficient obstacle for the burning gases which happen to come back from the motor and which try to make their escape outside along the direction shown by the arrow in Fig. 5.

As clearly seen in said Fig. 5, the several baffles 10, 11, 12 are located a convenient distance apart for providing between said baffles a cross section area sufficient for the passage of the air feeding the motor even when deposits of ice have taken place upon said baffles.

An efficient protection against fire caused by back fires from the motor, is thus realized while on another hand this arrangement avoids too small cross section areas which would run the risk of being obturated by ice.

Baffles may offer any desired arrangement and be provided in any number for preventing the passage of burning gases coming from the motor while securing in any event the air feeding of the motor.

In Fig. 6 in which the number of baffles has been increased in order to reduce the weight and dimensions of every baffle, pipe 1 shows a rectangular cross section as shown in Figs. 3 and 4, in order to render the construction easier and baffles are constituted by kinds of half cylindrical gutters 13 which are each constituted as shown

in Fig. 9, by a half cylindrical tube provided at its ends with flanges 14 for securing said baffles inside pipe 1. Said flanges 14 may be secured upon the walls of pipe 1 for instance by riveting, soldering or otherwise thus securing an intimate contact of the ends of said baffles 13 with the walls of pipe 1.

Thanks to this arrangement, it is seen, as shown by arrows F of Fig. 6, that the admission of air is effected by a sinuous course between the several baffles 13 which are located apart a sufficient distance for securing the passage of a sufficient quantity of air even after a deposit of ice.

Arrow G show that, on the contrary, flames coming from the motor are prevented from flowing, said flames being arrested by the concave face of baffles 13 which efficiently prevent said flames from going out of pipe 1.

In the constructional arrangement of Figs. 10 to 12, the air intake pipe 15 which is to be directly located inside an aeroplane during the construction of same, directly receives baffles 16 which are partially protruding upon each other, as shown in Fig. 10, said baffles being constituted by plates which may be either solid or foraminated or which may be also constituted by groups of blades conveniently secured together, or by means of superimposed wire gauze.

In these several constructional forms, the perforations which are provided in the several baffles, could be preferably obtained as shown in Fig. 9, every perforation having a wide base 17 turned towards the arrival of air, followed by a narrowing chimney 18 which is obtained by a kind of stamping of the material of said baffle. Every chimney may have smooth edges as in Fig. 13, or said edges may be roughened or conveniently cut or even having fins of any desired direction.

The passage of gases in the reverse direction of arrows in Fig. 10, will be prevented as long as said gases will be burning, said gases being cooled and extinguished during their passage through said baffles.

Pipe 15 of Fig. 10 may have frustoconical shape as shown in this figure, or it may have a cylindrical shape, the cross section of said pipe being either circular, square, polygonal or having any other shape.

The several air feeding pipes such as 15, may of course have any orientation or direction, said pipes being either vertical, inclined or even horizontal or having an inclination from their upper to their lower end.

In the several forms of construction, the baffles may either be solid with the pipe which contains same or be secured inside side pipe by autogen soldering, rivetting or otherwise.

My invention applies for preventing danger of fire due to back fires of internal combustion engines, more particularly when said motors are located on any vehicle.

What I claim is:—

In an internal combustion engine, an intake pipe for feeding the motor, transversal rectilinear gutters located in said pipe, every gutter being semi-cylindrical in shape, said baffles being staggered thus preventing the back fires while allowing the free passage of fresh air.

GEORGES EYSSARTIER.