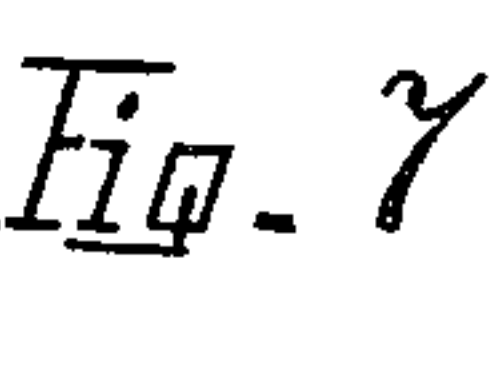
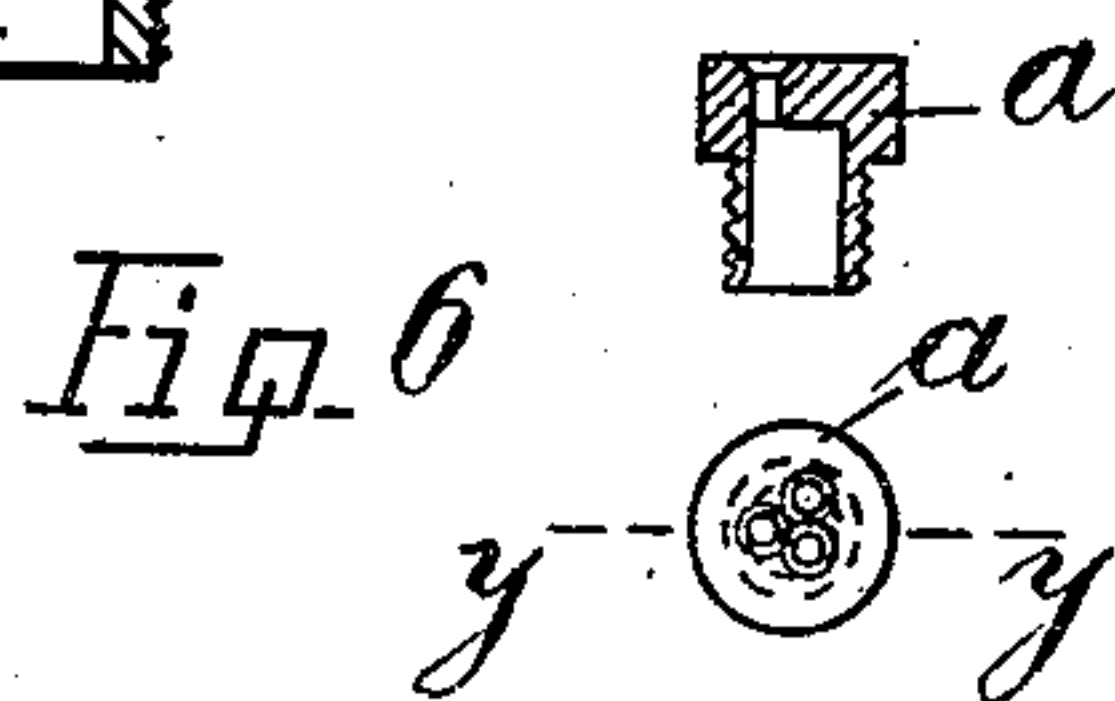
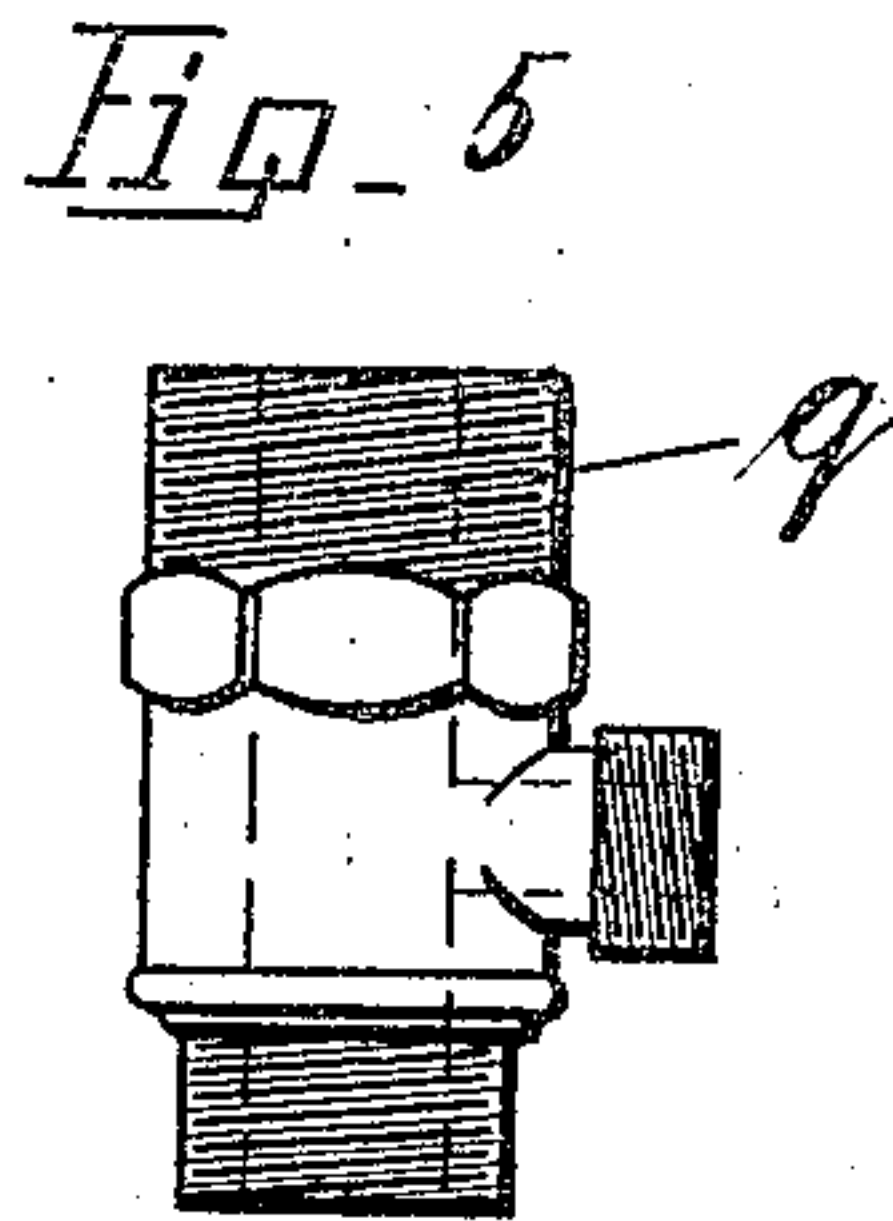
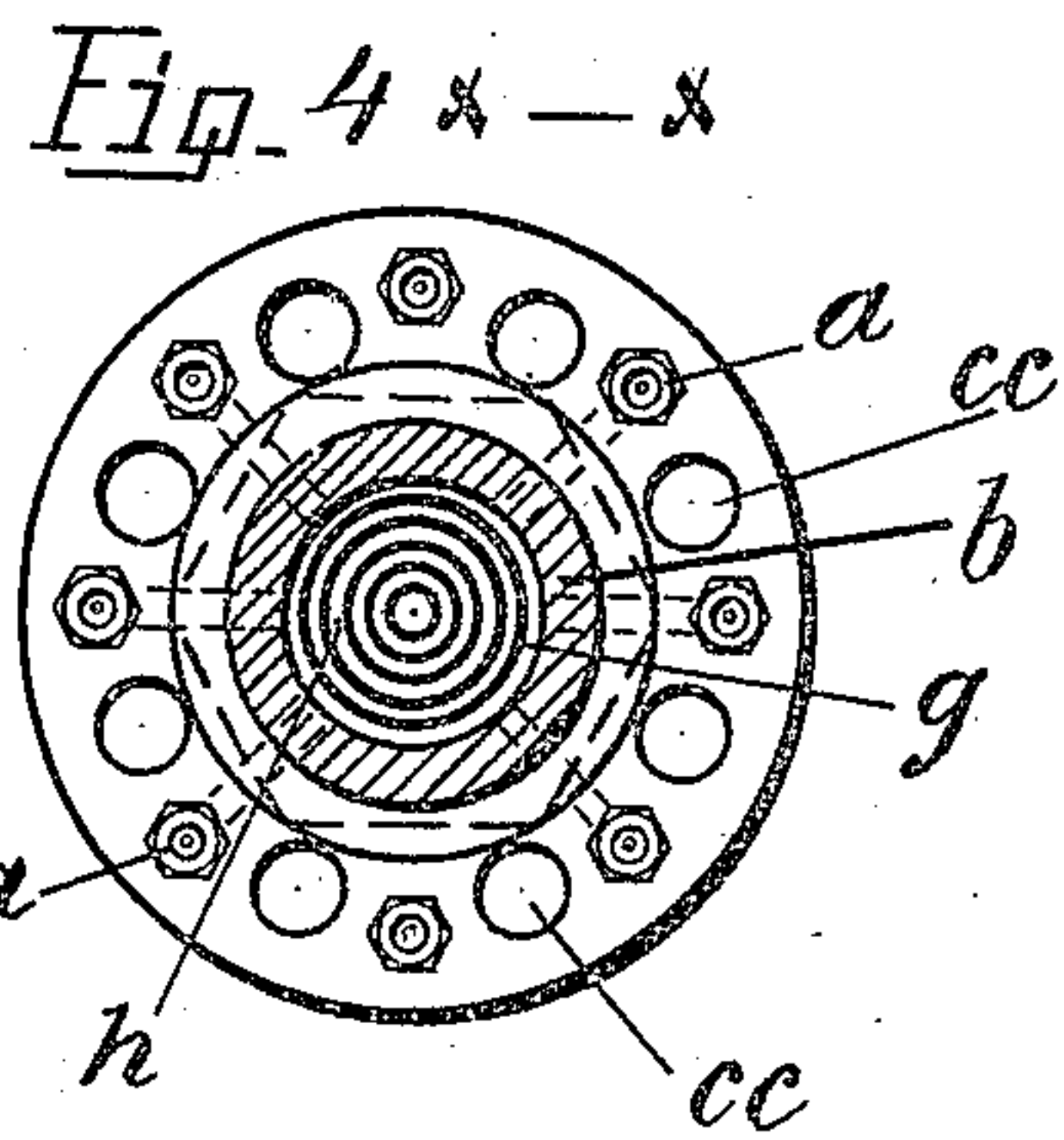
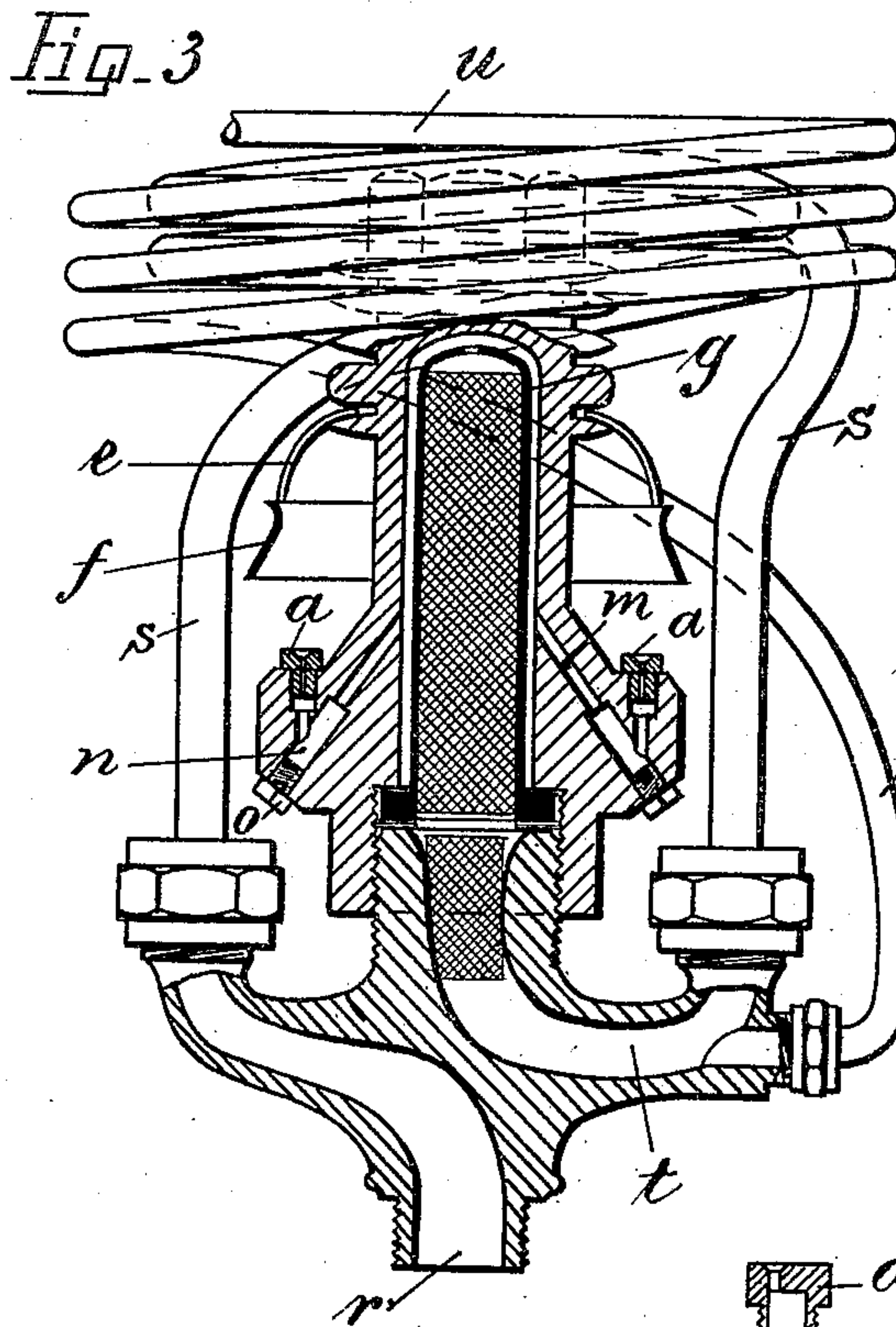
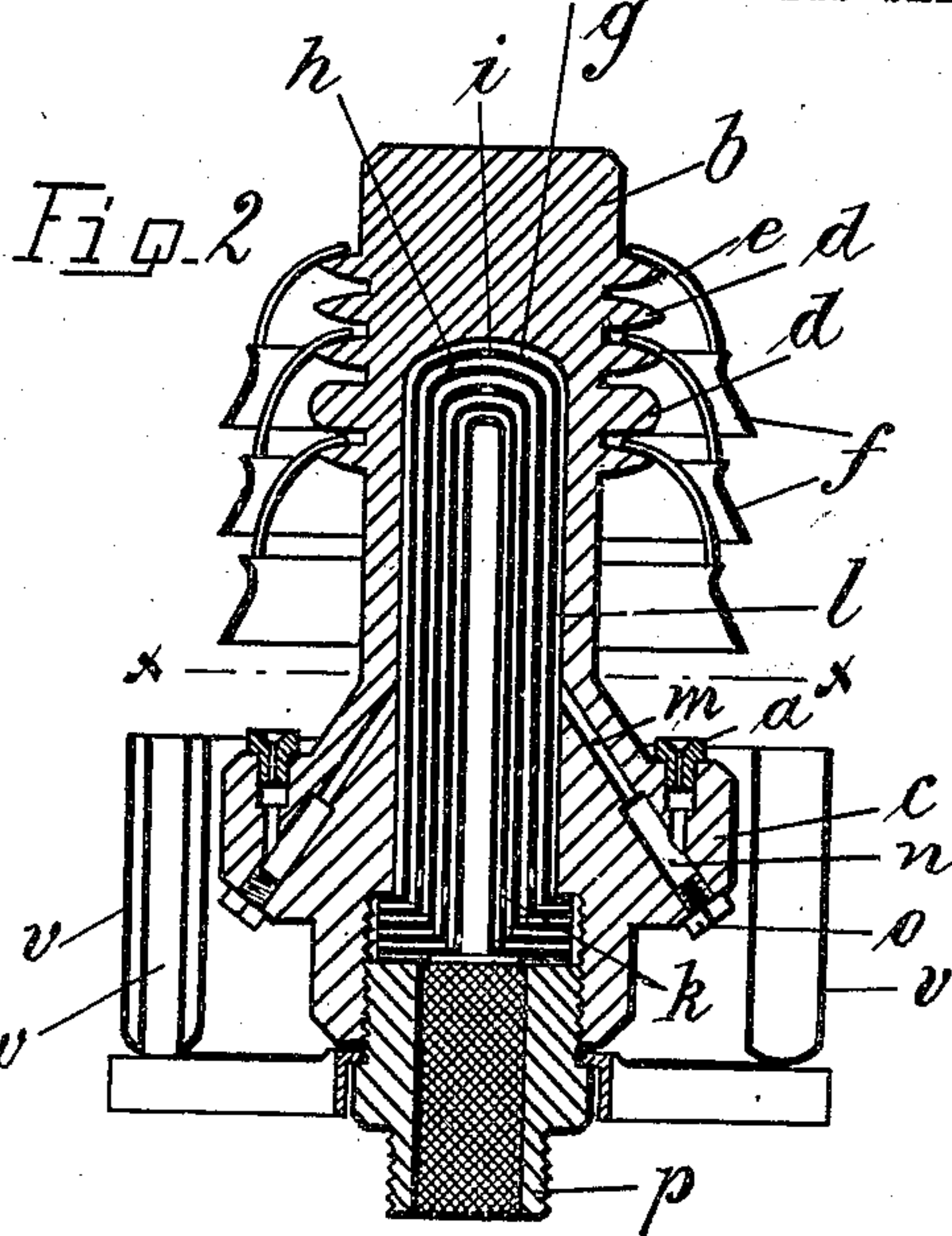
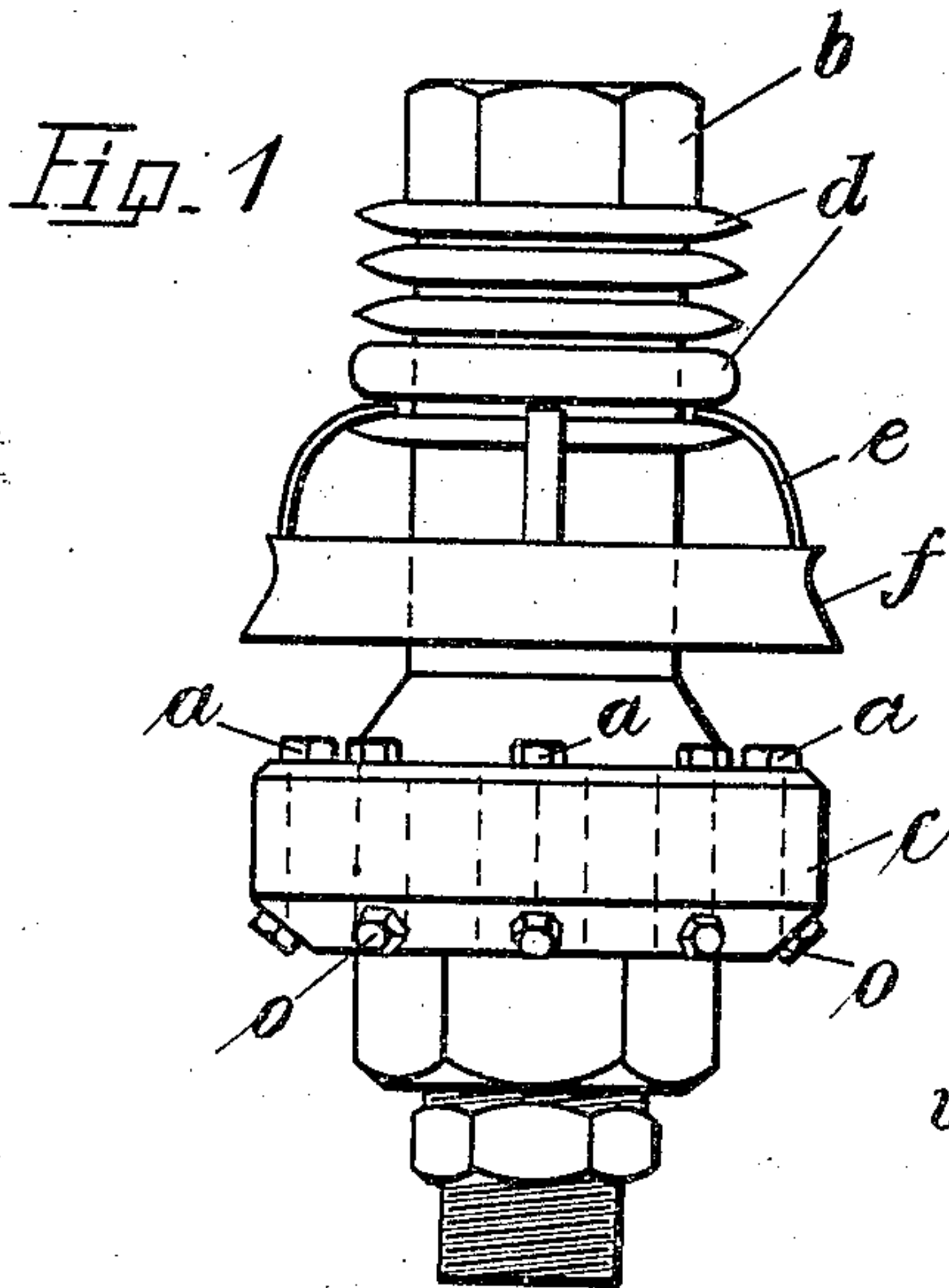


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HYDROCARBON BURNER.
APPLICATION FILED JULY 13, 1908.

933,853.

Patented Sept. 14, 1909.

2 SHEETS—SHEET 1.



Witnesses:
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2 SHEETS—SHEET 2.

Fig. 8

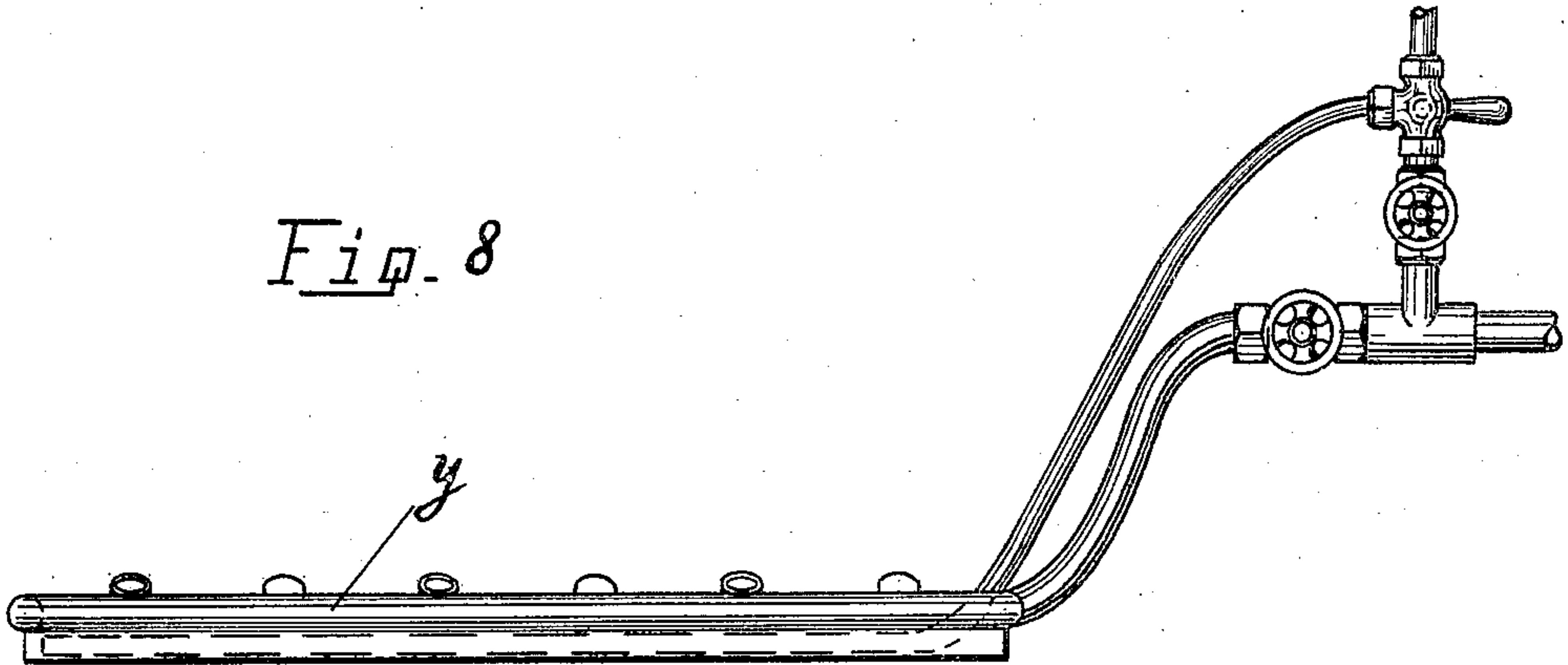


Fig. 9

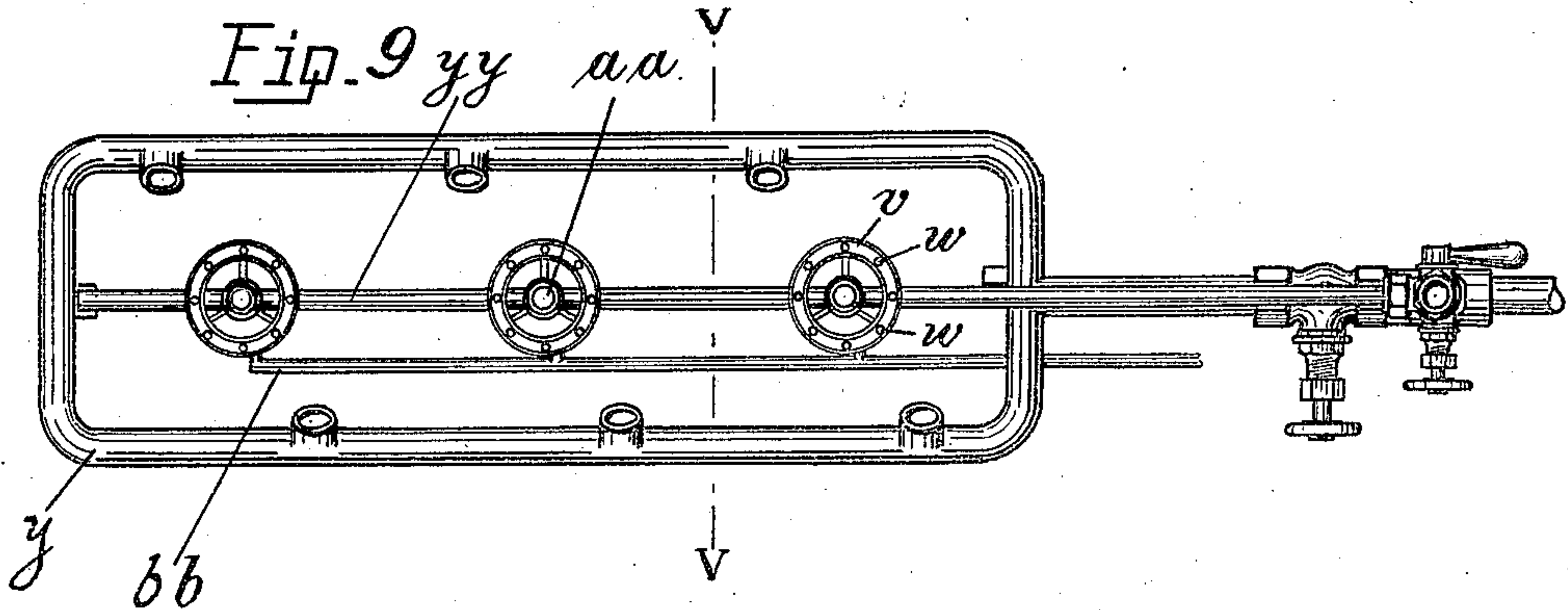
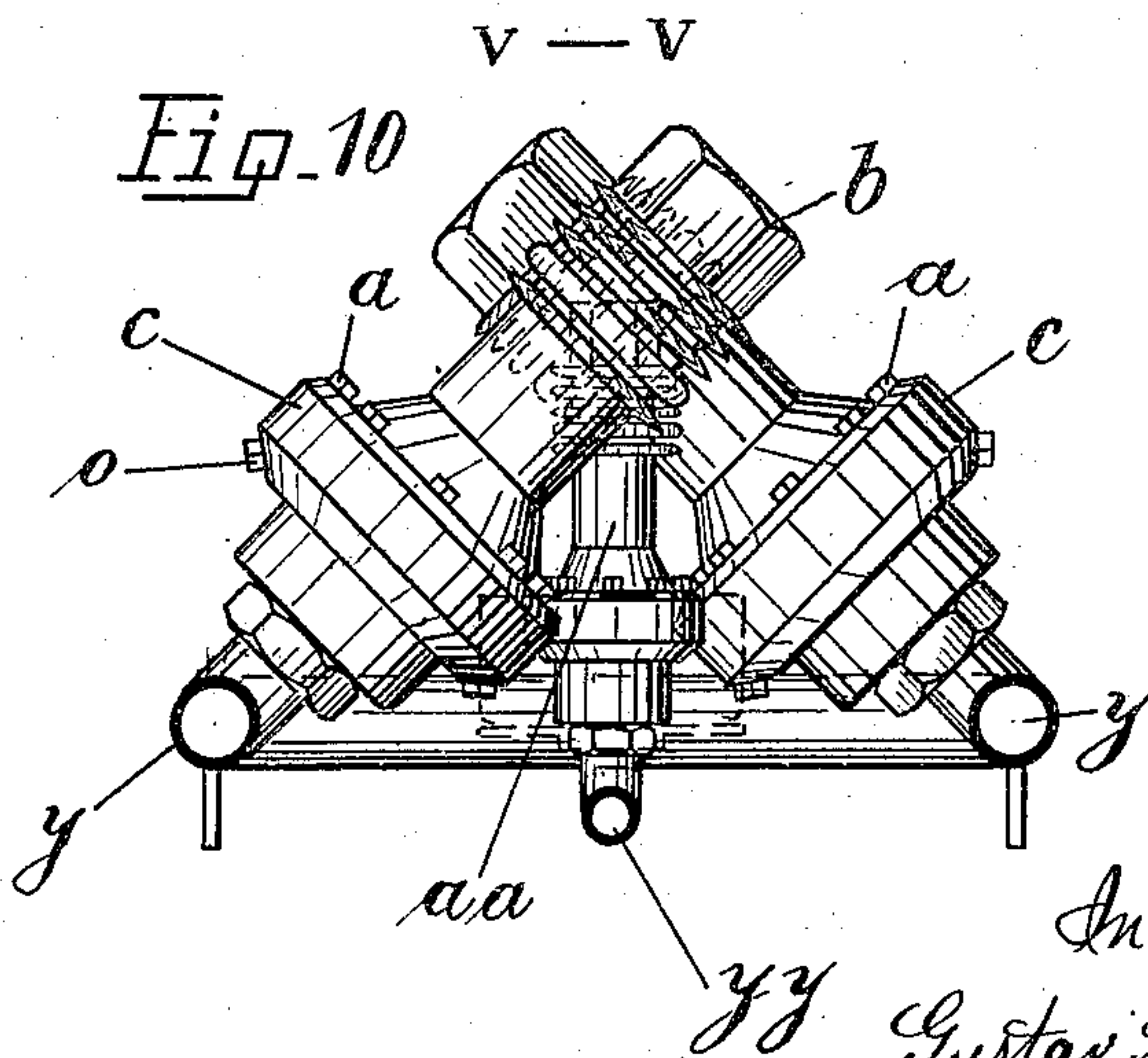


Fig. 10



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UNITED STATES PATENT OFFICE.

GUSTAV ADOLF SCHÖCHE, OF DRESDEN, GERMANY.

HYDROCARBON-BURNER.

933,853.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed July 13, 1908. Serial No. 443,387.

To all whom it may concern:

Be it known that I, GUSTAV ADOLF SCHÖCHE, a subject of the King of Saxony, residing at 2 Kasomenstrasse, in the city of Dresden and Empire of Germany, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

This invention has relation to certain new and useful improvements in hydrocarbon-burners in which petroleum, spirit, benzin and the like are first converted into vapor and thereupon mixed with atmospheric air, oxygen or other suitable gases to produce a very high temperature; and the invention consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the accompanying claims.

In the various hydrocarbon-burners hitherto existing, difficulties are met with by reason of imperfect vaporization, which results in volumes of thick smoke being given off and which of themselves greatly militate against the calorific effect of the burner. A further defect in existing burners of this class is that they are unsuitable for heating large surfaces, such as steam boilers, and seldom have proper provision for effective and easy cleaning when they become clogged, few are interchangeable and most of them, even when effective, have the vaporizing contrivance placed outside the burner in such manner as to be in the path of the flames produced, whereby these are obstructed in their course. For this reason the vaporizer is not infrequently a source of great danger inasmuch as the thin metal of which it is composed is liable to melt, whereby the liquid fuel escapes into the fire chamber.

The object of the present invention is to provide a burner which is self contained, has no weak outside points in its construction, admits of being made small enough for lighting purposes as also for heating small surfaces, such as a heater for baths and can be made large enough to produce the steam required to drive a small engine.

A further object is to provide a burner which can be employed in a series to heat boilers with the largest heating surfaces at present known, and which, when properly provided with that number of vaporizing units requisite for the size of the burner and the fuel employed, the vaporization will be perfect and no smoke generated, even when the liquid fuel is partly cut off dur-

ing that time when the full pressure of steam is not required.

A still further object is to provide a burner constructed in such manner as to allow of atmospheric air, oxygen or other gases of high calorific effect being intimately mixed with the vapor produced by the vaporizer, so that a flame of dimensions hitherto unknown in such burners may be produced, with a heating power equal to that produced in chemical laboratories by the employment of chemicals and appliances too costly for ordinary heating and lighting purposes.

A still further object of the invention is to provide a device of novel construction to easily ignite the burner and start the process of vaporization simultaneously.

These objects are attained by the arrangement illustrated in the accompanying drawings, and now to be described.

Referring to the accompanying drawings: Figure 1 is an elevation of the burner, Fig. 2 is a vertical section through the center of the same, also showing the igniting device, Fig. 3 is a vertical section through the center of the burner, showing an alternative form of construction for heating the air and hydrocarbon fuel, and conducting them in a heated condition to the interior of the burner, Fig. 4 is a sectional plan on the line X X of Fig. 2, Fig. 5 is a feed-union employed when it is required to feed to the burner atmospheric air, oxygen or other suitable gas in a quantity suitable to the position of any unit in a plurality of burners, Fig. 6 is a vertical section on the line y y of Fig. 7 and Fig. 7 is a plan view of one of the perforated burner heads or jets as shown in Figs. 1, 2, 3 and 4; Fig. 8 is a side view of a plurality of burners mounted on one feed pipe graduated in size and provided with an igniting device composed of smaller burners mounted on a separate single pipe, Fig. 9 is a plan view of the same, Fig. 10 is an enlarged detailed sectional view on the line V V of Fig. 9 showing the principal burners inclined toward each other to economize space, and also showing one ignition burner heating two large burners.

In the drawings in which like letters indicate similar parts in the several views, *a* designates jets having perforated heads illustrated in detail in Figs. 6 and 7, the number and size of said perforations being adapted to the size of the burner; *b* is the body of

the burner having an annular enlargement *c* near its base and rings *d*, on the upper part, provided for the double purpose of deflecting the flame and retaining the heat and supplemented by the deflectors *f*, depending from the rings *d* by means of the spiders *e*. Within the body *b* are a plurality of thimbles *g* with intermediate spaces *h*, having the apertures *i* at the top of alternate thimbles, and apertures *k* at the bottom of alternate thimbles, the apertures of the outermost and innermost thimbles being at the top. The aperture *i* of the outermost thimble connects with the chamber *l* surrounding said thimble, and said chamber *l* is connected by a plurality of canals *m* with the jets *a*, said canals *m* terminating in sacks *n* underneath the jets *a* said sacks *n* being adapted to receive particles of foreign substances which do not vaporize, said sacks being closed by plugs *o* which can be removed for cleaning. The annular enlargement *c* contains a plurality of jets *a* and also a plurality of apertures *cc*, preferably arranged so that jets and apertures alternate. The apertures or air passages *cc* have no connection with any part of the apparatus, but serve to conduct air to the flame, to increase the draft and support combustion. In Fig. 3 only one thimble *g* is shown, the interior thimbles being replaced by a filter of wire gauze, but it is obvious that the plurality of thimbles shown in Fig. 2 may be also used with or without the gauze filter. The union *p* shown in Fig. 2 may be replaced by the feed union *q* shown in Fig. 5, when it is desired to mingle air, oxygen or other suitable gas with the hydrocarbon fuel before it enters the innermost thimble *g*.

In the alternative construction shown in Fig. 3, the oil enters the double feed union at *r*, passes through the pipes *s* until it reaches the passage *t*, and the air enters the pipe *u* passing into the same passage *t*, where the heated fuel and air commingle, and pass upward into the interior of the burner.

In Fig. 2 is shown the annular igniting device *v*, which is so placed that its upper part, which is open, is near the level of the jets *a* and contains a plurality of air passages *w*, as fully illustrated in Fig. 9.

In using my burner in series for the purpose of heating large surfaces, I employ one or more feed pipes and arrange the burners so that the first burner to be fed is the smallest and has the finest apertures throughout, including the perforations of the burner heads or jets *a*, said apertures increasing in size with each succeeding burner along the course of the said feed pipe or pipes *y*. The ignition burners *aa* are placed on and fed by a smaller feed pipe *yy*. In using a series of burners I employ a small feed pipe *bb* to conveniently convey to the annular cup-shaped ignition device *v* mounted on each

of the ignition burners *aa* the alcohol or other fuel requisite for the initial ignition.

The operation is as follows: Oil under pressure and air are fed to the vaporizer through the union *p* or *q* entering the inner thimble and passing out at the top of said thimble through aperture *i*, enters the space *h* between said thimble and the next outer one. The mixture then passes through the apertures provided at the base of the last mentioned thimble and so on into each succeeding space and thimble, passing out of the outermost thimble through the aperture *i* at the top of the same. The mixture, now highly vaporized and the air being intimately commingled with the hydrocarbon-vapor, passes down the annular spaces between the outermost thimble and the body *b* into the slantingly bored canals *m*, to the jets *a* where it ignites and burns in an intense blue flame, which impinges against the deflectors *f* and *d*.

In the alternative construction shown in Fig. 3 the hydrocarbon and air are heated previous to being conveyed to the interior of the burner by passing them through the pipes *s* and *u* respectively, which coil around the flame and it will therefore be seen that, in this form, the deflectors *f* may be dispensed with, if it is so desired, inasmuch as the pipe coils *s* and *u* will perform practically the same function.

The operation of the burners when used in series is as follows: Alcohol is fed in a sufficient quantity through the pipe *bb* to the cup-shaped igniting device *v* placed on the smaller burners *aa* which are fed by the pipe *yy*. A light is applied to each of the igniting devices *v* and, as soon as the alcohol has heated the burners *aa* sufficiently, oil is admitted into the pipe *yy*, which causes the burners *aa* to ignite and perform their function of heating the larger burners *b* sufficiently to allow of fuel being admitted to the pipe *y* to feed the said larger burners *b*. When the said larger burners are in use, the smaller ones may be cut off by turning off the supply of fuel to the pipes *yy*, or they may be allowed to burn to supplement the larger burners if desired. The smaller burners *aa* also serve the purpose of furnishing sufficient heat to keep up a small head of steam during intervals when high pressure is not required.

Having described this invention, what I claim as new, and desire to secure by Letters Patent is—

1. A vapor burner comprising an igniter having an annular receptacle penetrated by a plurality of air holes, said igniter surrounding a hollow body containing a plurality of superimposed thimbles having apertures alternately at top and bottom, a plurality of individual passages from the outer thimble to an equal number of jets or

burner heads arranged around said body each jet being provided with a sack and plug therefor, a plurality of air passages arranged alternately between said jets, a plurality of deflectors arranged above said jets, and means to admit the fluid to be vaporized mixed with air to the innermost thimble.

2. In a vaporizer a plurality of superimposed elongated thimble-shaped caps with passages between each and the next larger, each of said caps having an aperture, said apertures being alternately at top and bottom, means to admit the liquid to be vaporized and air, and means for heating and ignition.

3. A vapor burner comprising a body portion, having an annular enlargement adjacent its lower end, and provided therein with air openings extending transversely therethrough, and with jet openings extending partially therethrough, and alternating with said air openings, said body being provided with a filtering and mixing chamber, for the oil, and air to be vaporized, and with downwardly extending radial vapor openings passing entirely through the said annular enlargement from the said chamber, and communicating with the said jet openings of said enlargement, and removable plugs closing the outer ends of said vapor openings, substantially as described.

4. A vapor burner comprising a body portion, having an annular enlargement adjacent its lower end, provided therein with air openings extending transversely therethrough, and with jet openings extending partially therethrough, and alternating with said air openings, said body being provided with a filtering and mixing chamber for the oil and air, and with downwardly extending radial vapor openings, passing entirely through the said annular enlargement from

the said chamber, and communicating with the said jet openings of said enlargement, said vapor openings being provided with enlarged portions below said jet openings forming traps to catch unvaporized portions of the fuel, and removable plugs closing the said enlarged outer ends of said vapor openings, substantially as described.

5. A vapor burner comprising a body portion, having an annular enlargement adjacent its lower end, provided therein with air openings extending transversely therethrough, and with jet openings extending partially therethrough, and alternating with said air openings, said body being provided with a filtering and mixing chamber for the fuel, and with downwardly extending radial vapor openings passing entirely through the said annular enlargement from the said chamber, and communicating with the said jet openings of said enlargement, removable plugs closing the outer ends of said vapor openings, and an igniting device surrounding the enlargement of said body, substantially as described.

6. In a heater, a plurality of vapor burners, arranged in parallel series, inclined toward one another, a single fuel feed pipe for said burners, said burners of each series being provided with burner openings graduated to burn equally throughout the series, and a plurality of igniting burners having a separate feed, arranged in a series between the series of inclined vapor burners, to simultaneously act upon the latter, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GUSTAV ADOLF SCHÖCHE.

Witnesses:

PAUL ARRAS,
CLÄRE SIMON.