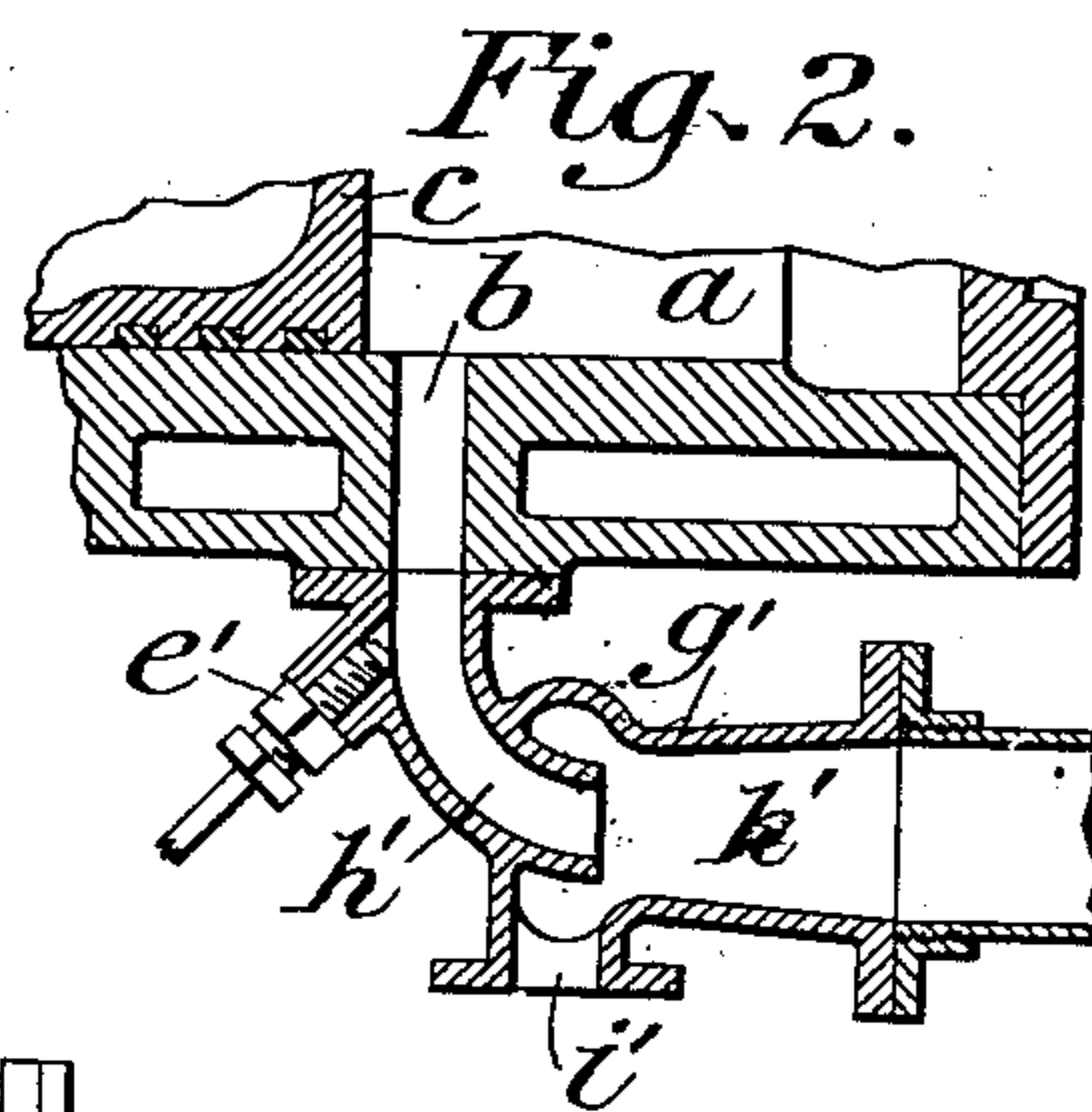
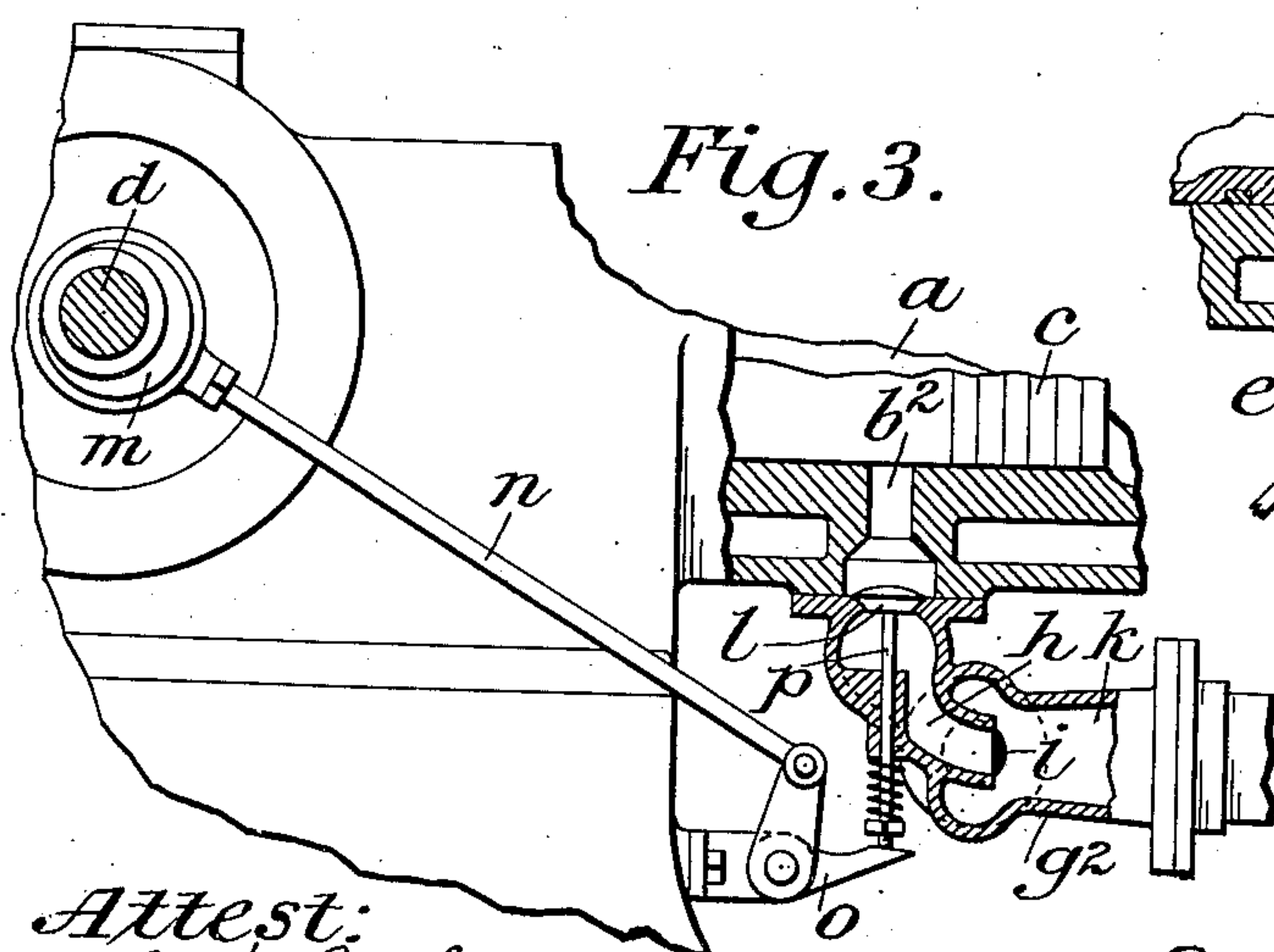
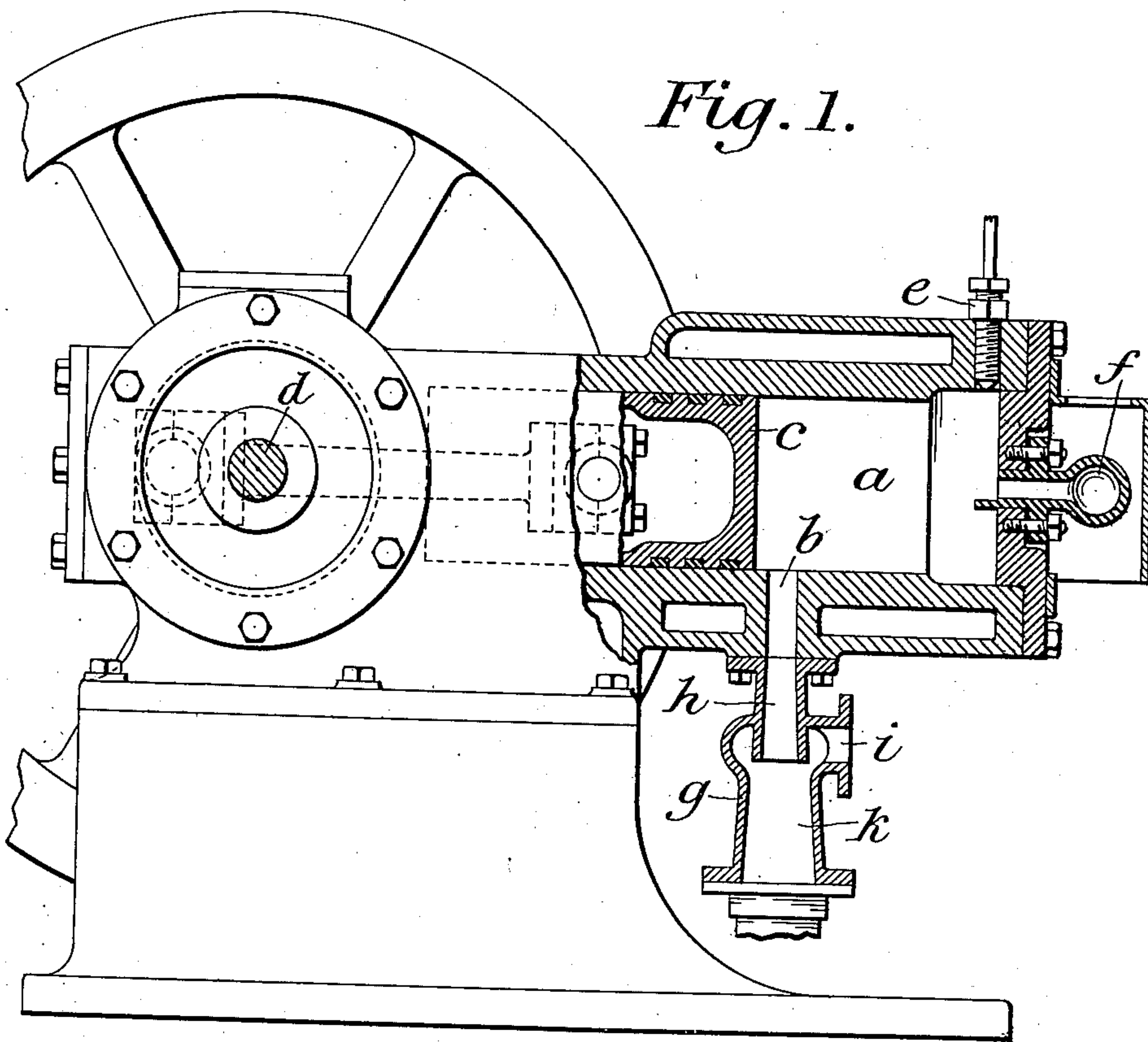


C. W. WEISS.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED MAY 12, 1908.

908,527.

Patented Jan. 5, 1909.



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UNITED STATES PATENT OFFICE.

CARL W. WEISS, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO AUGUST MIETZ, OF NEW YORK, N. Y.

INTERNAL-COMBUSTION ENGINE.

No. 908,527.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARL W. WEISS, a citizen of the United States, residing in the borough of Manhattan, in the city of New York, in the State of New York, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof.

This invention relates to the introduction into the working cylinder or explosion chamber of the air which, with the fuel, forms therein the explosive mixture and in accordance with the invention the exhaust from the cylinder or explosion chamber is made to act by induction or aspiration upon a body of fresh air so as to place the same in position to be drawn into the cylinder or explosion chamber through the exhaust opening as the pressure in the cylinder or chamber falls below atmospheric after the expulsion of the dead gases. When the exhaust port is opened, either by being uncovered by the piston in its movement or by being opened through suitable mechanism actuated from some moving part of the engine, the dead gases immediately escape with a high temperature and with such a high velocity that if the gases are directed through a suitable inductor or aspirator a flow of fresh air will be induced from a suitable air port into the continuation of the inductor or aspirator. Consequent upon the expansion which is permitted by the opening of the exhaust port, the temperature of the dead gases drops immediately and the pressure within the cylinder or chamber immediately falls below atmospheric. The body of fresh air which has been drawn into the inductor or aspirator is then immediately drawn into the cylinder or chamber to form therein, with the fuel, the fresh charge of explosive mixture. The fuel element of the charge may be introduced in any convenient and suitable manner, either with the air or independently thereof. Incidental to the introduction of the air in this manner, the number of necessary ports in the cylinder is reduced to one and, furthermore, the noise of the exhaust is largely reduced.

It will be obvious that the form of the devices employed for the introduction of the air in the manner described may be varied and that such devices may also be connected

differently to the cylinder or chamber, all as may be rendered desirable by the particular conditions of use.

In the accompanying drawing there are shown, for purposes of illustration and explanation of the nature of the invention, several embodiments of the invention which are found to operate satisfactorily in actual use.

In the drawing—Figure 1 is a view, partly in elevation and partly in longitudinal central section, of an internal combustion engine of a well known type to which one form of the invention is applied. Fig. 2 is a detail view in section, illustrating a different form of the inductor. Fig. 3 is a detail view, partly in section and partly in elevation, illustrating the application of the invention to an engine in which the exhaust port is opened through mechanical devices actuated from the crank shaft of the engine.

In the embodiment of the invention, illustrated in Fig. 1, the cylinder *a* is shown as provided with a single port *b*, which is both the exhaust port and the port for the introduction of the air and is uncovered by the piston *c* as the latter approaches the limit of its forward stroke. The piston *c* may be connected as usual to the crank shaft *d*. A fuel inlet, which may be of any usual or suitable character, is shown at *e* as located near the head of the cylinder, and there is also shown an igniter *f*, which likewise may be of any usual or suitable character. Connected with the exhaust port *b* is an inductor or aspirator *g* which preferably comprises an expanding nozzle *h*, whereby the pressure of the escaping gases is converted into velocity, as is well understood, and with an air inlet port *i* which is properly located with respect to the nozzle *h* so that the escape of the gases through the nozzle *h* produces an aspirating effect or induces a flow of air inward through the air port *i* into the extension *k* of the aspirator or inductor.

It will be understood that, in the operation of the engine, as soon as the port is uncovered by the piston *c* as the latter approaches the limit of its forward stroke, the dead gases, which are then at a high temperature and under great pressure, escape with considerable velocity. The escaping gases cause an inflow of air through the air inlet *i* so that the extension *k* of the inductor is practically filled with pure air as soon as

the escaping gases lose their great velocity. The expansion of the gases when released brings about a great reduction of temperature and therefore of pressure of the gases within the cylinder, so that the pressure in the cylinder falls below atmospheric and therefore the fresh air which fills the extension k is sucked into the cylinder before the port b is closed by the rearward movement of the piston. The air which is thus sucked into the cylinder mingles with the fuel element of the charge to form an explosive mixture in the usual manner and the fresh charge thus formed in the cylinder is compressed by the backward movement of the piston in the usual manner.

In Fig. 2 of the drawing the aspirator or inductor g' , provided as before with a nozzle h' , an air inlet i' and an extension k' , is slightly different in form from that shown in Fig. 1 so as to provide for a discharge of the gases in a different direction, and in this construction the inlet e' for the fuel element is shown as located in the nozzle h' , so that the fuel element is carried into the cylinder with the air.

In the construction shown in Fig. 3, the inductor or aspirator g^2 is substantially the same in form and details of construction as that shown in Fig. 2, but the exhaust port b^2 , in this instance, is shown as located near the head end of the cylinder and as controlled by a valve l which is actuated, to open the port, at the proper time from some convenient moving part of the engine, as

from an eccentric m on the engine shaft d , through an eccentric rod n and a bell crank o which acts directly upon the stem p of the valve. Any other well known or suitable mechanism for actuating the valve might be used.

It is evident that the invention might be embodied in various forms of apparatus suited to the requirements of different engines and that it is not to be limited to the particular constructions shown and described herein or any of them.

I claim as my invention:

1. An internal combustion engine having an air inductor applied to the exhaust port, whereby the escaping exhaust gases induce the flow of a body of air which is drawn into the cylinder or chamber through the exhaust port as the pressure therein falls.

2. In an internal combustion engine, the combination with a cylinder or chamber having an exhaust port, of an inductor or aspirator applied to the exhaust port and provided with an air inlet and an extension, whereby the escape of the exhaust gases induces a flow of air into the inductor or aspirator and the air is drawn into the cylinder or chamber through the exhaust port as the pressure therein falls.

This specification signed and witnessed this 4th day of May, A. D., 1908.

CARL W. WEISS.

Signed in the presence of:

W. B. GREELEY,

AMBROSE L. O'SHEA.