N° 16,043 A.D. 1909

Date of Application, 9th July, 1909

Complete Specification Left, 7th Aug., 1909—Accepted, 25th Nov., 1909

PROVISIONAL SPECIFICATION.

Improvements in the Construction and Driving of Ventilating Fans.

We, EDWIN JAMES BROCKWAY, of Sussex House, Prince's Road, Cleethorpes, Engineer, and EDWIN BURBIDGE PHILLIPS, of 251 Hainton Avenue, Grimsby, Ironfounder, both in the County of Lincoln, do hereby declare the nature of this invention to be as follows:—

Our invention has for its object improvements in the construction of fans which receive their motive power from hot air engines of the well known type, in which air is expanded and contracted without exhaust for furnishing reciprocating motion by being alternately shifted by a displacer from one end to the other of a cylinder of which the ends are maintained at widely different temperatures, the lower end of the displacer cylinder requiring heat to provide motive power.

Our improvements consist in the combination of a hot air engine and a fan being hinged on to a forked bracket or stand allowing the fan to be set in suitable angular position and the provision of heat to the displacer cylinder of engine from a gas burner.

These improvements we carry out first by erecting our engine in a cast iron body comprised largely of baffle plates and to the top portion of this we attach the fan which is driven by connecting rods to cranks attached to the axis of the fan and dispensing with all other intermediate gear. All bearings being of the ball or roller type to reduce friction, the fan itself acting as a fly wheel. At the lower portion of the engine body we attach a casing which encloses the lower portion of the displacer cylinder and on the bottom of this casing we hinge a saucer shaped tray containing a Bunsen or suitable gas burner which for lighting purposes is made to hinge downwards and afterwards closed. Our object is to dispense with lamps entirely and utilise a gas burner only supplied from the gas main.

One of the objects of this is to enable any householder to connect one of these fans on to his gas connections and so save the expense of putting in electric wiring and secondly to enable gas companies to compete with electrically driven fans.

Our next improvement is important as it enables the propeller to be set to any angle; this we carry out in the following manner: We take the engine and the fan which are combined and pin them on either side to a forked bracket or stand the centre of axis being between the fan and the engine, thus enabling suitable angular positions to be readily fixed and locked with thumb nuts on the pivot pins. In the varying of these angular positions, the position of our gas burner connection under the displacer cylinder vary and we therefore arrange for flexible connections from the gas main to compensate for this variation, we may also utilise a similar construction of Bunsen or other gas burner on a fixed instead of pivoted stand.

July 8th, 1909.

E. J. BROCKWAY.
EDWIN B. PHILLIPS.

[*Price 8d.*]

COMPLETE SPECIFICATION.

Improvements in the Construction and Driving of Ventilating Fans.

We, EDWIN JAMES BROCKWAY, of Sussex House, Prince's Road, Cleethorpes, Engineer, and EDWIN BURBIDGE PHILLIPS, of 251 Hainton Avenue, Grimsby, Ironfounder, both in the County of Lincoln, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has for its object improvements in the construction of ventilating fans of the propeller type which receive their motive power from caloric or hot air engines of any well known type but preferably to that class of engine in which air is expanded and contracted without exhaust by being alternately shifted by a displacer from one end to the other of a cylinder of which the ends are maintained at widely different temperatures, and communicating with the power cylinder, the lower end of the displacer cylinder, or chamber, requiring the application of heat which, according to our invention is supplied by a Bunsen burner connected by a flexible pipe with the ordinary gas service.

The fan or air propeller is connected with the engine in such manner that it can be set to any desired angle or inclination whether the engine is a fixed one or otherwise capable of being set in a position corresponding to the angle of the fan or air propeller. In the latter case, as well as in the means of mounting the Bunsen burner, any play is taken up by the flexible pipe from the gas main.

In the accompanying drawings

Figure 1 is an elevation of a fixed type of engine operating an air propeller which latter is capable of being set at any desired angle.

Figure 2 is an end elevation and

Figure 3 a front view showing the fan or air propeller, together with the engine, mounted on trunnions, and supported from the base so that the fan or air propeller together with the engine can be set and locked at any desired angle, as for example the position indicated by the dotted lines in Figure 2.

Figure 4 is a cross section through the acting and displacing cylinders drawn to a larger scale, showing the method of construction and mounting as well as the hinged form of Bunsen burner.

In Figure 1, the air propeller a is adjustably mounted on its axis a^1 and receives its motion through a pair of bevel or mitre wheels A the driver of which is secured to the shaft b at a point between its bearings on the standards c. At either end of the shaft b suitable cranks d are provided which are connected with their respective cylinders by the rods e. The standards c are mounted on to the top of the upper baffle plate of the engine main casting B as shown. The application of heat to the displacer cylinder, whether the engine is of the fixed or adjustable type, is similar to that shown at Figure 4.

As it is desirable in order to attain a high speed and consequent efficiency to minimise friction to the utmost degree we have found in practice that a considerable diminution of friction and greater simplicity is attained by mounting the air propeller on the engine and pivoting them both between two fixed points where they can be secured at any desired angle at which it may be desired the air propeller should operate. The arrangement shown in Figures 2 and 3 clearly show this whilst the means for producing the caloric effect and the form of construction will be better understood on reference to Figure 4. A is the main frame to which the fan or air propeller frame and base B B^1 are pivoted at A^1. C is the fan or air propeller. The base B^1 is provided with a displacer cylinder f, the underside of which is provided with a suitable

sheet metal flanged cover held in place by the ring f^1. A hood g surrounds the said displacer cylinder base f and this hood is also provided with a flange secured by screws through the ring g^1 to the underside of the casting B^1. The displacer cylinder f communicates with the power cylinder h as shown at Figure 4. The aforesaid parts are contained within an outer casting m which is also attached to the underside of the casting B^1 and a hinge joint m^1 serves to support a Bunsen burner j, j^1 provided with a tap and nozzle k to receive the flexible gas pipe. The front of this hinged burner and under cover can be conveniently locked in its proper position by means of the catch c^2. The axis of the fan or air propeller C is carried in ball bearings which are supported from the fan ring B by the spokes i from the said fan ring and cranks on either end of the said axis are set and operated from their respective cylinders by the connecting rods g and h^1.

It will be seen that in this modification our engine is formed in a cast iron body composed of baffle plates advantageously of circular formation and the fan or air propeller is operated without any superfluous intermediate gear. By the means herein described and shown it is possible to instantly start ventilation from a gas service and at the same time to efficiently protect the flame. The means shown allow the device to be placed in any desired position and the air currents directed as required. It therefore follows that in the matter of the transmission of power for ventilating purposes that gas with the aforesaid improvements will favourably compete with electricity and meet a long felt want. We would however have it understood that we lay no claim to the particular form of engine, as engines of a similar construction have hitherto been employed heated by hydrocarbons or the flame of an ordinary oil lamp for operating a fan.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is: —

First. In ventilating fans receiving motion direct through heat generated by the combustion of gas and air, arranging the displacer and power cylinders so that they are surrounded by baffle plates and operate on cranks formed on the extreme ends of the fan or air propeller axis, and operating substantially in the manner herein set forth.

Second. In ventilating fans the construction of a fixed caloric engine composed of a series of baffle plates, the upper part thereof supporting the crank shaft in suitable bearings and to which rotary motion is imparted to an adjustably mounted fan or air propeller substantially as shown with reference to Figure 1.

Third. In ventilating fans the combination with a fixed caloric engine heated by gas of a fan or air propeller operated thereby and capable of being set to any desired angle substantially as herein set forth with reference to Figure 1.

Fourth. In ventilating fans the means for flexibly connecting a Bunsen burner with the ordinary gas service where the heat is used for obtaining rotary motion and for protecting and locking the same in position substantially as herein set forth.

Fifth. In ventilating fans or air propellers actuated by caloric engines and heated by a Bunsen burner pivotally mounting the same whereby the angle of the engine and fan can be set to the desired angle substantially as shown at Figures 2, 3 and 4.

Dated this Sixth day of August, 1909.

E. J. BROCKWAY.
EDWIN B. PHILLIPS.

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SHEET 1.

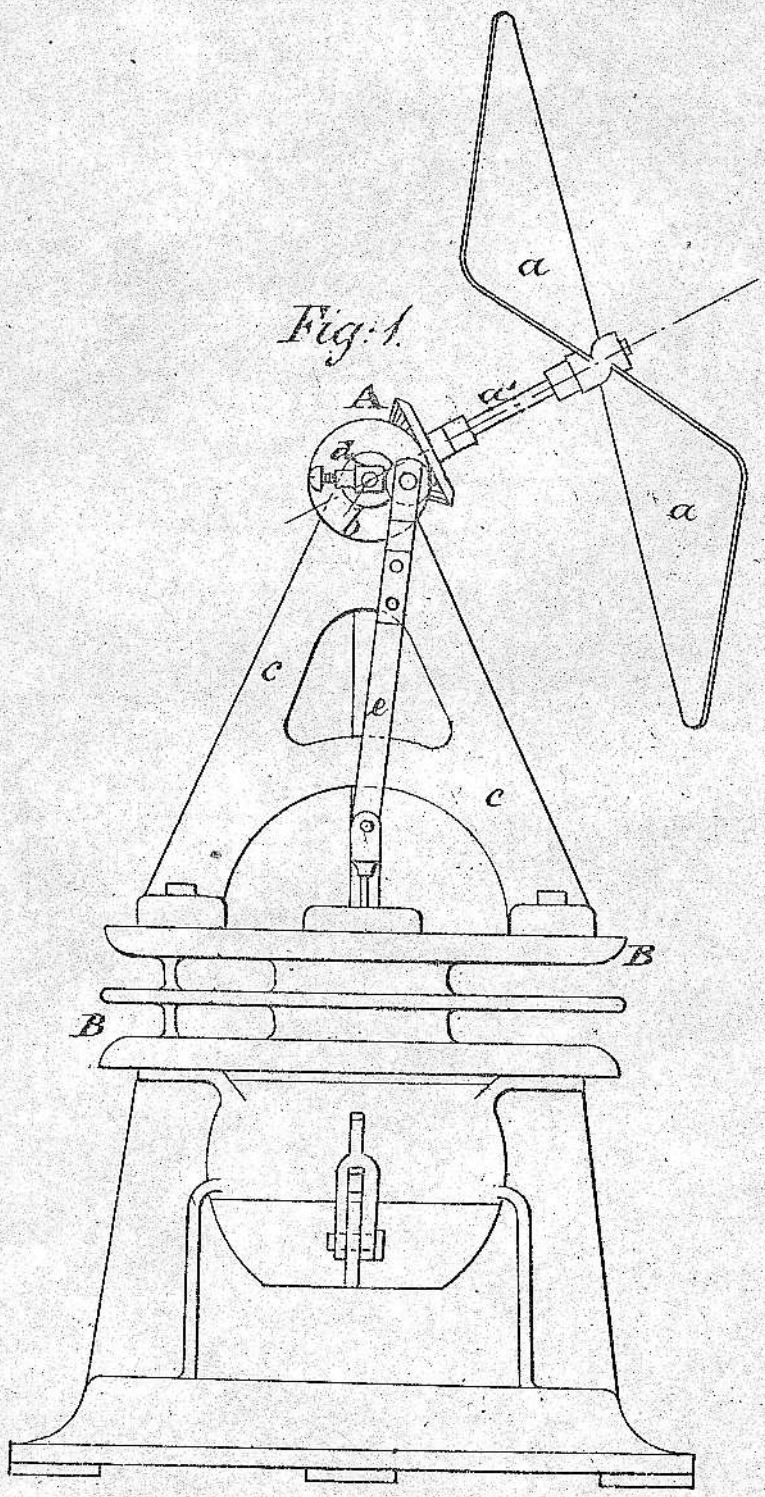


Fig. 1.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig: 2.

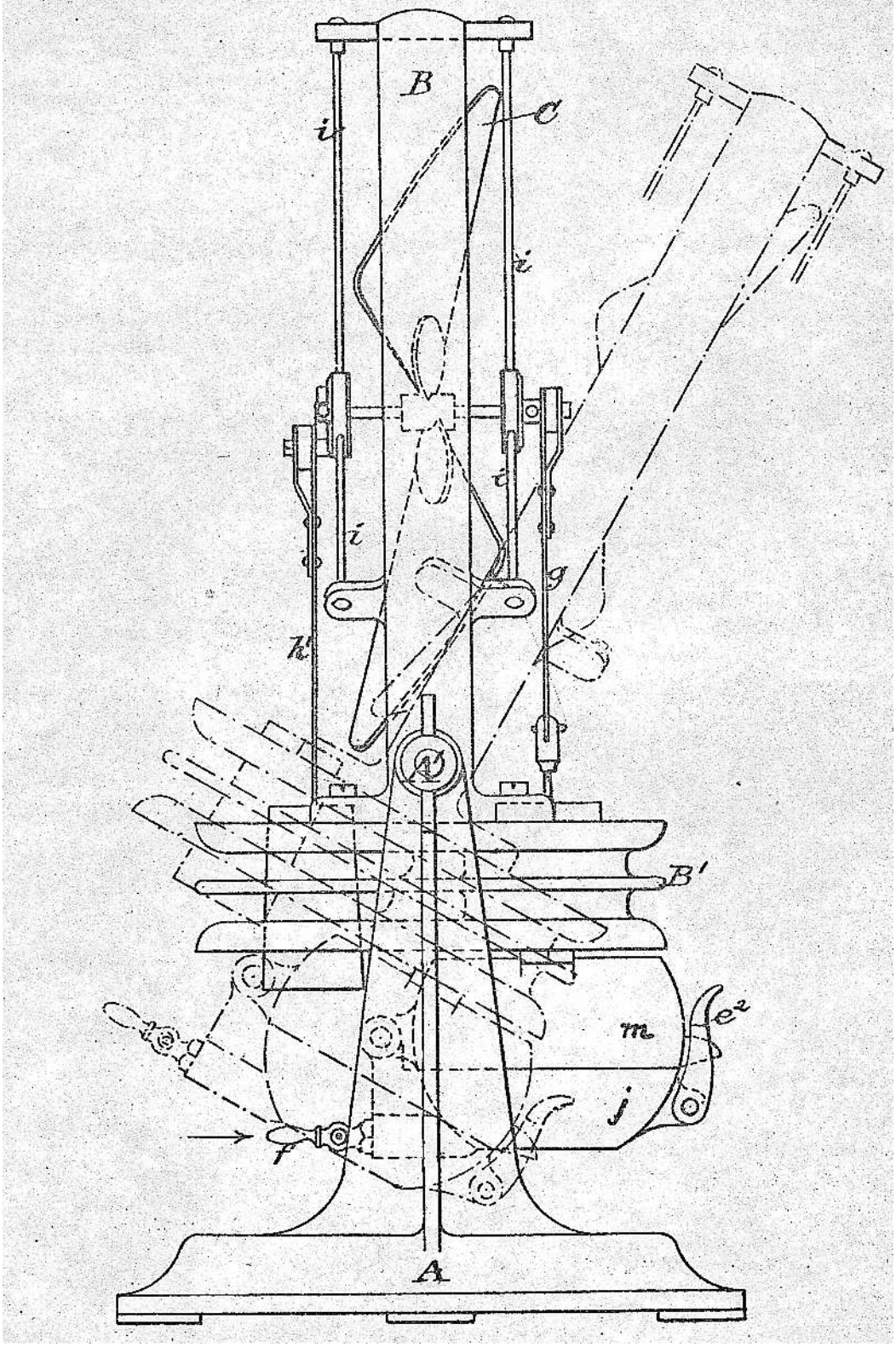
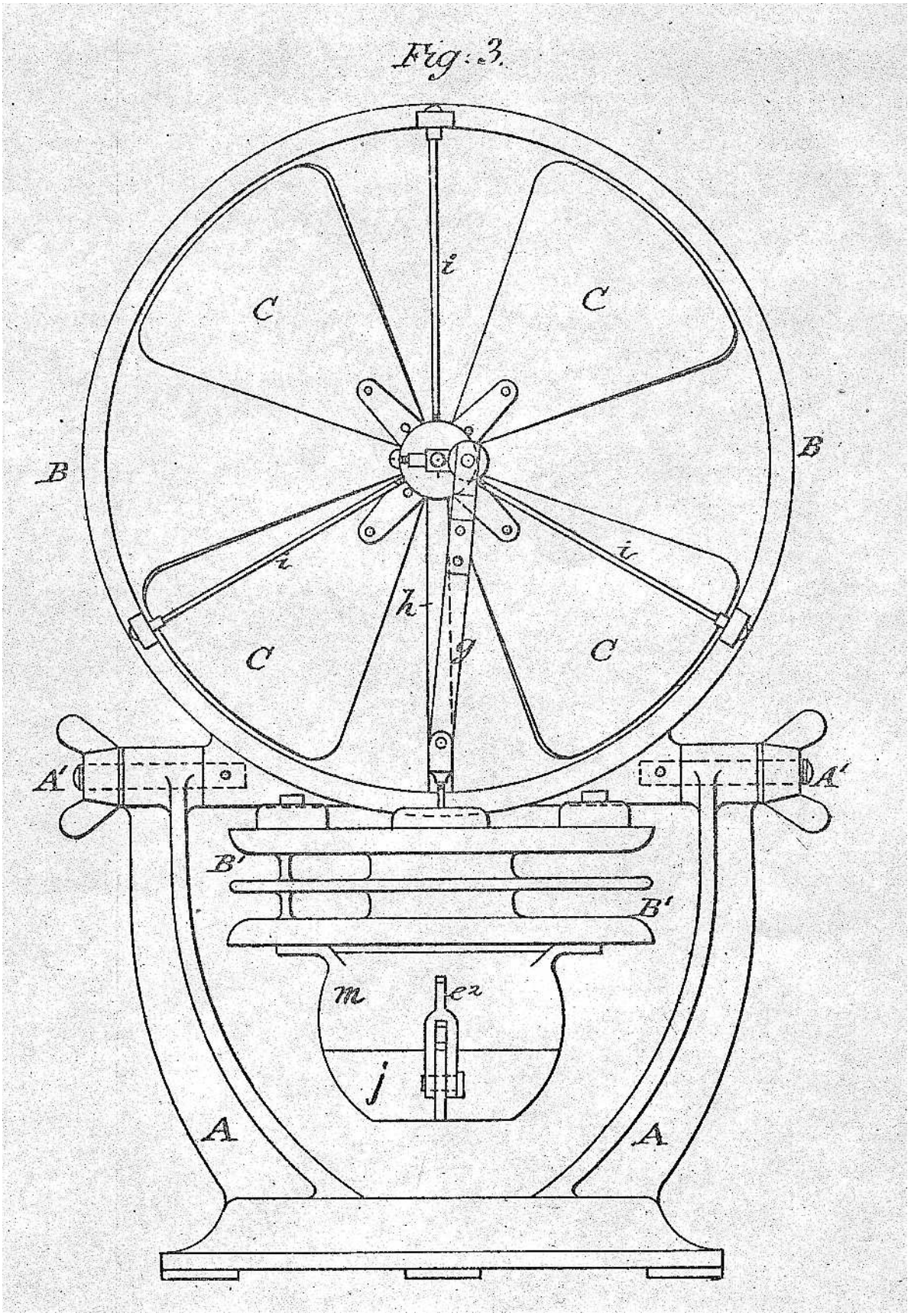


Fig: 3.



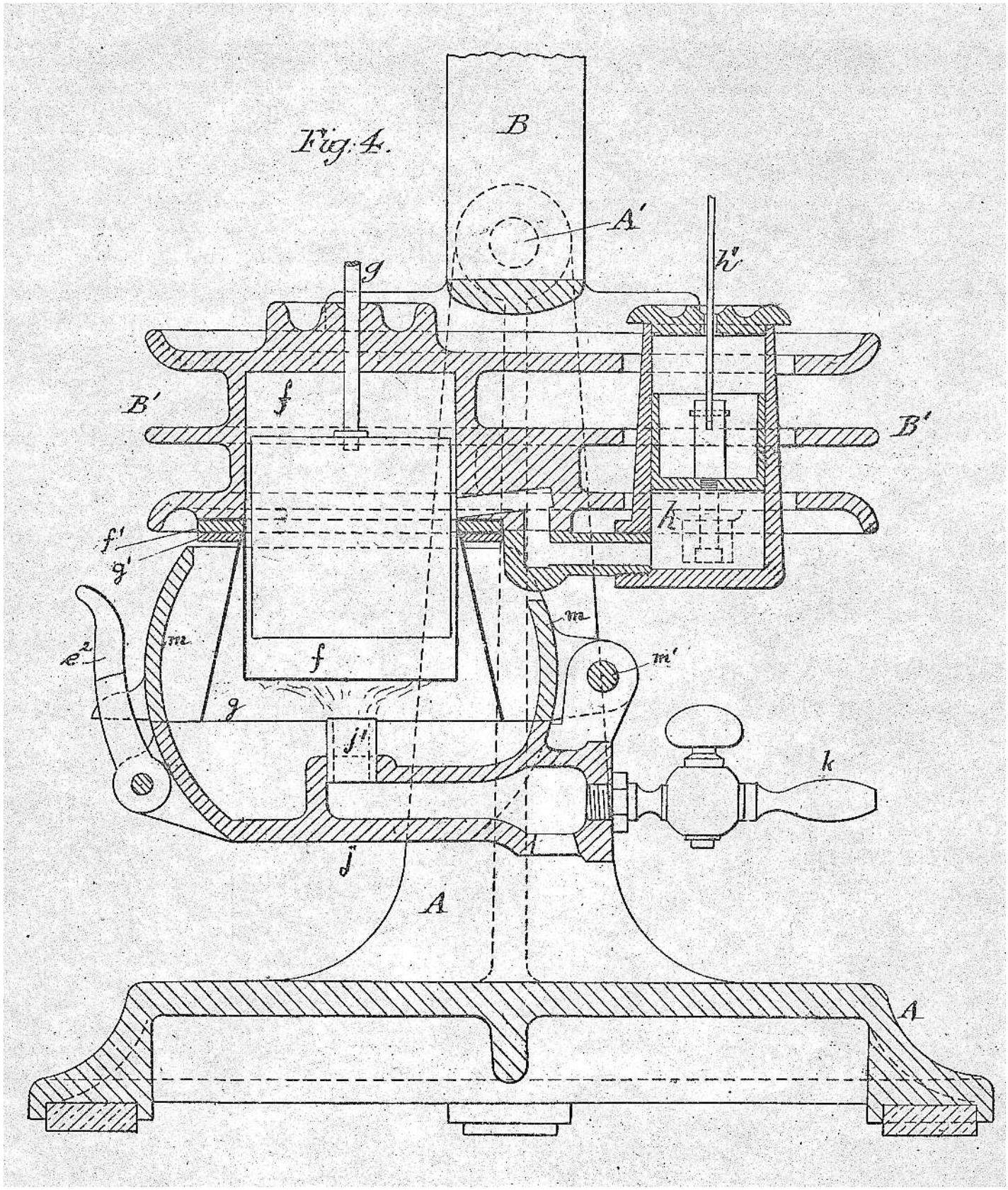


Fig. 4.
B
A'
h'
g
B'
f
B'
h
f'
g'
m
m
e²
m'
f
g
j'
k
j
A
A