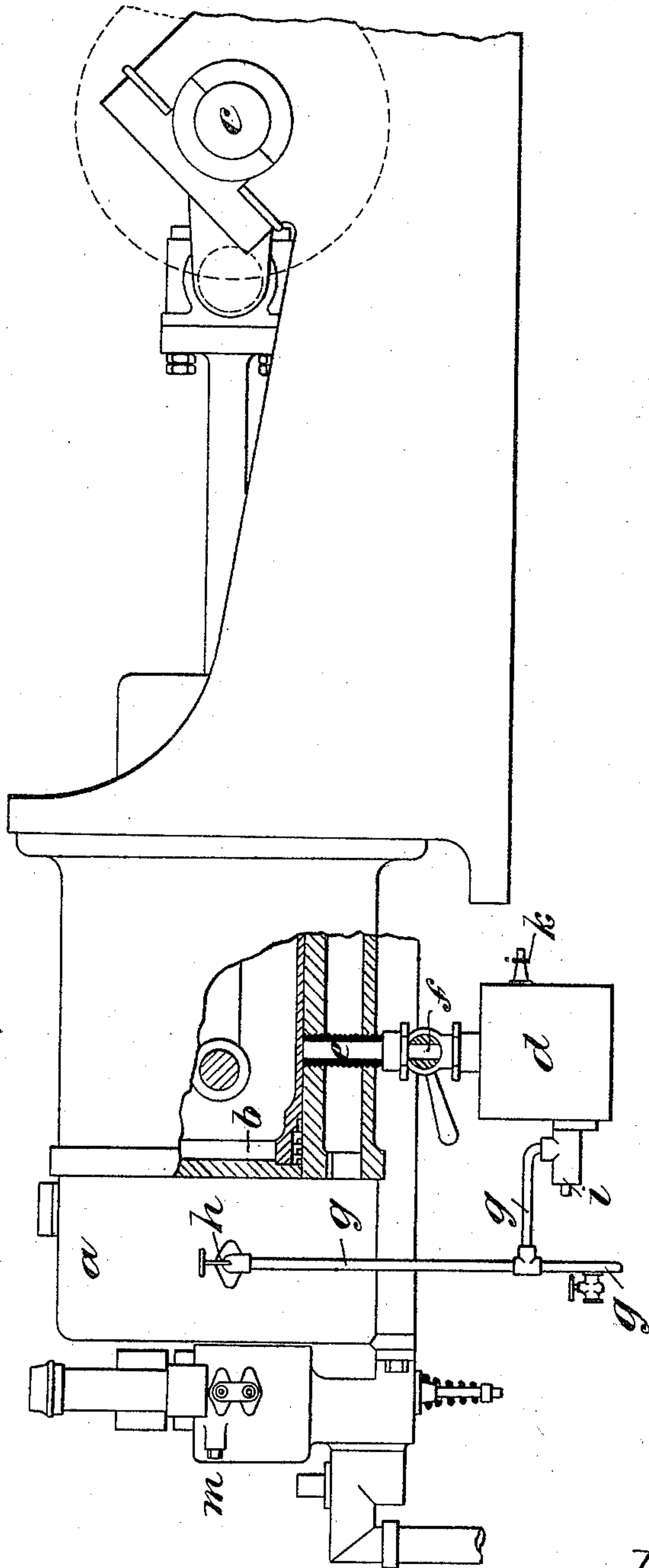


(No Model.)

A. R. BELLAMY.  
GAS OR SIMILAR MOTOR ENGINE.

No. 537,963.

Patented Apr. 23, 1895.



Attest  
Matter & Malcom  
James M. Fiske

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by Richards & Co  
Atty's

# UNITED STATES PATENT OFFICE.

ALFRED ROWE BELLAMY, OF STOCKPORT, ENGLAND.

## GAS OR SIMILAR MOTOR ENGINE.

SPECIFICATION forming part of Letters Patent No. 537,963, dated April 23, 1895.

Application filed October 6, 1894. Serial No. 525,099. (No model.) Patented in England March 22, 1893, No. 6,093.

*To all whom it may concern:*

Be it known that I, ALFRED ROWE BELLAMY, a subject of the Queen of Great Britain, and a resident of Stockport, Chester county, England, have invented certain new and useful Improvements in Gas or Similar Motor Engines, of which the following is a specification, the invention having been patented in England March 22, 1893, No. 6,093.

10 In self starting gas and similar motor engines as at present constructed, the first impulse is either obtained by firing a charge of gas and air at atmospheric pressure, or firing a charge of gas and air under compression.  
15 In the first instance the power obtained is insufficient to move the piston and revolve the crank-shaft until the engine gets into its proper working action, especially if there be any resistance to its free movement, through  
20 the engine being arranged to drive direct on to its work. In the second instance when firing a charge under compression, the shock to the parts is too severe, it being well known that to put an engine into motion by instantaneously giving the piston a sudden shock is both inadvisable and unmechanical.

The object of this invention is to arrange the starting so that a mixture of air and gas at atmospheric pressure is first exploded  
30 while the piston is at rest. This pressure sets the engine moving and after the piston has traveled a certain distance a communication is effected with another chamber containing a second charge of gas and air at atmospheric  
35 pressure which charge is compressed, and then fired by the first explosion and thereby a second and powerful impulse is given to the piston after it has been put into motion by the first explosion. To effect this object I  
40 employ a reservoir or chamber connected with the gas inlet and with the cylinder and placed at any suitable distance from the latter.

To render my invention clearly understood I have annexed hereto a drawing showing in  
45 elevation (partly in section) a gas or similar motor engine fitted with such an arrangement of reservoir for the purposes of my invention.

In the view *a* designates the cylinder; *b*, the piston; *c*, the crank shaft; *d*, the reservoir  
50 or chamber; *e*, a pipe connecting the reservoir *d* to the cylinder *a*; *f*, a tap or valve controlling the pipe *e*; *g*, the pipe which supplies

gas or explosive fluid through a back pressure valve *h* to the compression space or chamber of the cylinder *a*, and simultaneously  
55 through a back pressure valve *i* to the reservoir *d* which is also provided with a suitable valve *k* to allow the products of combustion to escape.

Upon starting, gas is admitted through the  
60 pipe *g* to the compression space or chamber of the cylinder *a* and simultaneously to the reservoir *d* thereby simultaneously forming an explosive fluid mixture at or about atmospheric pressure in both places, the gas having  
65 driven before it a portion of the air or products from the compression space or chamber of the cylinder, preferably through the valve *m* in communication with the ignition tube.

The first explosion is caused by the explosive fluid mixture in the cylinder coming in  
70 contact with the heated portion of the ignition tube. When the first explosion takes place the piston *b* is driven outward until it uncovers the port or pipe *e* communicating  
75 with the reservoir *d*. The flame from the first explosion immediately ignites the explosive fluid mixture in the reservoir *d* thus giving a second or supplementary impulse to the piston *b* whereby additional power is obtained  
80 for starting and this without any sudden shock or jar. After the piston has reached the end of its outstroke the tap or valve *f* may be closed by hand or automatically if preferred, to shut off the reservoir *d* from the  
85 cylinder *a*.

The reservoir *d* is shown connected with the cylinder *a* at a point covered by the piston *b* when the explosive charge in the compression space or chamber is ignited; but it may be  
90 connected by a port controlled by a separate valve if desired.

I declare that what I claim is—

1. In combination the cylinder, the piston, a reservoir and a fuel supply connecting with  
95 both the reservoir and the explosion chamber of the cylinder to supply the mixture thereto at atmospheric pressure when the piston is at rest at the rear of its stroke, said reservoir being connected to the cylinder at such point  
100 as to secure a second explosion only when the piston has advanced in its forward stroke, substantially as described.

2. In combination, the cylinder, the piston,



the reservoir, the fuel supply leading to the explosion chamber and the reservoir, the connection between the reservoir and the cylinder, and the valve in said connection to cut  
5 off the reservoir from the cylinder, said connection being arranged to be closed by the piston when at the rear of its stroke substantially as described.

3. In combination, the cylinder, the piston,  
10 the reservoir, the supply pipe *g*, connected with the explosion chamber and reservoir, the back pressure valves *h* and *i* in said connec-

tion, the exhaust valve *k* leading from the reservoir, and the connection between the reservoir and the cylinder, said connection being  
15 arranged to be closed by the piston when at the rear of its stroke substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ALFRED ROWE BELLAMY.

Witnesses:

DAVID FULTON,

RICHARD IBBERSON.