

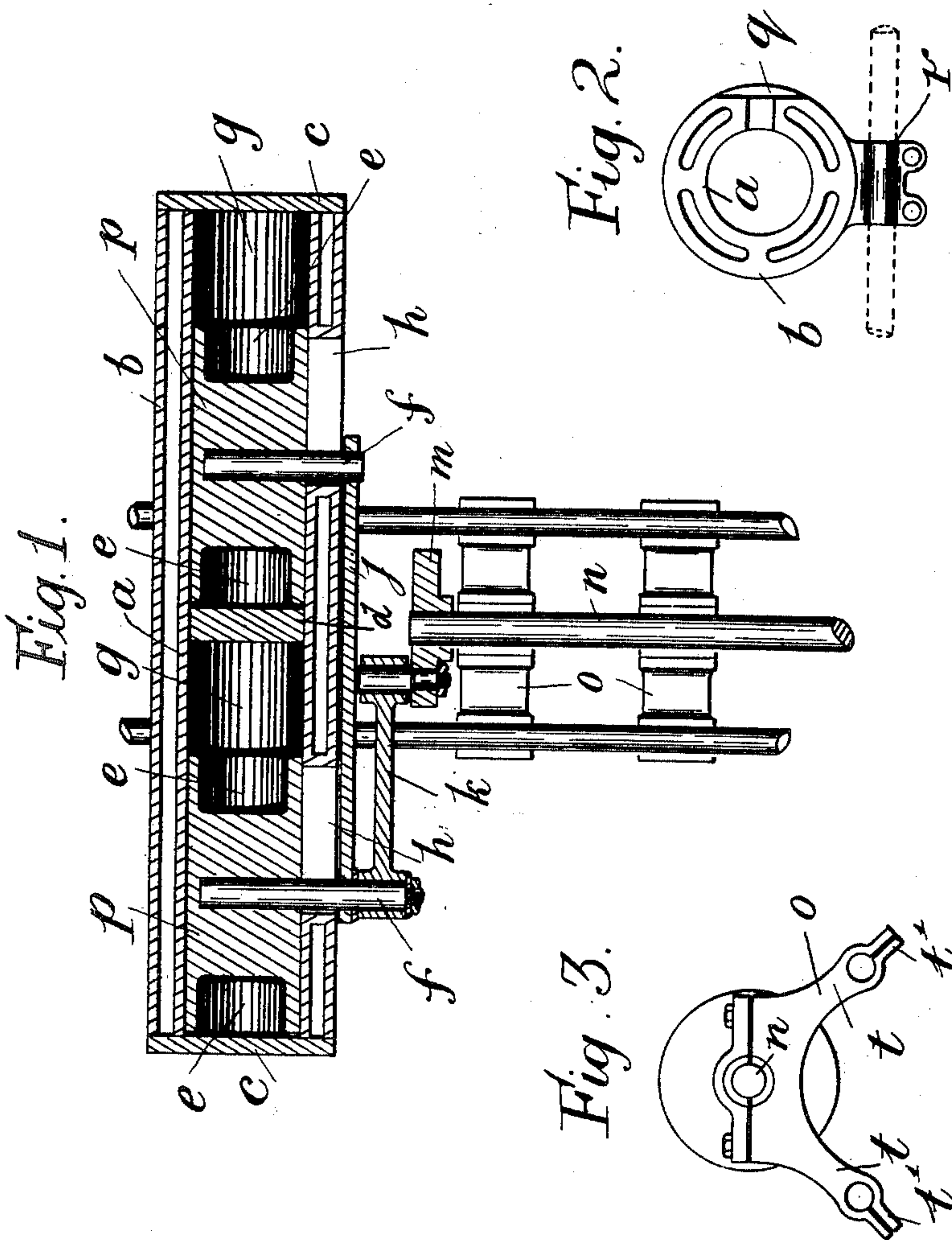
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Patented Feb. 12, 1901.

S. MILLER.  
EXPLOSION ENGINE OR MOTOR.

(No Model.)

(Application filed Apr. 30, 1900.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

SAMUEL MILLER, OF LONDON, ENGLAND.

## EXPLOSION ENGINE OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 667,846, dated February 12, 1901.

Application filed April 30, 1900. Serial No. 14,877. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL MILLER, a subject of the Queen of Great Britain and Ireland, residing at 6 Hilda road, Buxton, London, England, have invented certain new and useful Improvements in Explosion Engines or Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to explosion engines or motors, the object being to so construct a motor of this description as to combine a maximum of efficiency with a minimum size of motor; further, to allow of the parts being readily separated or removed for repairs, &c., to secure perfect alinement of the operating-pistons, and in this way to obtain a compact and efficient motor of comparatively great power which is particularly suitable for use in connection with motor-vehicles and motor-driven boats, although it may be employed for other purposes for which it is suitable.

This invention consists, essentially, in the employment of a single cylinder bored throughout its length, which is closed at each end and divided approximately at the center by a diaphragm or partition into two chambers. Within each chamber a double piston is arranged, consisting of a cylindrical block sufficiently turned out or recessed at each end to form an explosion-chamber, while each double piston is furnished with a pin or part projecting through slots formed in the side of the cylinder of a length in proportion to that of the stroke, and these two pins, at or near their outer extremities, are united by a connecting bar or rod, so that both pistons partake of a common simultaneous motion which may be communicated by a single connecting-rod to a crank-disk, crank-axle, or its equivalent.

In order that my invention may be more fully understood, I will now proceed to describe same with reference to the accompanying drawings, in which—

Figure 1 is a sectional plan of the essential parts of an explosion engine or motor constructed according to this invention. Fig. 2 is a cross-section taken through a cylinder such as is employed for use in connection

with this invention. Fig. 3 is a detailed view showing means whereby the main driving-axle may be mounted upon tubular members or rods of the frame of a motor-vehicle.

According to this invention a single cylinder *a* is employed, furnished with a suitable water-jacket *b*. This cylinder is bored throughout its length, while it is closed at each end *c* and divided by a partition or diaphragm *d*, arranged approximately at the center, into two chambers *g g*. Within each chamber a double piston *p* is arranged, consisting of a cylindrical block sufficiently turned or recessed at each end to form an explosion-chamber *e*. Each of the double pistons *p* is furnished with a pin *f*, projecting through slots *h*, formed in the side of the cylinder *a* and water-jacket *b*, and these two pins are united at or near their outer extremities by a connecting rod or bar *j*, so that both pistons *p p* partake of a common simultaneous motion which may be communicated by a single connecting-rod *k* to a crank-disk, such as *m*, mounted upon the main driving-axle *n*.

Valve-gear of any suitable and well-known form and operated in the usual manner may be employed to allow of the charge being taken in at either side of either of the double pistons in a proper sequence, as required, so that while explosion is taking place at one end of one of the double pistons at the other extremities compression, charge-taking, and exhaust are occurring in their proper order.

As shown in Fig. 2, the cylinder may be sufficiently cut away at one side so as to form a flat surface *q*, against which slides carried by the rod or bar *j* bear and slide backward and forward during the operation of the motor or engine, for covering the slots *h*, while upon the lower part of the outer jacket of the cylinder clamping-pieces *r* may be cast or formed in any other suitable manner, so as to allow of the said cylinder being clamped to the tubular members or rods of the frame of the vehicle, while, as shown at Fig. 3, the main driving-axle *n* may be supported in suitable bearings *o*, cast or formed with downwardly-projecting extremities *t*, terminating in clamping ends *t' t'*, designed to grip the tubular members or rods of the frame of the vehicle, or in the case of a motor-driven boat these downwardly-projecting extremities *t t*



may be furnished with suitably-shaped parts designed to be clamped or bolted to the floor; but where it is designed to be employed as a stationary engine it can be arranged or formed  
 5 in connection with a suitable base-plate in any convenient manner.

In connection with the pistons *p p* packing-rings of any suitable and well-known kind may be employed, while the cylinder *a* may  
 10 be formed in two or more sections designed to be united to form a complete cylinder and divided by a partition or diaphragm into two chambers, as hereinbefore described. Moreover, the operating parts, consisting of the  
 15 cylinder *a*, pistons *p p*, rod or bar *j*, and connecting-rod *k*, may be duplicated where additional power is required, in which case the second set of operating parts are preferably arranged upon the same tubular members or  
 20 rods of the frame of the vehicle as the first and by the side thereof and parallel thereto.

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

25 1. The combination, with an engine-cylin-

der provided with two working chambers arranged end to end and provided with slots in their sides, of double-acting pistons working in the said chambers, each said piston having an explosion-chamber in each end of  
 30 it, a driving connection for the said pistons, pins projecting from the said pistons through the said slots, and means for coupling the said pins, substantially as set forth.

2. The combination, with an engine-cylin- 35 der provided with two working chambers arranged end to end, of double-acting pistons working in the said chambers, each said piston having an explosion-chamber in each end of it, a driving connection for the said pis- 40 tons, and coupling mechanism operatively connecting the said pistons, substantially as set forth.

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

SAMUEL MILLER.

Witnesses:

CHAS. LEASON,  
 THOS. KAY.