

**No. 701,857.**

**Patented June 10, 1902.**

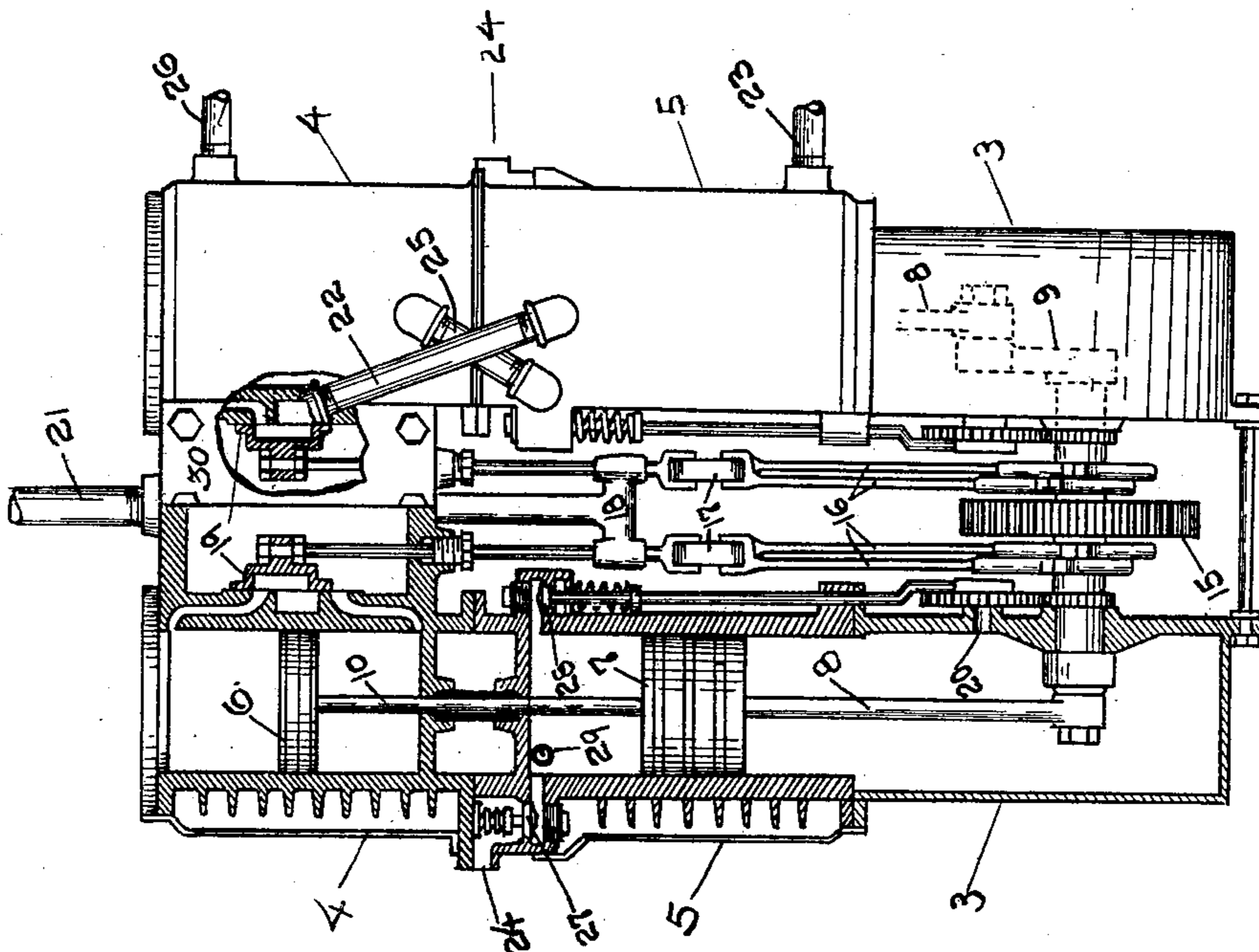
W. DIETER & H. ORUM.

**MOTOR.**

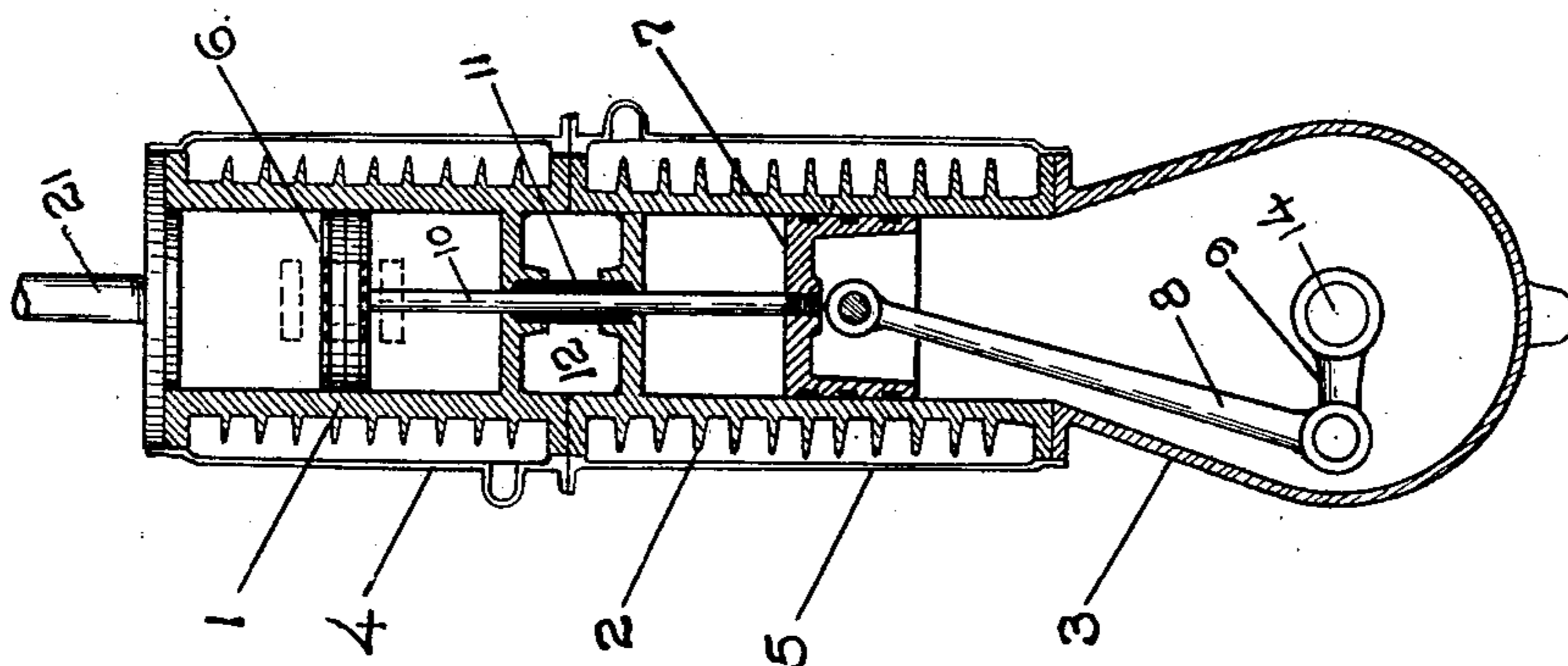
(Application filed Feb. 20, 1901.)

(No Model.)

Fig. 1.



ਲੰ  
ਫੰ



WITNESSES:

WITNESSES:  
 Boyd. A. Bennett.  
 Richard E. Benedict.

INVENTORS

John Dieter  
Hartwig Orum

# UNITED STATES PATENT OFFICE.

WILLIAM DIETER, OF BROOKLYN, NEW YORK, AND HARTVIG ORUM, OF CHICAGO, ILLINOIS; SAID ORUM ASSIGNOR OF HIS RIGHT TO IRVING A. O'HARA, OF BROOKLYN, NEW YORK.

## MOTOR.

SPECIFICATION forming part of Letters Patent No. 701,857, dated June 10, 1902.

Application filed February 20, 1901. Serial No. 48,178. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM DIETER, residing at Brooklyn, county of Kings, and State of New York, and HARTVIG ORUM, residing at Chicago, county of Cook, and State of Illinois, citizens of the United States, have invented a certain new and useful Motor for Automobiles, Cycles, Boats, and for all Purposes Where a Flexible and Economical Power is Required, of which the following is a specification.

Our invention relates to improvements in motors; and the object of said invention is to produce a flexible and economical motive power; and we accomplish this object by a novel mechanism hereinafter described.

Figure 1 is a view in front elevation, one-half of which shows a center section of the motor. Fig. 2 is a view in side elevation, showing a section through the cylinders and frame.

The component parts are indicated as follows:

1 is a steam-cylinder provided with circular flanges.

2 is a combustion-cylinder for an explosive-gas mixture. This cylinder is also provided with circular flanges. Frame 3 connects with cylinders and includes the crank-shaft bearings.

4 and 5 are cylinder-jackets.

6 is steam-cylinder piston.

7 is the combustion-cylinder plunger.

8 9 14 are respectively the connecting-rods, cranks, and crank-shaft.

10 is a piston-rod connecting piston 6 to plunger 7.

11 is a stuffing-box between cylinders 1 and 2.

12 is a steam-jacket between cylinders 1 and 2.

15 represents a driving-wheel on shaft 14.

16 indicates the eccentrics for operating steam-valves 19 and connects to links 17.

18 is the valve-rod guide.

20 is the cam-shaft, which operates the combustion-cylinder exhaust-valve and to which is connected a spark-timer of ordinary construction. This spark-timer is not illustrated.

21 designates the steam-inlet pipe, connected to the steam-valve chest.

22 and 23 are steam-exhaust pipes connected with the steam-exhaust and cooling-jacket of the cylinders 1 and 2, as seen in Fig. 1, and 25 and 26 represent exhaust-gas pipes.

24 indicates the inlet for the gas mixture.

27 is the combustion-cylinder inlet-valve, and 28 is the exhaust-valve.

29 is the electric-spark plug, and 30 the steam-chest for cylinders 1.

Such being the construction, the operation is as follows: Steam being admitted into the steam-cylinders through inlet-pipe 21 starts the motor. The speed can be varied at will by shifting the links, and the motion can be reversed by the same mechanism. Using the steam alone, the combustion-cylinders 2 and plungers 7 act as guides and cross-heads. Having started the motor, the explosive mixture can be admitted through inlets 24 into cylinders 2 and there compressed by plungers 7 and exploded by electric-spark plugs 29. Now, if desired, steam can be shut off, and the motor will continue to run by the explosions taking place in the combustion-cylinders. It is clear that steam or an explosive mixture, independently or combined, will run the motor. The steam-exhaust is conducted through pipe 22 into the space between jackets 5 and cylinders 2, cooling cylinders 2 and heating the exhaust, and when finally expelled through pipe 23 becomes less visible. The flanges on cylinders 2 muffle the steam and make an almost-noiseless exhaust. The hot gases are exhausted from cylinders 2 and conducted through pipe 25 into the space between jackets 4 and cylinders 1, heating cylinders 1 and exhausting through outlet 26. The flanges on cylinders 1 muffle the gases and make the exhaust almost noiseless. Steam being admitted through a port (not shown in drawings) from the steam-chest 30 into jacket 12 reduces the temperature of the explosion-cylinder head.

There are numerous ways of constructing and arranging cylinders, frames, and details, and we do not limit our invention to the details shown and described.

Having described the invention, we claim—

In an engine of the character described, a steam-motor, an explosive-motor, operative connected, a steam-jacket interposed between

the cylinders of said motors, a piston movable  
in the cylinder of the steam-motor, a plunger  
movable in the combustion-chamber of the  
explosive-motor, and a piston-rod carrying  
5 said piston and plunger and movable through  
said steam-jacket, substantially as shown and  
described.

In testimony whereof we have signed our

names to this specification in the presence of  
two subscribing witnesses.

WM. DIETER.  
HARTVIG ORUM.

Witnesses:

HARRY GOODIEL,  
RICHARD BENEDICT.