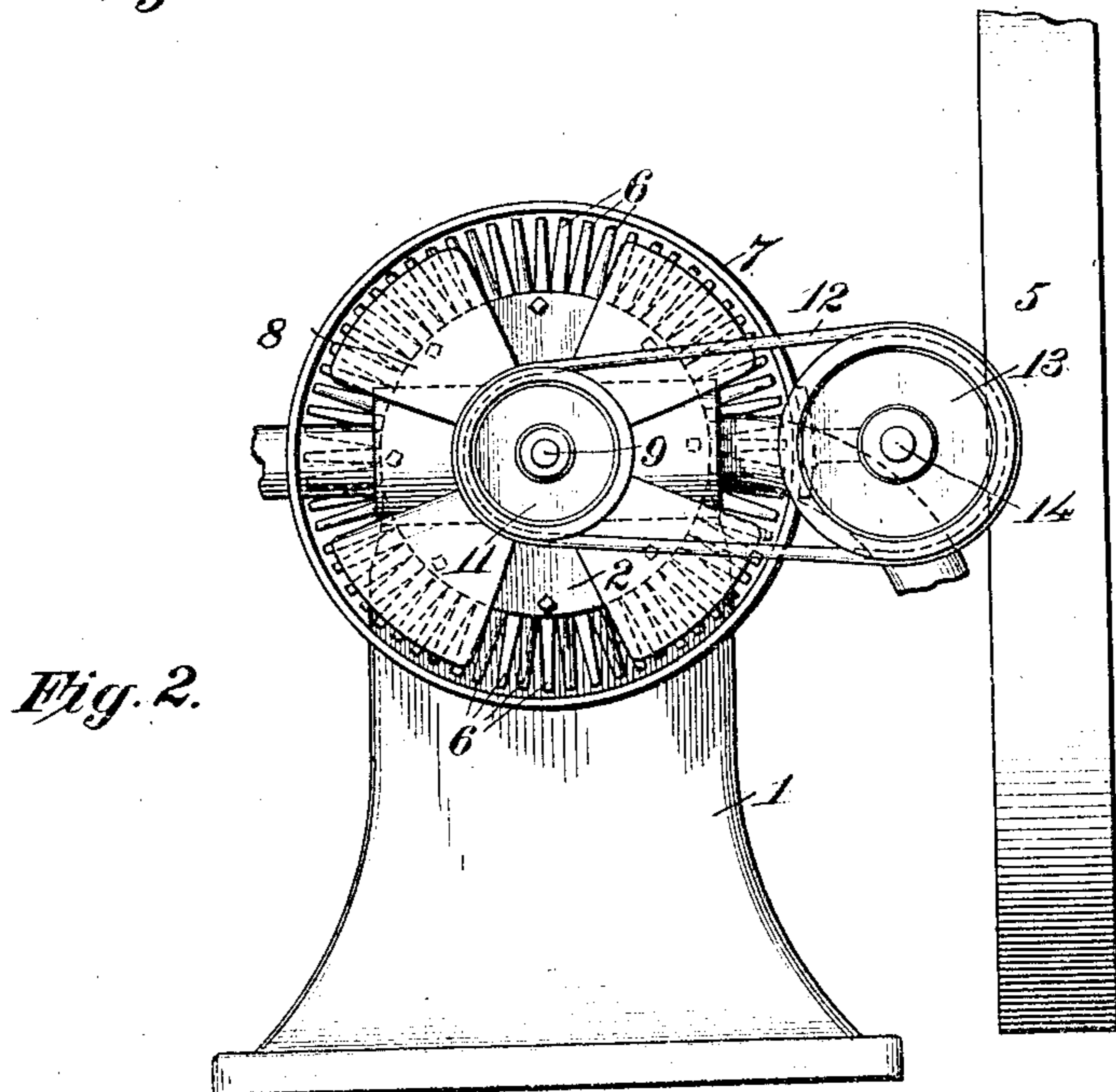
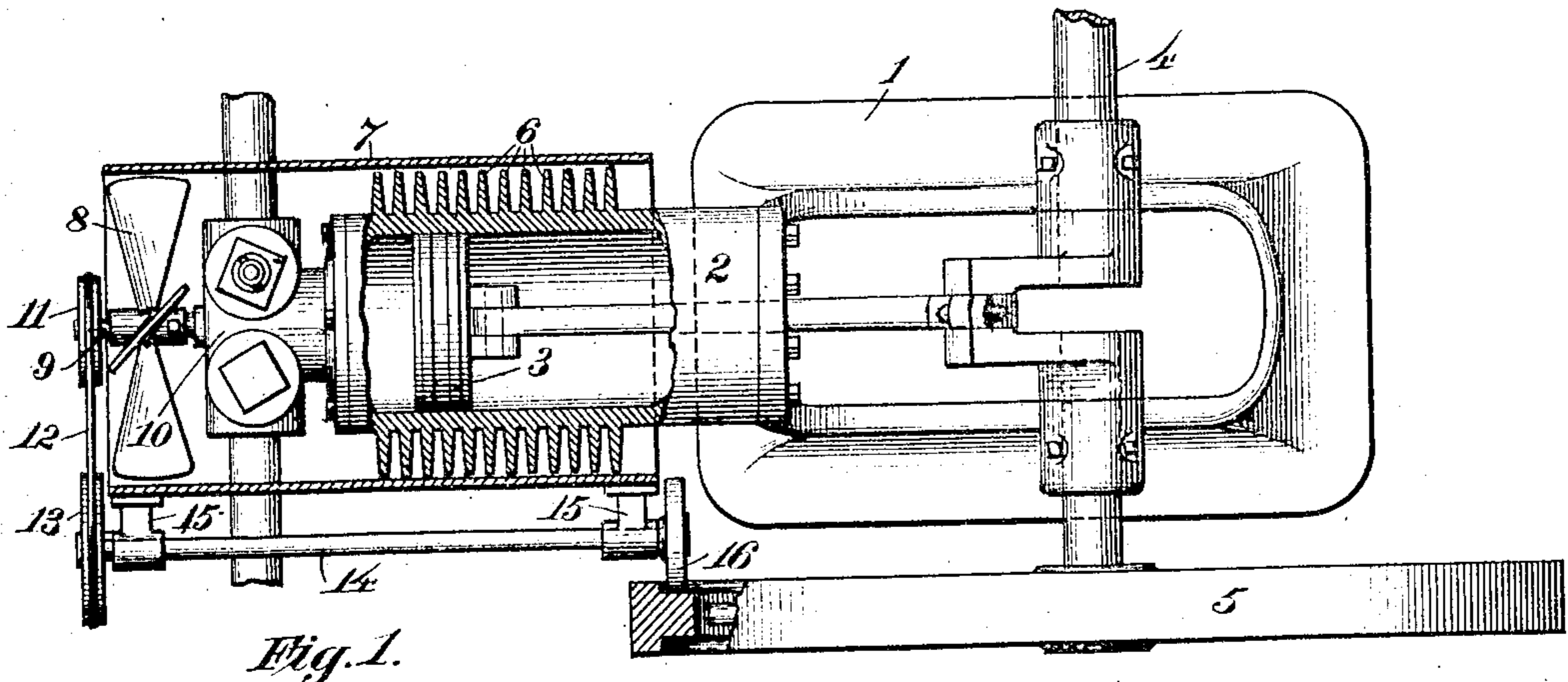


G. E. MARTIN & A. F. SWANSON.  
SYSTEM FOR AIR COOLING GAS ENGINE CYLINDERS.  
APPLICATION FILED MAY 27, 1907.

919,612.

Patented Apr. 27, 1909.



Witnesses:

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# UNITED STATES PATENT OFFICE.

GEORGE E. MARTIN AND ADOLPH F. SWANSON, OF CHAMPAIGN, ILLINOIS.

## SYSTEM FOR AIR-COOLING GAS-ENGINE CYLINDERS.

No. 919,612.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed May 27, 1907. Serial No. 875,805.

*To all whom it may concern:*

Be it known that we, GEORGE E. MARTIN and ADOLPH F. SWANSON, citizens of the United States, residing in Champaign, in the county of Champaign and State of Illinois, have invented certain new and useful Improvements in Systems for Air-Cooling Gas-Engine Cylinders, of which the following is a full and true description, such as will enable others skilled in the art to which it appertains to make use of the same.

Our invention relates to gas engines and has particular reference to air cooled gas engines.

More especially our invention may be denominated a system for air-cooling gas engine cylinders.

The objects of our invention are to provide a cylinder for gas or internal combustion engines which shall have greater radiating properties than similar cylinders now on the market; and to equip the same with a suitable device for maintaining a circulation of air about the cylinder during the operation of the engine.

Our invention will be more readily understood by reference to the accompanying drawings forming a part of the specification and in which,

Figure 1 is a plan view of a gas engine having a cylinder embodying our invention and equipped with an air circulating device; the cylinder of the engine being shown partially in section, and Fig. 2 is an end elevation of the engine shown in Fig. 1.

Referring to the drawings, 1 indicates the bed or frame of a gas engine of which 2 is the cylinder, 3 the piston, 4 the crank shaft and 5 the fly wheel. The explosion end of the cylinder is provided upon its outer face with a large number of long slender pins 6. These are cast integrally with the cylinder and are coextensive with the explosion chamber thereof. The pins 6 present a large exposed surface of metal for the radiation of heat, thus maintaining the cylinder at a much lower temperature than would otherwise be possible. We know that it is not new to provide a plurality of radial members cast integral with the cylinder for the purpose of increasing the heat radiating surface but, as now made these radial members are comparatively short and thick, as it is impossible with the method of casting the cylinders now in vogue, to make them of any considerable length. We have found that a large num-

ber of long slender pins are more efficacious in cooling a cylinder than are a less number of pins which are comparatively short and thick. As it is impracticable to cast cylinders by the present method with a large number of pins of great length and of small diameter, we have devised a new method for casting the same. By this method, cylinders may be cast which shall have a large number of pins of any desired size, formed integrally therewith.

Surrounding the cylinder 2 and extending considerably beyond the explosion end thereof is a jacket or casing 7. This is preferably formed of light sheet metal and is of but slightly greater diameter than that of the cylinder 2 and pins 6. The projecting end of the casing 7 contains the inlet and exhaust valve casings and means for circulating a current of air through the casing about the cylinder. The latter comprises a fan 8 mounted upon a short shaft 9, journaled in the head of the cylinder, or in the casting 10 which constitutes the valve casing. The fan 8 is driven from some moving portion of the engine. In the preferred form as illustrated in the drawings, it may be driven from the rim of the fly-wheel. Upon the end of the shaft 9 is a pulley 11, which is connected by a belt 12 to a similar pulley 13 fixed upon the end of a shaft 14. The shaft 14 is journaled in bearings 15 which may be arranged upon the jacket 7 as shown. Upon the opposite end of the shaft from the pulley 13 is a friction roller 16, which bears against the rim of the fly-wheel. It is evident that when the engine is running a current of air will be rapidly circulated through the jacket 7, by means of the fan 8, and that the jacket 7, by being but of sufficient diameter to receive the cylinder 2, a large quantity of cold air will be made to circulate rapidly among the pins 6, consequently carrying off a great amount of heat. By keeping the cylinder 2, and pins 6, constantly surrounded by a volume of cold air they rapidly give off their heat, especially the long slender pins 6. It is obvious that the longer and more slender the pins 6 the greater will be the radiation of heat.

Having described our invention what we claim as new and desire to secure by Letters Patent is:

In an internal combustion engine, a cylinder having a plurality of long slender pins extending radially from the side walls thereof,

and the usual fly wheel, in combination with  
a cylindrical jacket arranged about said cyl-  
inder and extending beyond the end thereof,  
said end being closed by the usual head, a  
5 valve casing formed in said head, a fan ar-  
ranged in the end of said jacket and journaled  
on said casing, a shaft bracketed upon the  
side of said jacket, suitable connection be-  
tween one end of said shaft and said fan for  
10 driving the latter and a friction wheel on the  
opposite end of said shaft and arranged to

engage the rim of the fly wheel, substantially  
as described.

In testimony whereof, we have hereunto  
set our hands, this 17th day of May, 1907, in 15  
the presence of two subscribing witnesses.

GEORGE E. MARTIN.  
ADOLPH F. SWANSON.

Witnesses:

FLORENCE CHARLES,  
LILIAN L. GULICK.