

No. 861,786.

PATENTED JULY 30, 1907.

T. L. WILLSON.

FOG SIGNAL.

APPLICATION FILED SEPT. 2, 1906.

FIG. 1.

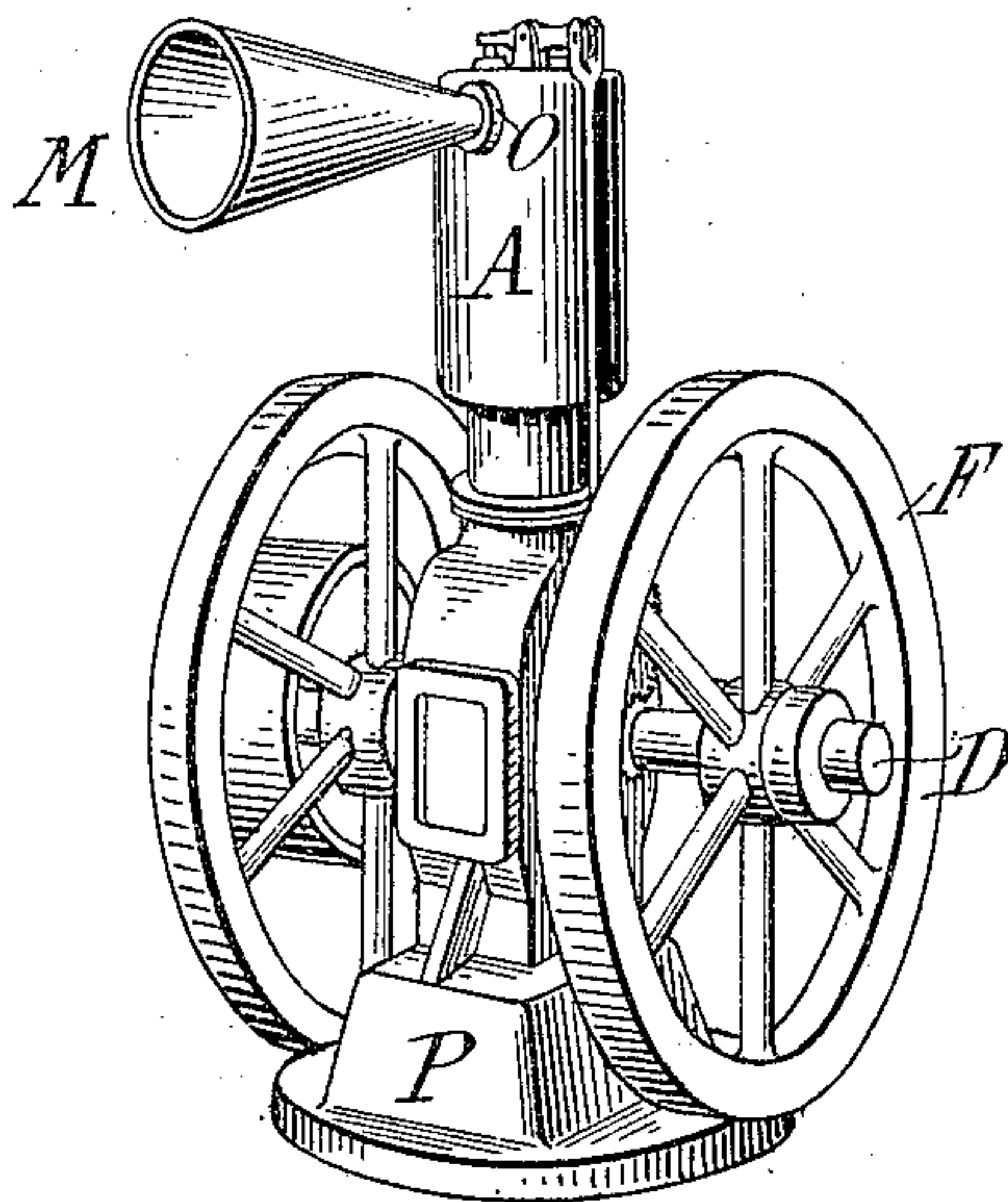


FIG. 4.

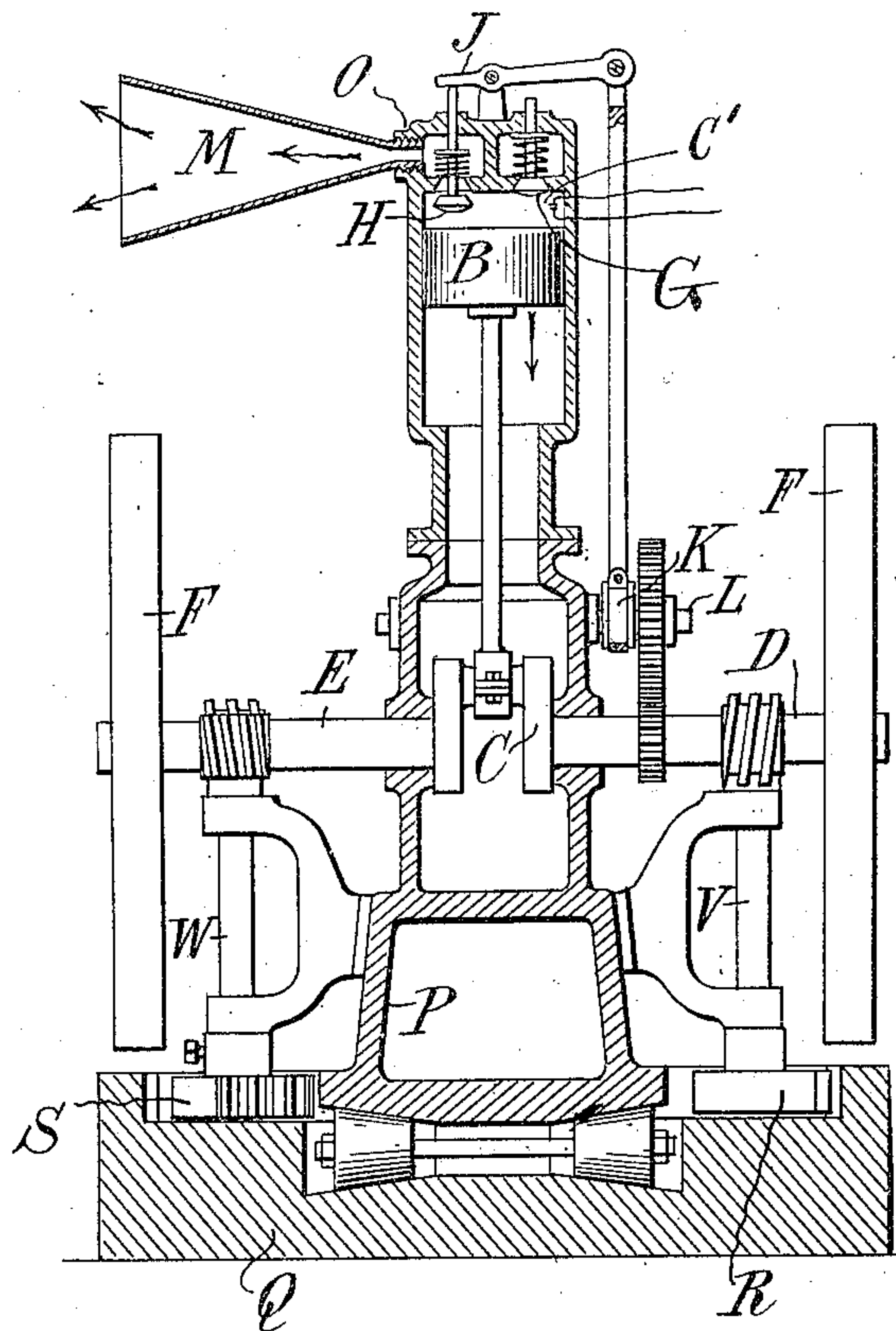


FIG. 3.

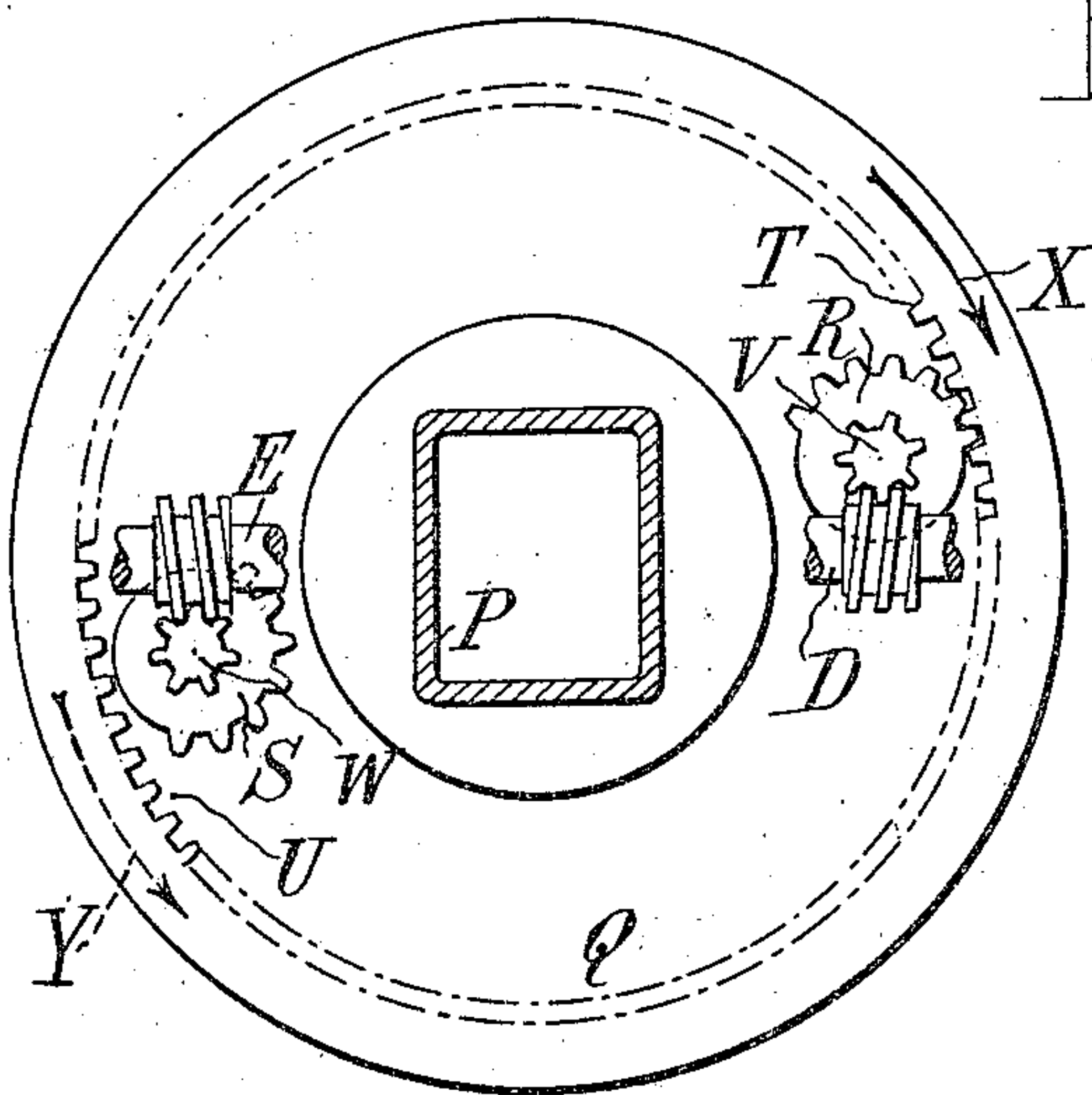
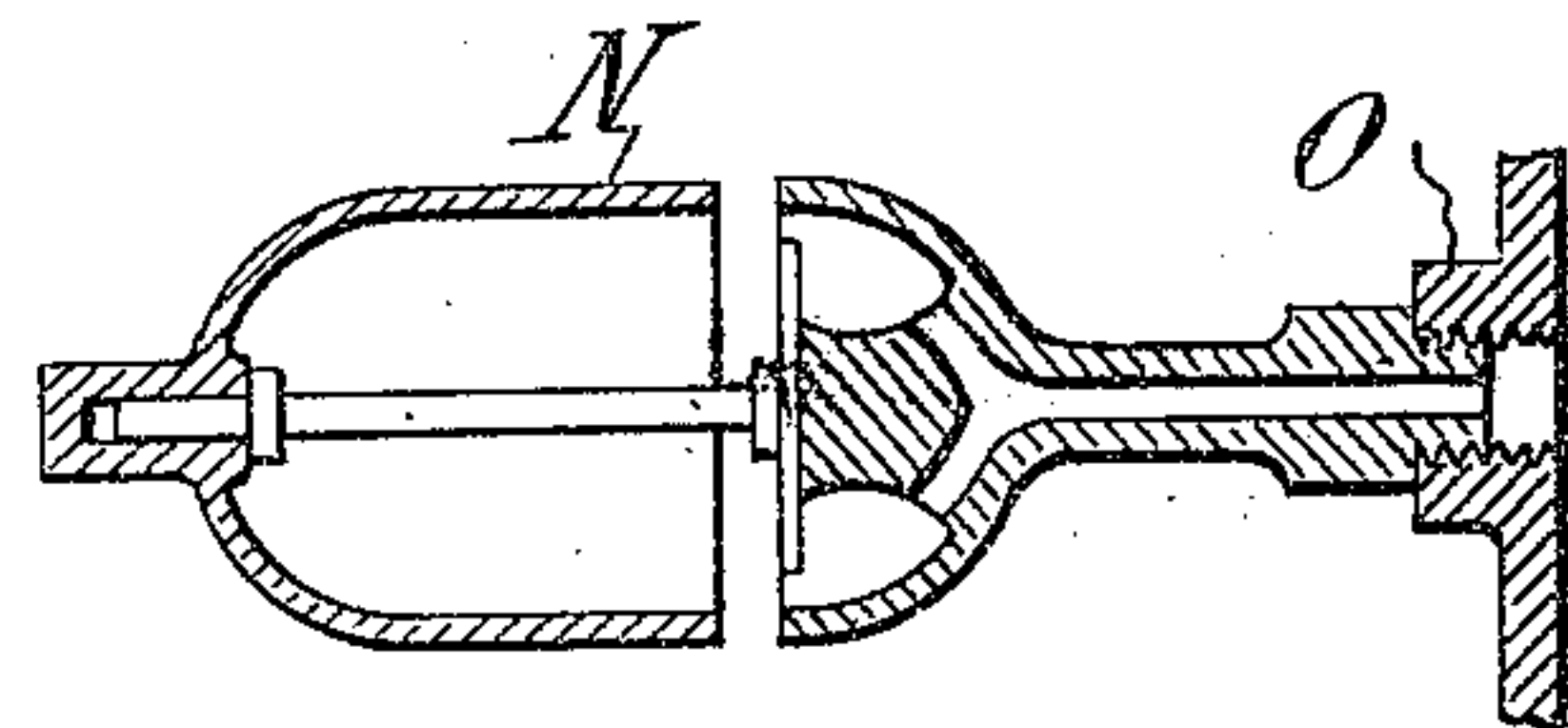


FIG. 2.



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WITNESSES:

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# UNITED STATES PATENT OFFICE.

THOMAS L. WILLSON, OF OTTAWA, ONTARIO, CANADA, ASSIGNOR, BY MESNE ASSIGNMENTS,  
TO INTERNATIONAL MARINE SIGNAL COMPANY, LIMITED, OF OTTAWA, CANADA, A COR-  
PORATION OF CANADA.

## FOG-SIGNAL.

No. 861,786.

Specification of Letters Patent.

Patented July 30, 1907.

Application filed September 2, 1905. Serial No. 276,811.

To all whom it may concern:

Be it known that I, THOMAS L. WILLSON, a subject of the King of Great Britain, residing at Ottawa, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Fog-Signals, of which the following is a specification.

In mechanical fog signals for light-ships, buoys, or other locations on land or sea, it is customary to use a steam engine, steam being generated in a boiler and being admitted at intervals to a whistle or siren, or other sound-intensifying device; and a portion of the steam being used to run an engine which controls the operation of the whistle or the like. Or an engine is sometimes used to compress air in a reservoir and admit the air at intervals to a horn or the like for operating the same.

I propose to eliminate a great part of the expense of the aforesaid apparatus, and to simplify the operation by using the exhaust of an engine to give the signal. Preferably an internal combustion engine is used, and the products of combustion are exhausted at approximately the instant when the maximum explosive force is generated, the gases passing into a megaphone or a whistle or other sound-intensifying or directing device. In this way approximately or substantially all the power of the engine is directed to the production of the signal, the adjustment being such that the residual power is only sufficient to run the engine. The regular running of the engine preferably includes the operation of mechanism for varying the direction toward which the sound is projected, as by rotating or oscillating the entire engine.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a perspective view of a single cylinder gas or gasoline engine with a megaphone attached; Fig. 2 is a sectional view of a whistle attached to a similar engine; Fig. 3 is a plan illustrating a mechanism for regularly and slowly oscillating the entire engine to vary the direction of the sound; Fig. 4 is a sectional view through the cylinder, being more or less diagrammatic so as to show the relative positions of all the parts at the same instant.

Referring to the embodiment illustrated, A is the cylinder of the engine, in which is the piston B driving cranks C, and crank shafts D and E carrying fly-wheels F. G is the inlet and H the exhaust valve, the latter being opened at a predetermined instant by means of a lever J driven from an eccentric K on the shaft I, which is operated at half the speed of the crank shaft D.

By adjusting the angle of the eccentric K, the point at which the exhaust valve H will open is determined. This is an ordinary type of four-cycle engine in which ordinarily the full force of the expansion is utilized

to drive the piston B downward, after which the exhaust valve is opened and the return of the piston by the fly wheels expels the gases of combustion; the fly wheels again carrying the piston down and sucking in fresh explosive mixture through inlet valve G, then compressing this mixture, whereupon a spark passes between the terminals of the sparkers C' and the explosion takes place again and the cycle is repeated. In the present case, however, I have shown the valve H open when the piston B is near the top of its compressing stroke and has just started downward. It may be opened a little earlier or a little later, the time being readily determinable by experiment so as to secure the greatest noise. The greatest force of the expansion is expended in driving the gases through the exhaust valve and through the megaphone M which directs and also intensifies the noise. The proportions and timing of the parts however are such as to leave a certain residuum of power sufficient to continue the movement of the fly wheels, and also to operate the direction-varying mechanism hereinafter described when such a mechanism is used.

The explosion described makes a very loud noise indeed, and one which is most adapted to carry a long distance in fog. It is not essential to use the megaphone M or any equivalent device, it being only necessary to proportion the engine so as to get the maximum noise-producing effect from the exhaust, the matter of power being entirely secondary. Or instead of the megaphone M, a whistle, such as the ordinary steam whistle N-Fig. 2, may be applied to the exhaust port O, or in fact any other sounder or sound-intensifying device may be so applied.

Various mechanisms may be used for changing the direction of the signal at intervals. These require very little power, and may be operated by the engine without interfering with its function as a noise producer. As an example, the base P may be revolvably mounted upon a fixed base Q, and turned first in one direction and then in the other by means of mutilated pinions R and S engaging respectively and alternately teeth T and U, the pinions being mounted on vertical shafts V W driven by worm-gearing from the crank shafts D E; and the teeth being formed on the fixed base Q. When the engine has swung around in the direction of the arrow X, Fig. 3, for a distance corresponding to the number of teeth on the pinion R, it will rest for an interval and then swing in the opposite direction, as indicated by the arrow Y, under the control of the pinion S.

Though I have described with great particularity of detail certain specific embodiments of the invention, yet it is not to be understood therefrom that the invention is limited to the particular embodiments disclosed. Various modifications thereof in detail, and in the ar-

rangement and combination of the parts, may be made by those skilled in the art, without departure from the invention.

What I claim is:--

- 5 1. A signaling apparatus comprising an engine having a cylinder with an exhaust valve, a piston reciprocating in said cylinder and compressing a gas therein, means for exploding the compressed gas, and means connected with said piston for opening said valve at the moment when the  
10 greatest pressure in the cylinder is generated, whereby approximately all the power of the engine is directed to the production of an audible signal, the residual power being only sufficient to return the piston and continue the engine in operation.
- 15 2. A signaling engine having a cylinder with an exhaust valve and a piston reciprocated by the explosion of the driving medium and serving to compress the driving medium in the cylinder, and means connected with said piston for exhausting at approximately the instant of  
20 generation of maximum explosive force, whereby approximately all the power of the engine is directed to the production of an audible signal, the residual power being only sufficient to continue the engine in operation.

3. A signaling engine including in combination means for maintaining it in continuous operation by the explosion of the driving medium, and means operating automatically to expend in noise all the force of the explosion except just enough to run the engine without any load thereon.

4. A signaling apparatus including in combination an engine the exhaust of which is utilized in making the signal in a determined direction, and means for automatically turning said engine to direct the signal to different points.

5. A signaling apparatus including in combination an engine operated by explosion of the driving medium and having an exhaust valve arranged to open at the moment when the greatest noise-producing force is generated, means for directing said noise, and means for automatically oscillating said engine continuously.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS L. WILLSON.

Witnesses:

DOMINGO A. USINA.  
FRED WHITE.