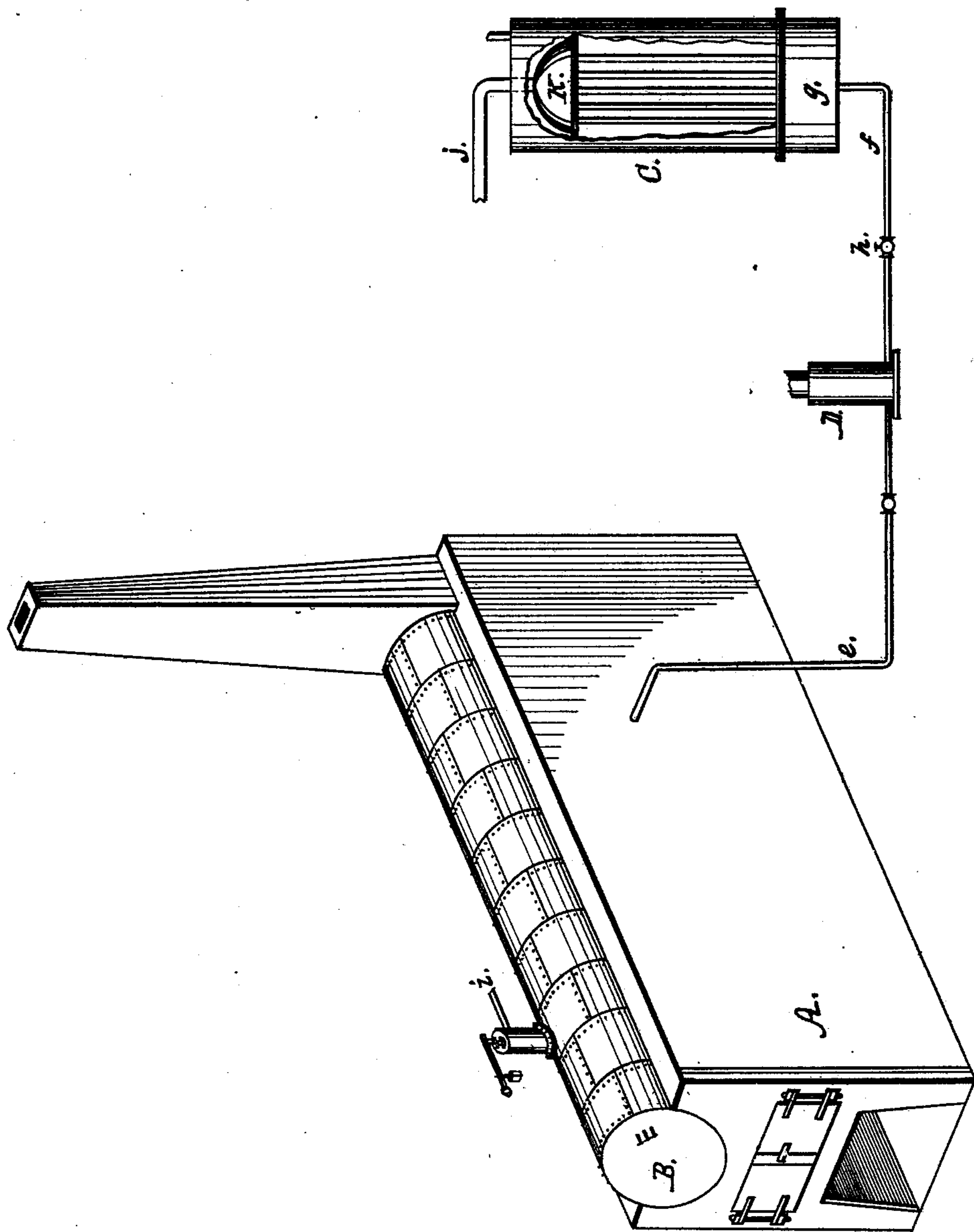


J. WILLIAMS, E. SMITH & J. R. MILLIGAN.  
Motor for Machinery.

No. 213,797.

Patented April 1, 1879.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JOSEPH WILLIAMS, OF SHARPSBURG, EDGAR SMITH, OF PITTSBURG, AND  
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## IMPROVEMENT IN MOTORS FOR MACHINERY.

Specification forming part of Letters Patent No. **213,797**, dated April 1, 1879; application filed  
February 7, 1879.

*To all whom it may concern:*

Be it known that we, JOSEPH WILLIAMS, of Sharpsburg, EDGAR SMITH, of Pittsburg, and JOSEPH R. MILLIGAN, of Wilkins township, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Motors for Machinery; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

Our joint invention consists, first, in the mixture, hereinafter described, to be used for actuating a piston, consisting of the vapor of bisulphide of carbon and petroleum-oil; second, in the method, hereinafter described, for producing a motor for actuating a piston—viz., injecting bisulphide of carbon into a boiler supplied with petroleum-oil previously heated; and, third, in the method of operating a piston, as hereinafter described—viz., supplying the cylinder with a mixture composed of the vapor of bisulphide of carbon and petroleum-oil and with a small quantity of liquid petroleum-oil.

To enable others skilled in the art with which our invention is most nearly connected to make and use it, we will proceed to describe its construction and operation.

In the accompanying drawing, which forms part of our specification, A represents a furnace; B, a steam-boiler; C, a condenser; D, a force-pump, which is connected with the boiler B and condenser C by pipes *e* and *f*, all of which are of the ordinary form and construction, the operation of which is well understood.

We connect the boiler with the cylinder of an engine by a pipe furnished with the usual throttle-valve.

The boiler B is supplied with petroleum-oil or petroleum-oil and water, (preference being petroleum-oil,) filling the boiler to the ordinary water-line. The lighter or volatile portion of the petroleum-oil must be evaporated for the purpose of separating the gasoline and benzole from it prior to putting the petroleum-oil in the boiler B. We then heat the petroleum-oil, or the petroleum-oil and water, in the boiler B

to about 200° of heat, which should be indicated by a suitable instrument. We then charge the chamber *g* of the condenser C with bisulphide of carbon, then open the valve *h*, so that the bisulphide of carbon will be forced by the pump D gradually into the boiler B, which, coming in contact with the previously-heated petroleum-oil, or petroleum-oil and water, is rapidly vaporized, forming a force or pressure in proportion to the quantity of bisulphide of carbon injected into the boiler, and the heat applied thereto.

The boiler B should be provided with a suitable pressure-gage for indicating the pressure in the boiler, which will also enable the operator to adjust the flow of the bisulphide of carbon.

The desired pressure being obtained, the vapor is allowed to pass through pipe *i* to the cylinder of the engine for the purpose of actuating its piston, the exhaust of the engine communicating by means of the pipe *j* with the chamber K of the condenser C. The exhausted vapor from the cylinder of the engine being condensed is carried back again into the boiler B, through the medium of the pipes *e f* and pump D, and worked over.

The cylinder of the engine must be supplied internally with a small quantity of petroleum-oil; also, the steam-chest and its valve or valves and the piston-rod lubricated with said oil.

A motor, formed by bringing bisulphide of carbon in contact with petroleum-oil, or petroleum-oil and water, as hereinbefore stated, will, with a small quantity of said oil in the cylinder of the engine, operate in all respects the engine as well as steam, with the cost of the former, as compared with the latter, reduced at least seventy-five per cent., and is equally as well controlled by the engineer as steam.

The petroleum-oil is used for vaporizing the bisulphide of carbon, for the reason that it rapidly absorbs the heat of the fire, and thereby rapidly vaporizes the bisulphide of carbon, the evolving of which atomizes a portion of the petroleum-oil, which atoms commingle with the vapor, so that the latter acts as a lubricant in the actuating of the piston for operating machinery.

We are aware that bisulphide-of-carbon gas



has been experimented with for a motive power in a great variety of ways, one example of which may be found in the English patent granted to A. V. Newton, No. 2,388, dated October 11, A. D. 1856. Our invention or discovery, in contradistinction to that of the said Newton, will more fully appear by a reference to his alleged invention, as described in his specification, to which we make special reference, and for the reason that we wish it distinctly understood that we do not claim, broadly, vaporizing bisulphide of carbon for a motor or vaporizing it by water, fatty oils, or glycerine.

Having thus described our joint invention, what we claim is—

1. The mixture described, to be used for

actuating a piston, consisting of the vapor of bisulphide of carbon and petroleum-oil.

2. The method described of producing a motor for actuating a piston—viz., injecting bisulphide of carbon into a boiler supplied with petroleum-oil previously heated.

3. The method of operating a piston as described—viz., supplying the cylinder of an engine with a mixture composed of the vapor of bisulphide of carbon and petroleum-oil and with a small quantity of liquid petroleum-oil.

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