C. G. WILSON.

MERCURIAL EXPANSION ENGINE.

No. 104,526. Patented June 21, 1870.

Fig: 1

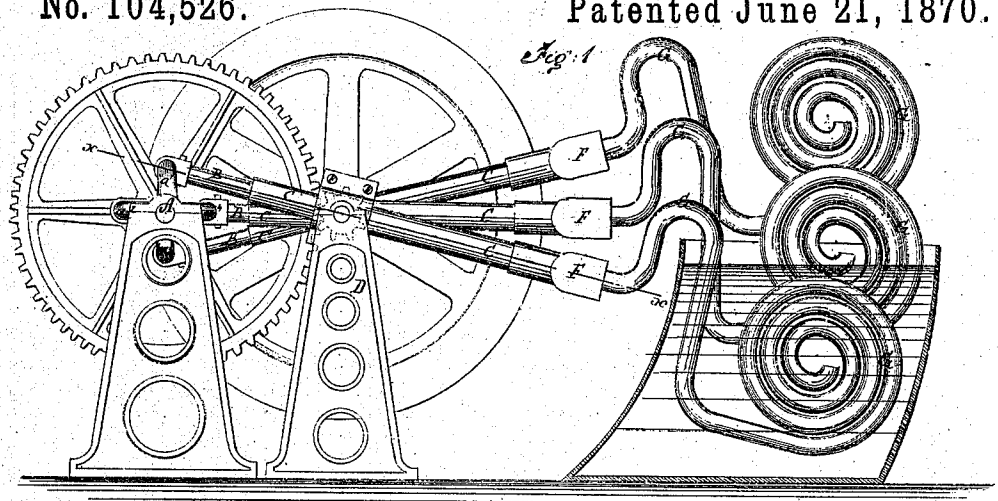


Fig: 2

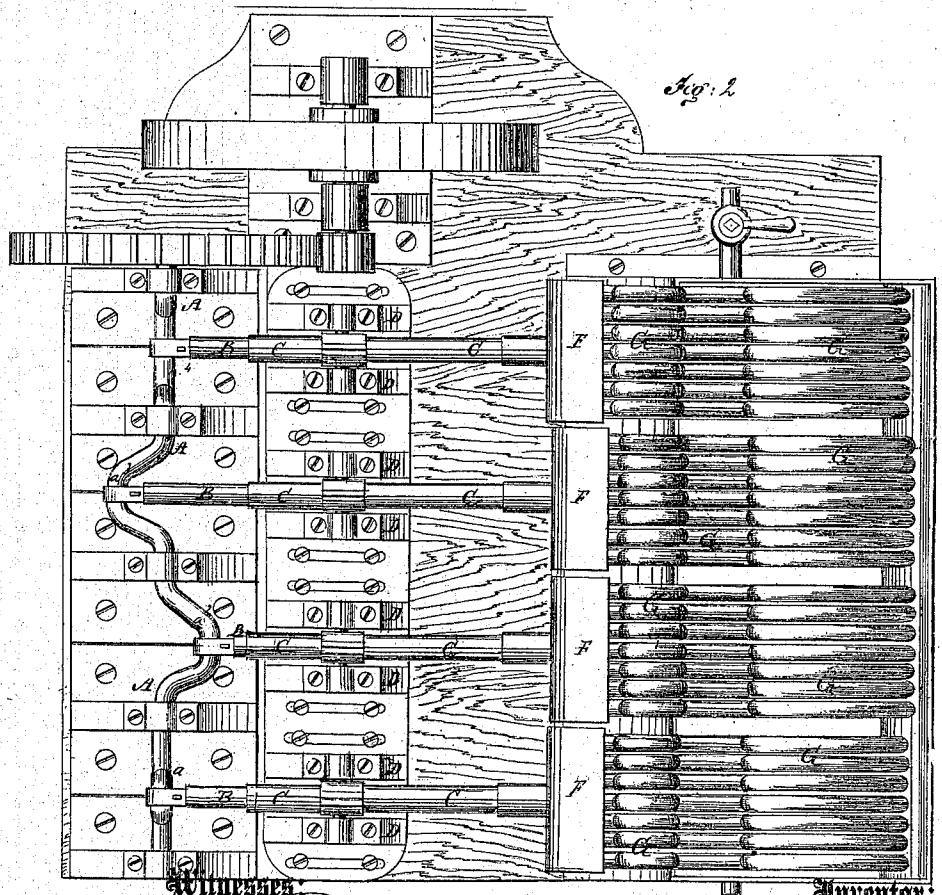
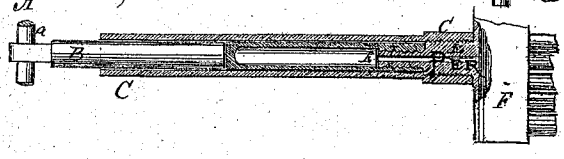


Fig: 3



Witnesses:

Chas. Nida.

Alex. F. Roberts

Inventor:

Chas. G. Wilson

Munn & Co

Attorneys.

United States Patent Office.

CHARLES G. WILSON, OF BROOKLYN, NEW YORK,

Letters Patent No. 104,526, *dated June* 21, 1870.

MERCURIAL-EXPANSION ENGINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, CHARLES G. WILSON, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Mercurial-expansion Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a side view of my improved engine, partly in section through the heating-trough.

Figure 2 is a top or plan view of the same.

Figure 3 is a detail sectional view, taken through the line *x x*, fig. 1.

Similar letters of reference indicate corresponding parts.

My invention has for its object to furnish a simple, cheap, safe, and reliable motor, designed for use where only small power is required, and which shall be so constructed that it may be easily manipulated and kept in repair; and

It consists in the construction and combination of the various parts of the machine as hereinafter more fully described.

A is the crank-shaft, to which motion is given by the engine, and from which motion is communicated to the machinery to be driven by an ordinary gearing.

Upon the shaft A is formed four or more cranks, *a'*, arranged at right or equal angles with each other, as shown in figs. 1 and 2.

To the cranks *a'* are pivoted the outer ends of the pistons B, which enter and work in the tubes C.

The tubes C are provided with trunnions formed upon or attached to them, which work in bearings attached to the upper ends of the standards D, the lower ends of which are adjustably bolted to the bed of the machine, so that they may be adjusted as required.

The other ends of the tubes C are screwed upon the bases of the nozzles E formed upon or attached to the forward edge of the hollow cross-heads F, with the rear side edges of which are connected the ends of the coils G.

Seven, more or less, coils G are connected with each hollow cross-head or cylinder F.

The shape of the coils G is immaterial, so long as they are so formed that, as the tubes C oscillate, the bodies of the coils may descend into the trough H, as shown in fig. 1.

The forward or end parts of the nozzles E are made smaller than their bases, and the outer surface of said smaller parts is corrugated or roughened, to enable the India-rubber tubes or bags I to be wired, or otherwise securely attached, to said nozzles.

The other ends of the bags I are closed and rest against the ends of the pistons B, to prevent the contents of the coils from escaping around the said pistons, while, at the same time, allowing the said contents to expand and contract freely.

The trough H is filled with brine, and beneath it should be placed an ordinary furnace, or other heating apparatus, so that the said brine may be kept heated to about two hundred degrees (200°) Fahrenheit.

The coils G are filled with mercury up to the pistons, the rubber bags I preventing said mercury from coming in contact with said pistons, and from escaping through the tubes C.

By this construction, one or more of the coils G will always be in the trough H.

As the mercury heats it expands and forces out the piston B, revolving the crank-shaft A through about a quarter of a revolution. At the same time the piston B and tube C act as a lever to raise the coil G out of the trough H. As the coil G rises out of the trough H the rapid evaporation from its wet surface quickly cools the mercury, which contracts and allows the coil to again descend into the trough H, by its own weight and by the leverage of the said piston B and tube C.

All the coils G operating successively in the same way, a continuous motion is given to the shaft A, and through it to the machinery to be driven.

Other liquids than mercury may be used in the coils G, provided they possess the quality of receiving and parting with heat readily.

The coils G should move through an arc of about thirty degrees, (30°) of which about seven should be in the trough H, and the remaining space in the air.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. Imparting motion to machinery by means of the expansion and contraction of mercury, or equivalent heat-conducting liquid or compound, substantially as herein shown and described, and for the purpose set forth.

2. The combination of the crank-shaft A *a'*, pistons B, tubes C, rubber bags I, hollow cross-heads F, coils G, and trough H, with each other, substantially as herein shown and described, and for the purpose set forth.

The above specification of my invention signed by me this 23d day of December, 1869.

CHAS. G. WILSON.

Witnesses:

GEO. W. MABEE,

JAMES T. GRAHAM.