C. M. & E. E. MILLER.
Portable Engine.

No. 202,853. Patented April 23, 1878.

Fig. 1.

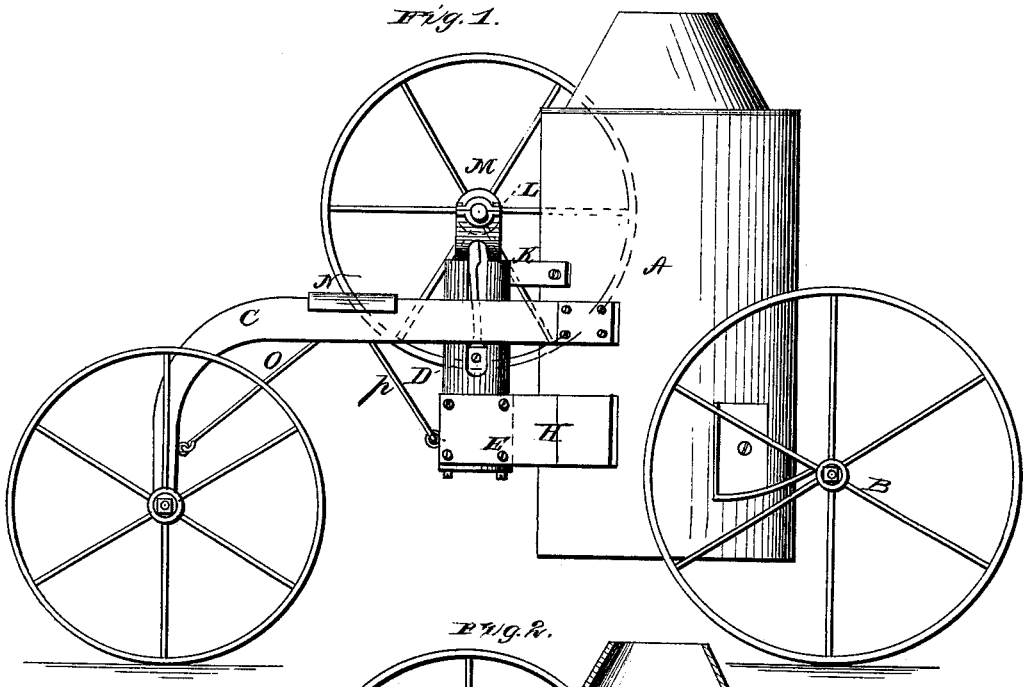


Fig. 2.

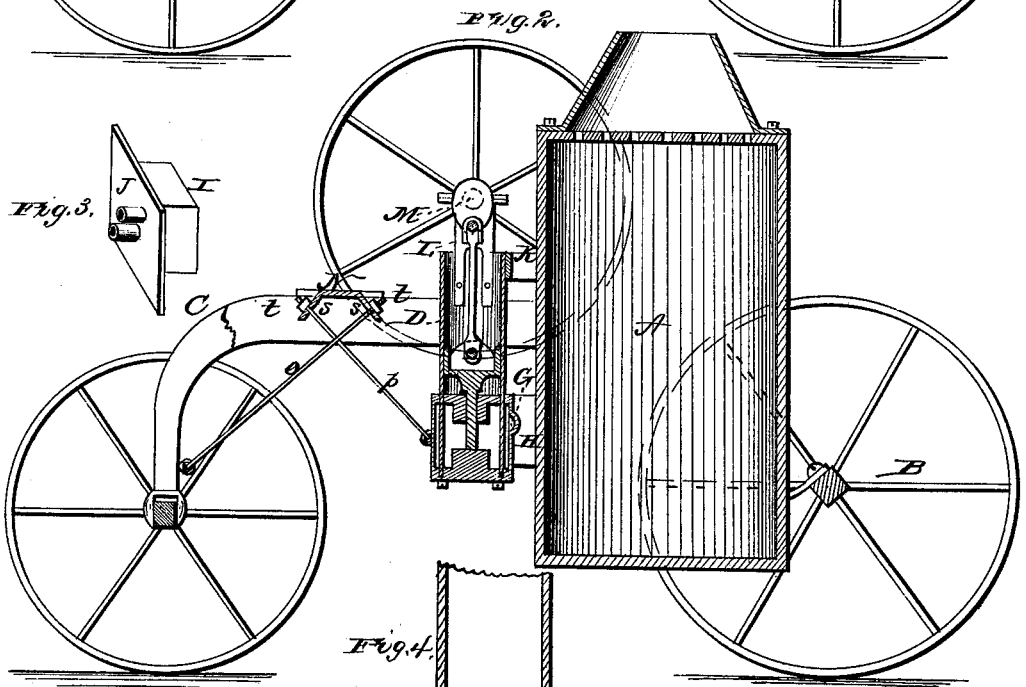
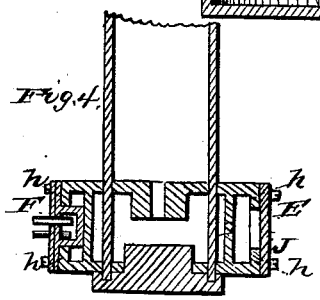


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

CASSIUS M. MILLER AND EDGAR E. MILLER, OF CANTON, OHIO; SAID CASSIUS M. MILLER ASSIGNOR TO C. AULTMAN & CO., OF SAME PLACE.

IMPROVEMENT IN PORTABLE ENGINES.

Specification forming part of Letters Patent No. **202,853**, dated April 23, 1878; application filed February 13, 1878.

To all whom it may concern:

Be it known that we, CASSIUS M. MILLER and EDGAR E. MILLER, both of Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Portable Engines; and we do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation; Fig. 2, a longitudinal vertical section; Fig. 3, a perspective view of the heater-cover and box I, and Fig. 4 a transverse section through the cylinder, heater, and steam-chest.

Like letters of reference indicate the same parts in the several figures.

Our invention has for its object to improve the construction and operation of agricultural and other light portable engines; and to this end consists, first, in the combination of a heater with the steam-chest and cylinder by which the steam from the chest is exhausted into the heater for heating the water-pipes, the cylinder, steam-chest, and heater being all cast in one piece to cheapen the cost of manufacture; secondly, in the heater-cover, constructed with a hollow case or box projecting into the heater, said box receiving the pipes, which are connected thereto in such a manner that they can be detached readily for cleaning the heater; thirdly, in casting the cylinder, steam-chest, and heater in one piece, and combining them with the braces by which they are supported from the boiler; fourthly, in casting the steam-chest, heater, cylinder, the lower braces, and the upper arms, which carry the crank-shaft, all in one piece, by which the whole attachment can be easily applied to and removed from the boiler; fifthly, in connecting the heater and steam-chest to the reach of the carriage in such a manner as to equalize the strain between the reach and the steam-chest and heater, as we will presently describe.

In the accompanying drawings, A is the boiler, of the ordinary or any preferred construction, supported by the hind wheels B and by the reach C, which is curved downward to allow the front wheels to swing under it. D is the cylinder, mounted centrally upon a horizontal case, one end, E, of which forms the steam-chest, and the other end, F, the heater, into which the steam from the chest exhausts through a port, G, at the rear side. These three parts are all cast in one piece, and form a convenient and economical structure for this class of engines. They are secured to the boiler by braces or stays H H, bolted or otherwise fastened thereto, with their opposite ends bolted to internal flanges *h h*, cast with the heater and chest. One brace forms the cover to the steam-chest, but the other is cut away centrally for the passage into the heater of a hollow box or case, I, secured to the heater-cover J, which is a separate piece from the heater-brace, although bolted thereto, and to the flanges *h h*. If desired, the braces may be cast directly to the heater and steam-chest; but the former construction is preferable.

The heater-cover J receives the water-pipes, which enter the hollow box, and are joined to the cover by external union-joints, being large joints, which permit the pipes to be disconnected. By this construction the hollow box is nearly surrounded by exhaust-steam from the chest, for the purpose of heating the water in the pipes, and when it becomes incrusted from the deposits from the water the pipe can be detached from the cover, the latter removed from the heater, and the box heated or otherwise treated for removing the lime or other incrustations.

K K are stays connecting the upper end of the cylinder to the boiler, and L L are upright arms, which receive the crank-shaft M and its attachments. The stays K and arms L are either bolted to the cylinder or cast therewith. We prefer to cast the arms with the cylinder, as being the easiest and cheapest mode of construction. The reach C is constructed of two wrought-iron plates, joined at the forward ends, and so connected to the front axle that it can freely swing laterally. From this forward point the plates diverge, straddling the cylinder, and are fastened to the boiler at such height as to permit the front wheels to swing under the curve, as hereinbefore stated.

N is a bridge, flanged to fit over and slide upon the upper edges of the reach-plates, and bent downward at each edge between the plates, as shown at *s s*, where it receives the tie-rod *o*, by which it is joined to the forward part of the reach, and the two tie-rods *p p*, by which it is joined to the steam-chest and heater, respectively. The angle of the parts *s s* is such that the nuts *t*, by which the several tie-rods are adjusted, shall fit against the upper surfaces of said parts, to prevent the tie-rods from bending or breaking their threads.

The bridge slides freely upon the plates of the reach, and can be adjusted to the requisite position. By this construction the forward or back strain between the front and rear parts of the engine is through the bridge, and is therefore equally distributed.

Having thus described our invention, we claim as new—

1. The cylinder D, steam-chest E, and heater F, all cast in one piece, and arranged, relatively to each other, substantially as described, for the purpose specified.

2. The heater-cover constructed with the case or box I, to project into the heater, substantially as described for the purpose specified.

3. The heater-cover constructed with the box or case I and adapted to receive the water-pipes, in the manner substantially as described, for the purpose specified.

4. The heater and steam-chest cast with the internal end flanges *h h*, substantially as described, for the purpose specified.

5. The cylinder, steam-chest, and heater, cast in one piece, in combination with the braces H H connecting them to the upright boiler, substantially as described.

6. The cylinder, steam-chest, and heater, cast in one piece, in combination with the braces H H and arms L L, substantially as described, for the purpose specified.

7. The steam-chest and heater, connected to the reach C so as to equalize the strain between them and the reach, by means of suitable stays or ties.

8. The combination of the tie-rods *o p* and bridge N with the reach C and the steam-chest and heater, substantially as described, for the purpose specified.

9. The bridge N, adapted for adjustment upon the reach C, substantially as described, for the purpose specified.

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