E. F. & J. McFarland,

Motor.

No. 51,737. Patented Dec. 26, 1865.

Fig. 1.

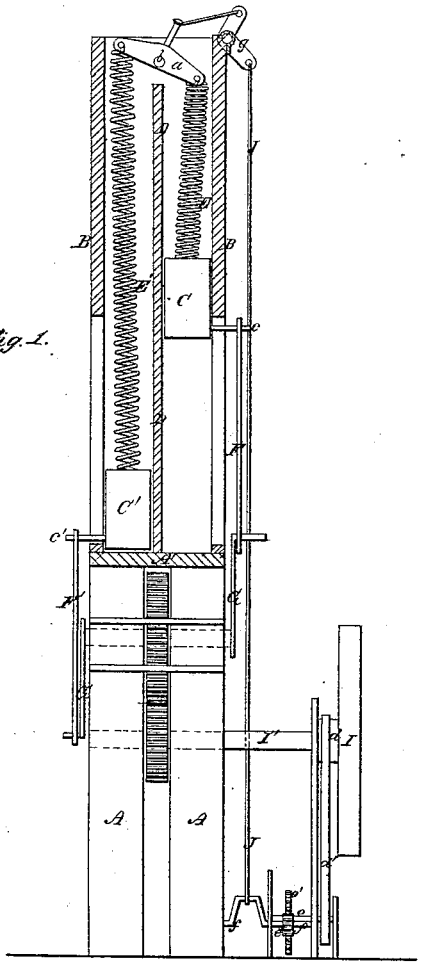


Fig. 2.

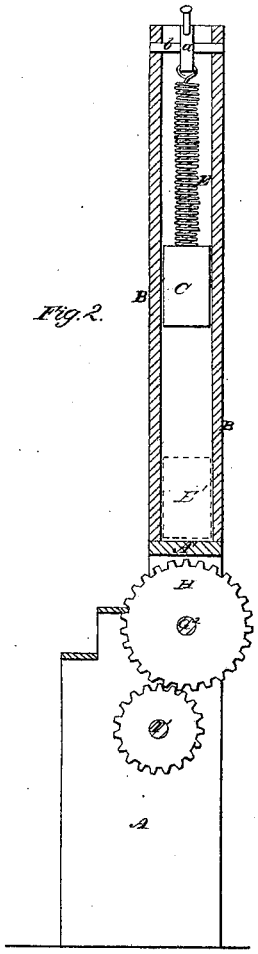
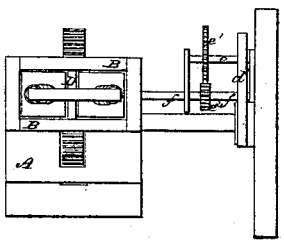


Fig. 3.



Witnesses.

R. F. Campbell

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UNITED STATES PATENT OFFICE.

EDWD. F. McFARLAND AND JOHN McFARLAND, OF WORCESTER, MASS.

IMPROVEMENT IN SPRING AND WEIGHT PISTON-ENGINES AND STAMPING-MACHINES.

Specification forming part of Letters Patent No. **51,737**, dated December 26, 1865

To all whom it may concern:

Be it known that we, EDWARD F. McFARLAND and JOHN McFARLAND, of Worcester, county of Worcester, and State of Massachusetts, have invented a new Spring and Weight Engine and Stamping-Machine; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical section of the upper part of our engine and an external view of the lower part thereof. Fig. 2 is a vertical central section through the engine. Fig. 3 is a top view.

Similar letters of reference indicate corresponding parts in the three figures.

The object of our invention is to obtain power from the alternate extension and retraction of loaded springs, which are suspended from the extremities of an oscillating beam for driving machinery and for other purposes, as will be hereinafter described.

To enable others skilled in the art to understand our invention, we will describe its construction and operation.

In the accompanying drawings, A represents a solid foundation, which may be made of metal or of stone. I prefer to make this foundation of masonry, as it will be much cheaper than iron and answer every purpose. Upon this foundation is secured a metal slab, A′, and upon this is erected a frame, B, which forms vertical guides for receiving and guiding two weights, C C′, in their up and down movements.

The frame B may be made of any desired height, according to the fall which it may be found necessary to allow the weights C C′, and it may be made of any desired area horizontally, according to the size which may be required of the weights C C′. If these weights are rectangular, the frame B will be made of this shape, or if cylindrical the frame will be shaped accordingly. As said frame is intended more particularly to prevent the weights from vibrating or tilting in giving to them a rapid vertical motion, it may be made of light bars, instead of being closed, as shown in the drawings, or any form of frame-work which will guide the weights may be adopted, as circumstances may require. We prefer in every case to employ a division, D, for preventing the weights from striking each other.

At or near the upper end of the frame B is an oscillating beam, *a*, which is secured to a rock-shaft, *b*, and from the extremities of this beam we suspend the weights C C′ by means of springs E E′, which may be made of metal, formed as shown in the drawings, or they may be made of india-rubber. The helical metal springs are preferable. The weights and springs should exactly counterbalance each other, and the springs should be made of an equal length and as near alike in every other respect as possible. The length of these springs E E′ should be such as will admit the weights C C′ to strike the bed-plate A′ before the springs are extended to their utmost.

The weights C C′ have wrist-pins *c c′* projecting from them through slotted guides of frame B, as shown in Fig. 1, to which pins pitmen F F′ are connected at their upper ends. The lower ends of these pitmen are pivoted to the two throw-cranks G G′ of a crank-shaft, G^2. This shaft has its bearings in the foundation of the engine, and carries a large spur-wheel, H, which communicates motion to a fly-wheel, I, through the medium of several spur-wheels of varying sizes. The shaft I′ of the fly or balance wheel I has a drum, *d*, upon it, from which motion is communicated to a shaft, *e*, by means of a belt, *d′*. This shaft *e* carries a spur-wheel, *e′*, which engages with the teeth of a pinion, e^2, that is keyed on a crank-shaft, *f*, to the crank of which a rod, J, is connected, and is carried upward and again connected to a rectangular rocking lever, *g*, that receives its motion from the beam *a*, to which the loaded springs E E′ are suspended.

In Fig. 1 of the drawings the weight C is represented as just having started to move downward, while the weight C′ has just started upward, the weight C by its own gravity and the impetus which it acquires in descending, together with the recoil of the extended spring E′, all operate to lift the weight C′. When the weight C descends a certain distance it strikes suddenly upon the bed-plate A′, which throws or starts the weight upward again to allow the opposite weight to descend.

By arranging the guide B upon a movable

bed or carriage and removing the bottom of the guide-frame, we have an engine which may be used for a stone-pounder, for ramming earth, and for various purposes where it is an object to utilize manual-power.

The power for operating the loaded springs may be applied to one or the other of the crank-arms G G′ of the shaft G^2, or at any other practicable point, as the necessity of the case may demand. Power is absolutely necessary of course, and it must be so applied to the machine continuously as to produce an oscillation or vibration of the beam *a*.

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

The employment of loaded springs which are suspended from the extremities of an oscillating beam and guided in their upward and downward movements substantially in the manner described.

Witness our hands in matter of our application for a patent.

EDWARD F. McFARLAND.
JOHN McFARLAND.

Witnesses:
MICHAEL O'DRISCOLL,
JOHN WARD.