C. HARDY.

EXPLOSIVE-ENGINE.

No. 178,925. Patented June 20, 1876.

Fig 1.

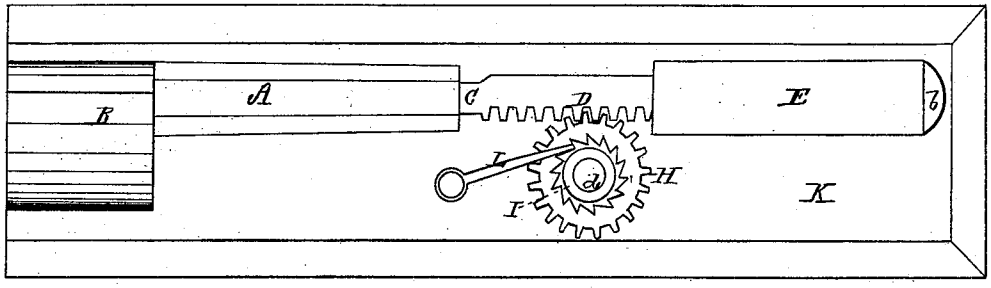
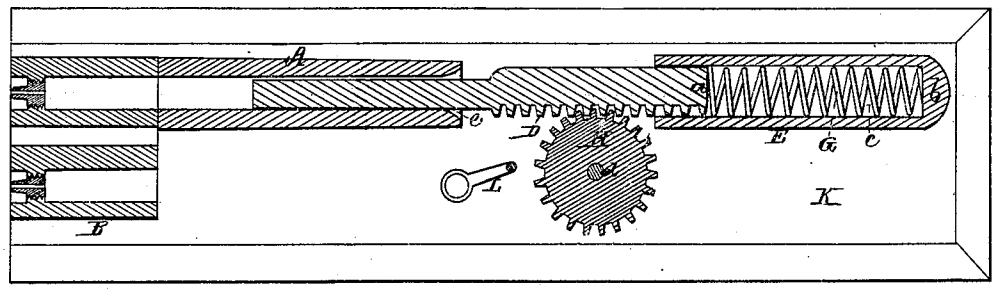


Fig 2.



Witnesses.

S. N. Pipes

L. A. Miller

Charles Hardy.

by his attorney.

R. H. Eddy

UNITED STATES PATENT OFFICE.

CHARLES HARDY, OF NASHUA, NEW HAMPSHIRE.

IMPROVEMENT IN EXPLOSIVE ENGINES.

Specification forming part of Letters Patent No. **178,925**, dated June 20, 1876; application filed May 22, 1876.

To all whom it may concern:

Be it known that I, CHARLES HARDY, of Nashua, of the county of Hillsborough and State of New Hampshire, have invented a new and useful Improvement in Explosive Engines, or Poudrometers; and do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 denotes a side view, and Fig. 2 a longitudinal section, of an engine or apparatus embodying my invention.

In such drawings, A represents a pistol or gun barrel, provided with a rotary magazine, B, like that of the fire-arm termed a "revolver." In fact, the first part of my invention is a gun, cannon, or fire-arm, the barrel of which is represented at A, the next consisting in a piston or plunger, C, provided with a toothed rack, D, and extended within the bore of the gun or barrel A, and also into another or stationary barrel, E, containing a helical spring, G, and arranged in advance of, and in line with, the barrel A, as shown. The said spring G rests at its rear end against the rack-head *a*, and at its other end against the breech or head *b* of the bore *c* of the case or barrel E. A gear, H, engages with the rack D, and has fixed to its side a ratchet-wheel, I, both gear and ratchet being supported on a pivot, *d*, projecting from the plate K, to which the barrels A and E are fastened. A pawl, L, pivoted to the plate K, engages with the ratchet-wheel I, as shown.

The gun, cannon, or fire-arm I prefer to have of the kind termed a "breech-loader," whether it be a revolver, a repeater, or of a different construction. The piston is to fit loosely in the bore, which, at and near the mouth, may be enlarged, as shown at *e*, to admit of the ready escape of the gases of an exploded charge. It is important that there should be a suitable windage around the piston for the escape of the gases resulting from the explosion of a charge, unless the piston be made to closely fit the bore, and the latter at some suitable part be provided with one or more lateral openings extending through the barrel, and being for the escape of the said gases after the piston may have been driven forward by the force of the explosion of a charge.

When a charge of gun-powder, or any other explosive material (as gun-cotton or dynamite, for instance) is fired in the gun or barrel A, its explosion will cause the piston to be driven forward against the spring, and such to be contracted until the force of its resistance may equal or counterbalance that of the explosion. In moving forward, the rack of the piston will revolve the gear and its ratchet-wheel, which, with the pawl and rack, will hold the spring in its contracted state. By suitably applying mechanism to the gear, such gear, on the pawl being raised out of engagement with the ratchet-wheel, may be revolved by the rack, and the power stored in the spring, and be caused to put such mechanism in motion or action.

There may be applied to the plate K a dial, and to the gear a finger to turn with the gear, and indicate on the dial the force of the compression of the spring, in which case the apparatus may be used as a poudrometer or measurer of the explosive force of any explosive material or compound capable of being fired in the gun or barrel A.

I claim as my invention—

The explosive engine, substantially as described, composed of a common fire-arm or gun-barrel, A, the piston or plunger C, rack D, gear H, ratchet-wheel I, pawl L, and the spring G, arranged in the carrier or stationary barrel L, all being applied essentially as set forth.

CHARLES HARDY.

Witnesses:
R. H. EDDY,
J. R. SNOW.