

No. 38,715.

PATENTED MAY 26, 1863.

R. PORTER.
AIR PUMP.

Fig. 1.

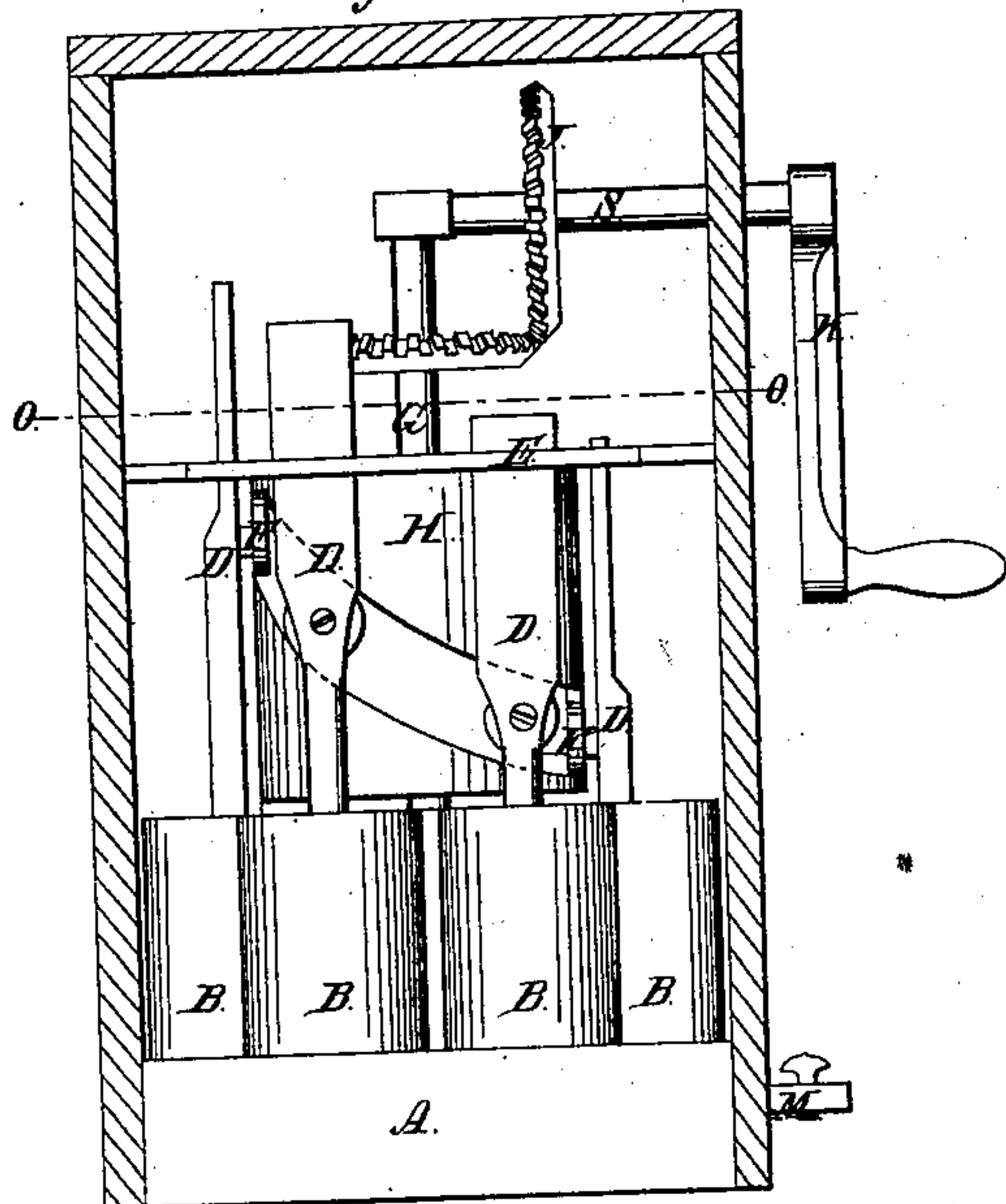


Fig. 3.

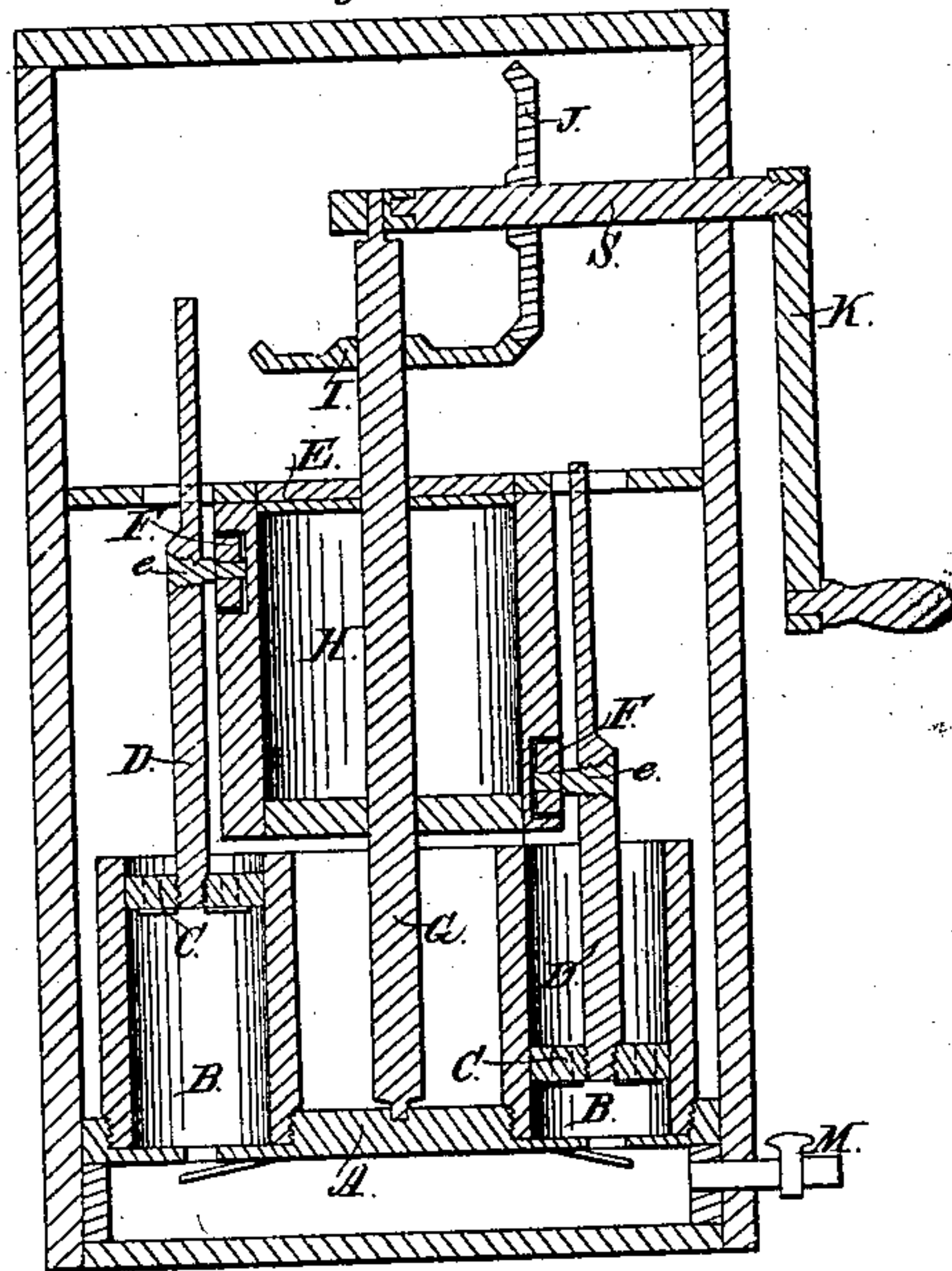


Fig. 2.

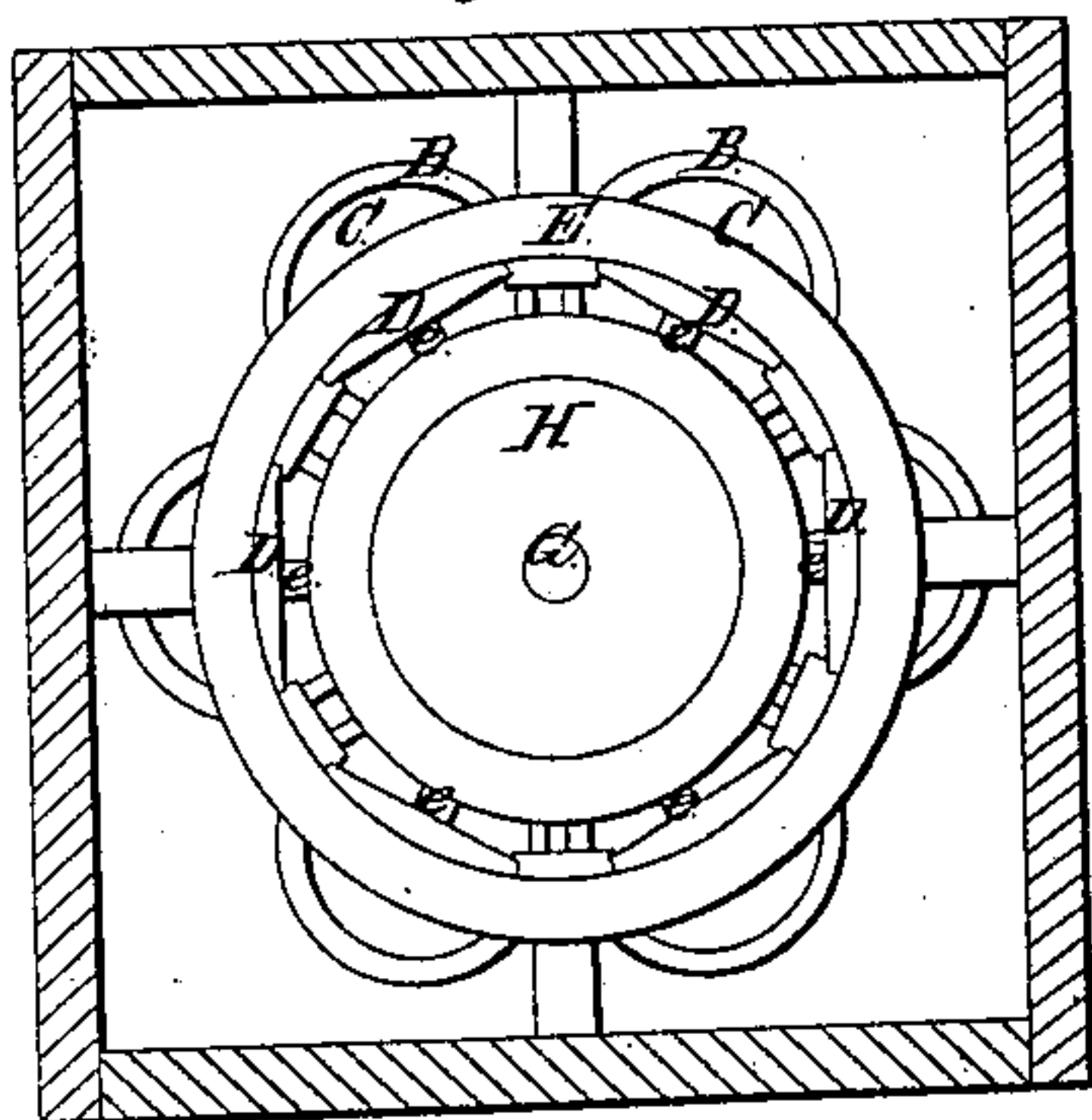
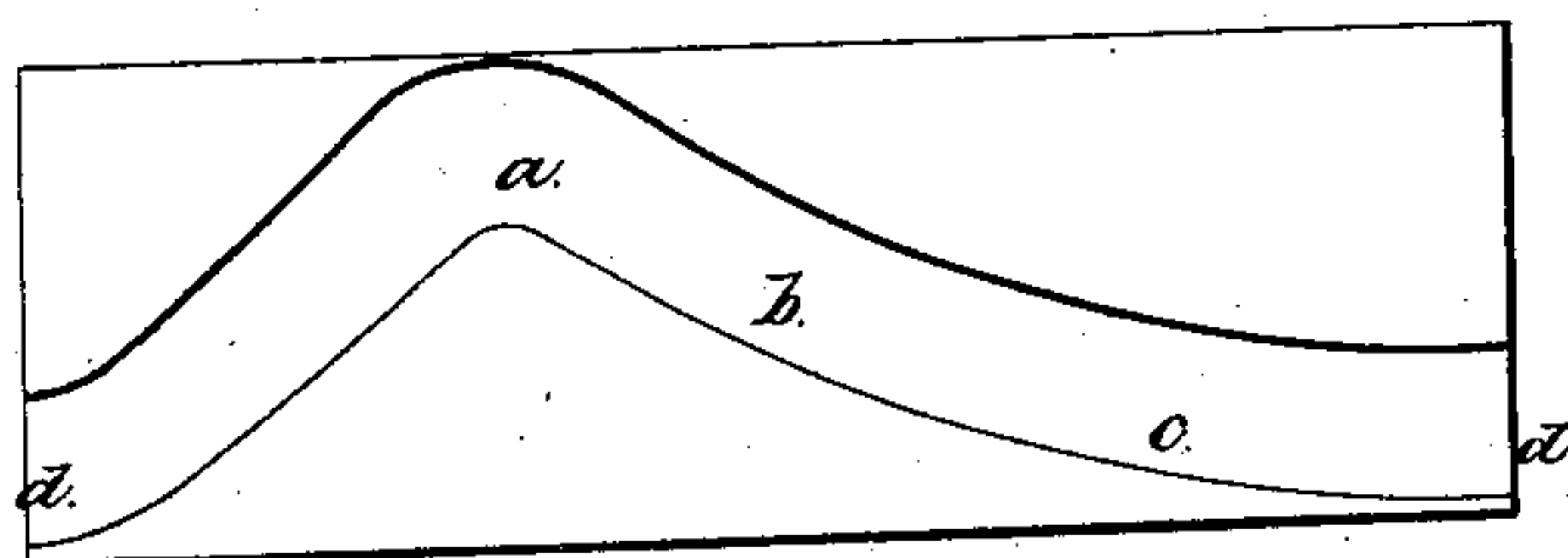


Fig. 4.



Witnesses

Daniel T. Martin
Randolph L. Hickney

Inventor.

Rufus Porter

UNITED STATES PATENT OFFICE.

RUFUS PORTER, OF MELROSE, ASSIGNOR TO THOMAS F. WELLS, OF ROXBURY, MASSACHUSETTS.

IMPROVEMENT IN AIR-PUMPS.

Specification forming part of Letters Patent No. **38,715**, dated May 26, 1863; antedated October 2, 1862.

To all whom it may concern:

Be it known that I, RUFUS PORTER, of Melrose, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Air-Pumps; and I do hereby declare that the following is a full and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a front elevation. Fig. 2 is a horizontal section on the line *o o* of Fig. 1. Fig. 3 is a central vertical section; and Fig. 4 represents the periphery of the grooved cam cylinder, extended in the form of a plane.

The nature of this invention consists of an arrangement of mechanism whereby the pistons of six (more or less) air-pumps are operated by means of a grooved cylindrical cam in such a manner that the force applied shall encounter a uniform resistance, and produce, if so required, a uniform blast or discharge of compressed air.

To a hollow platform, A, (which constitutes an air-chamber,) are attached a concentric series of vertical cylinders or pump-barrels, B, each of which is furnished with a valved piston, C, of ordinary construction, and each communicating with the air-chamber A. To each piston is attached a piston-rod, D, which extends upward through an annular guide-plate, E, and to the centerward side of which is connected an anti-friction pulley, F. Upon the center of the platform A stands a vertical shaft, G, upon which is mounted a cam-cylinder, H, in the periphery of which is an irregular circumferential groove, *a b c d*, of sufficient width and depth to admit the pulleys F to play freely therein, so that a vertical vibratory motion of the several pistons is produced by a rotary motion of the shaft G, the relative diameter of the cam-cylinder being such that the irregular groove receives all of the pulleys, and operates them all at the same time.

The peculiar form and direction of the circumferential groove are plainly represented in Fig. 4, by which it may be seen that the descent of each piston is so graduated that its most rapid motion is at the commencement,

while its respective pulley is traveling from *a* to *b*, and that the greatest force is thereto applied at the stage in which the greatest resistance is encountered, when the pulley travels from *c* to *d*. The ascent of the piston, effected by the passing of the pulley from *d* to *a*, is comparatively rapid.

Upon the shaft G, above the cam-cylinder H, is mounted a bevel gear-wheel, I, which meshes to a vertical bevel gear-wheel, J, which is mounted upon a horizontal shaft, S, to the right end of which is attached a crank, K, and upon which may be mounted a fly-wheel, if occasion requires.

The anti-friction pulleys F are so connected to the piston-rods E that one or more of them may be readily detached whenever the operation of a less number of pistons is required, the pivot *e*, upon which each pulley is mounted, being inserted from the outward side of the piston-rod, and secured in its place by having a screw-thread extending a part of its length, as represented in Fig. 3. The compressed air is discharged through the tube M.

Instead of the irregular groove *a b c d*, the cam-cylinder may be furnished with an irregular circumferential flange, and each piston-rod being furnished with two pulleys—the one above the other—the flange may work between them for the purpose of operating the pistons; or the cam-cylinder may terminate below, at the line of the upper side of the groove, so as to depress the pistons only and let them be elevated by a series of helical or other springs.

Two, three, or four crank-shafts, S, may be employed on opposite or different sides of the central shaft, G, each shaft S being furnished with a gear-wheel, J, all meshing into the same horizontal gear-wheel, I, so that two or more men may be employed at the several cranks at the same time. Two or more discharging-tubes, M, may also be employed, if occasion so requires.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The operating of a concentric series of pump-pistons by means of a central cam-cylinder, the axle of which is parallel to the rods

of said pistons, substantially as shown and described.

2. The axle-pivots *e*, constructed as herein described, in combination with the piston-rods D and pulleys F.

3. The combination of the cam cylinder H with a concentric series of air-pumps, con-

structed and arranged substantially in the manner and for the purpose herein set forth.

RUFUS PORTER.

Witnesses:

DAVID T. MARSTON,
RANDOLPH L. STICKNEY.