

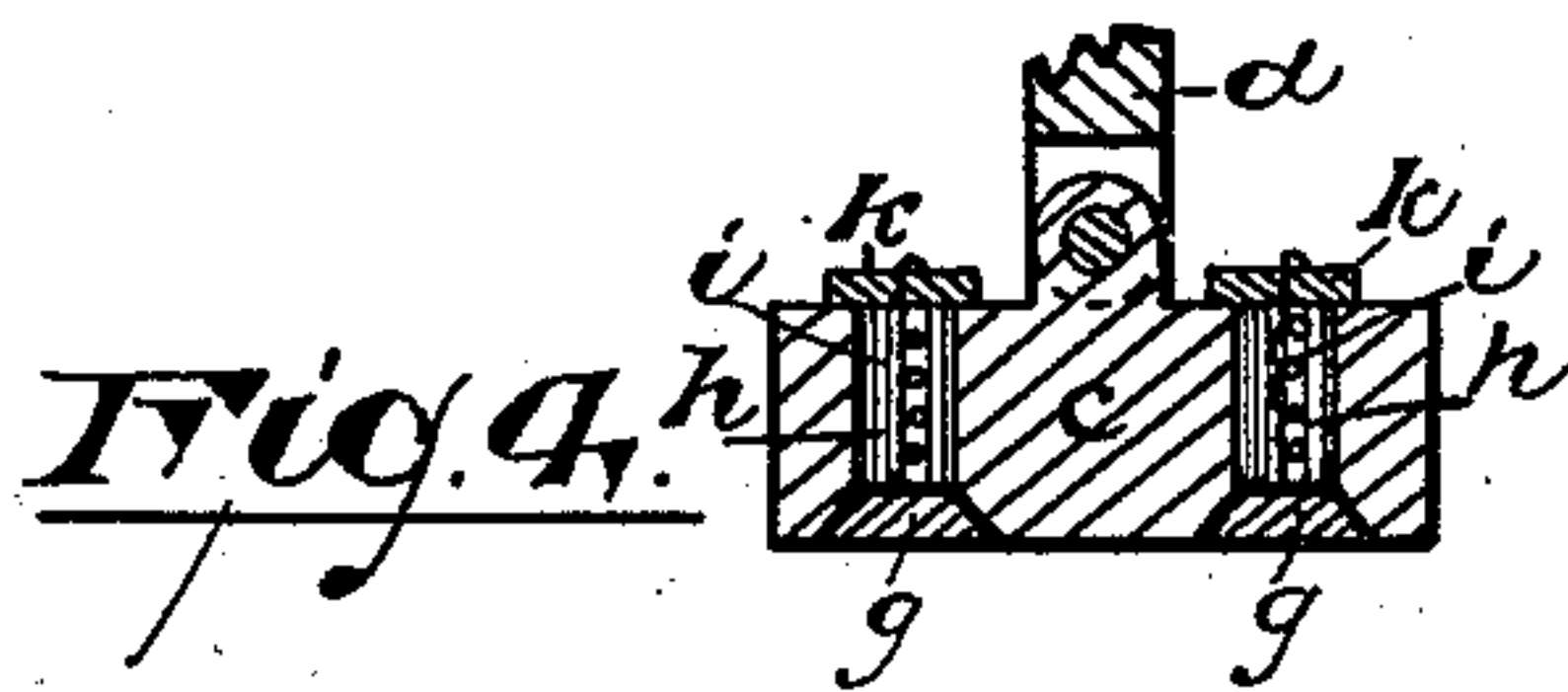
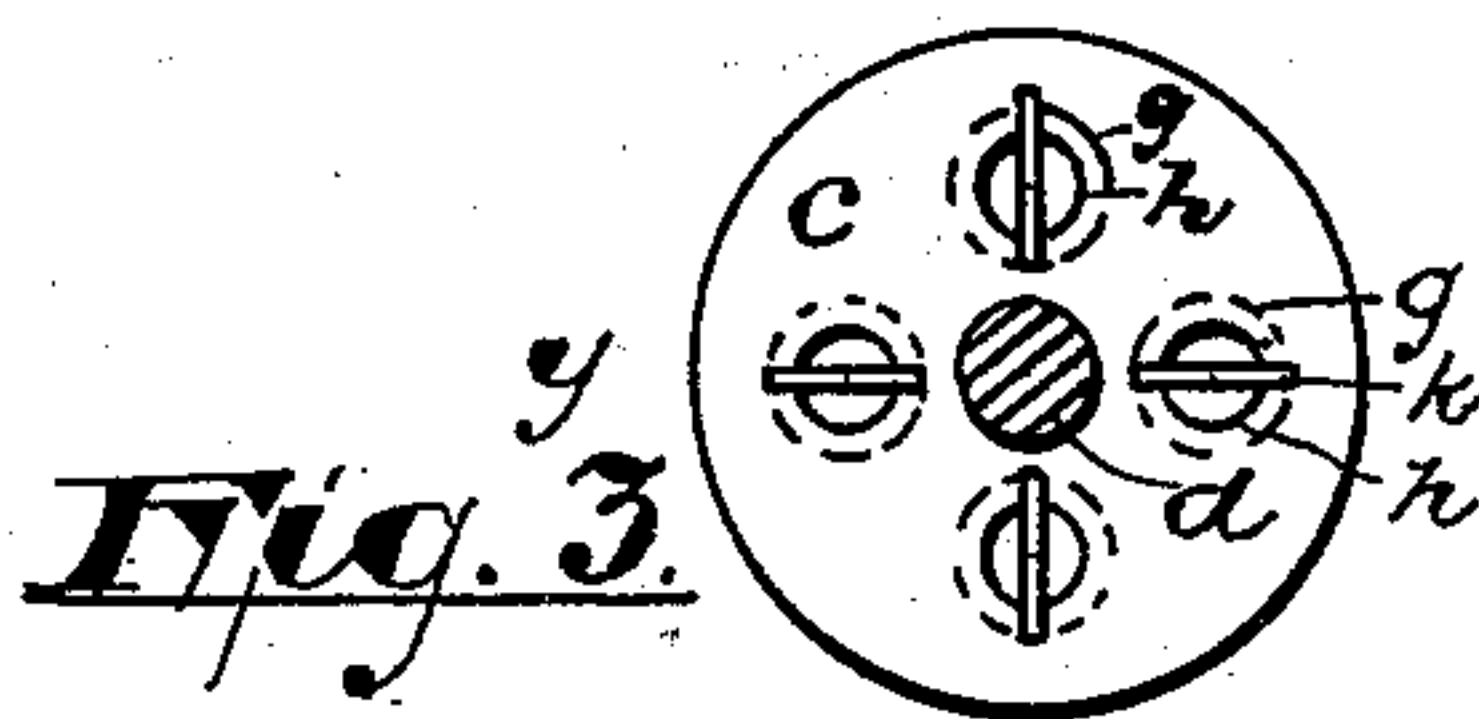
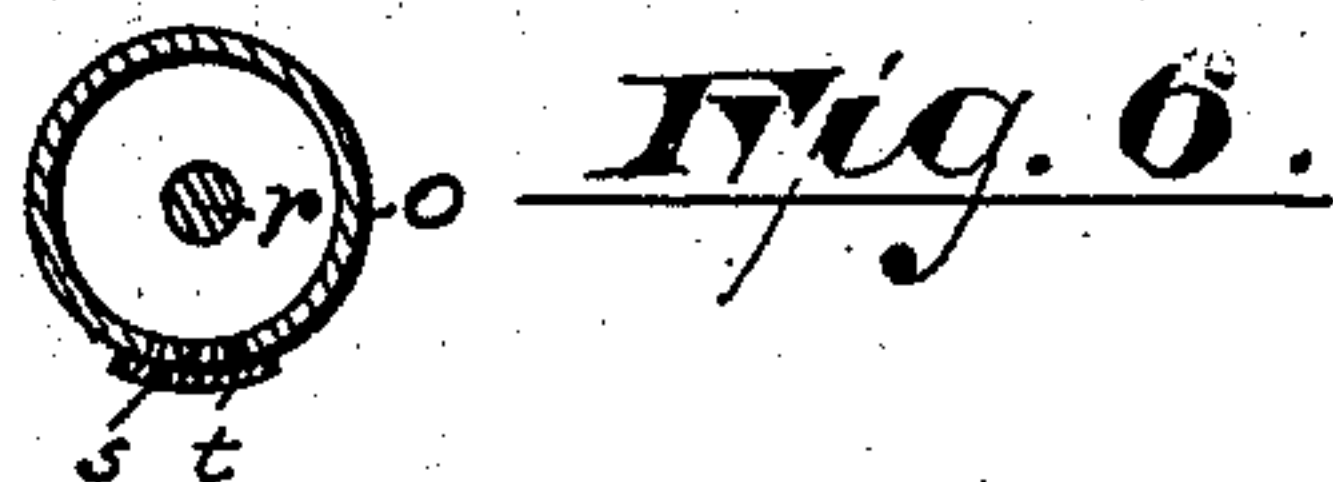
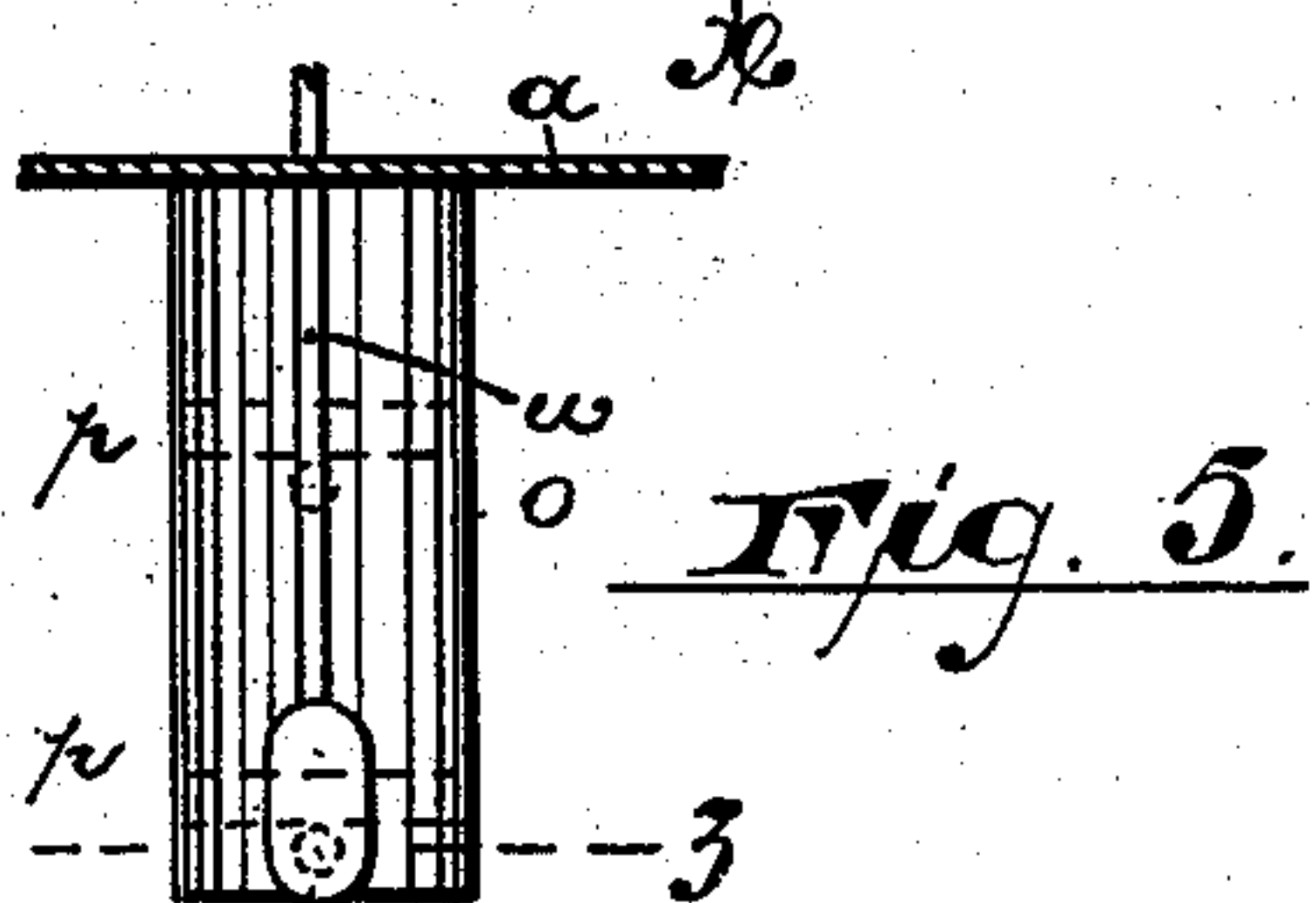
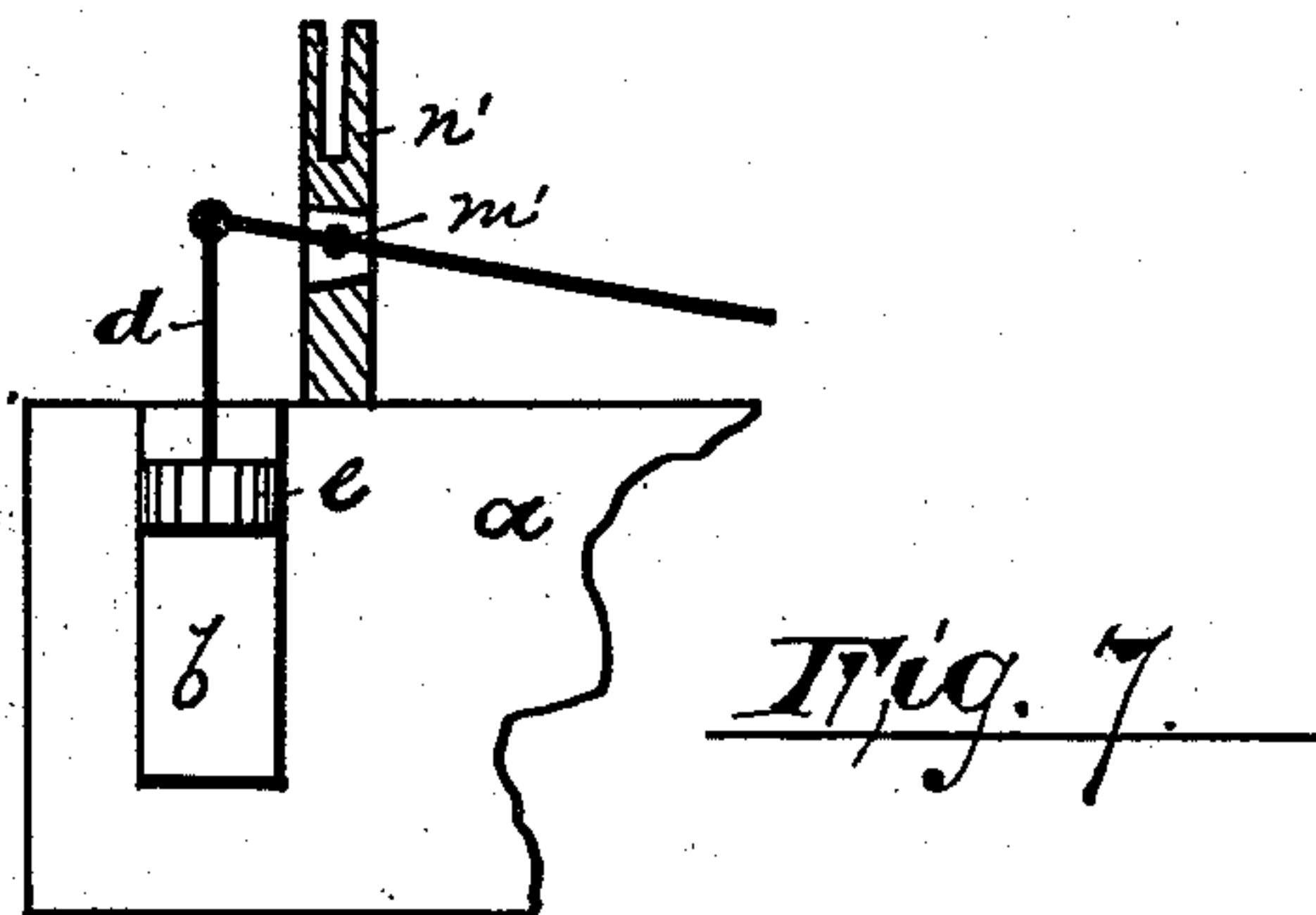
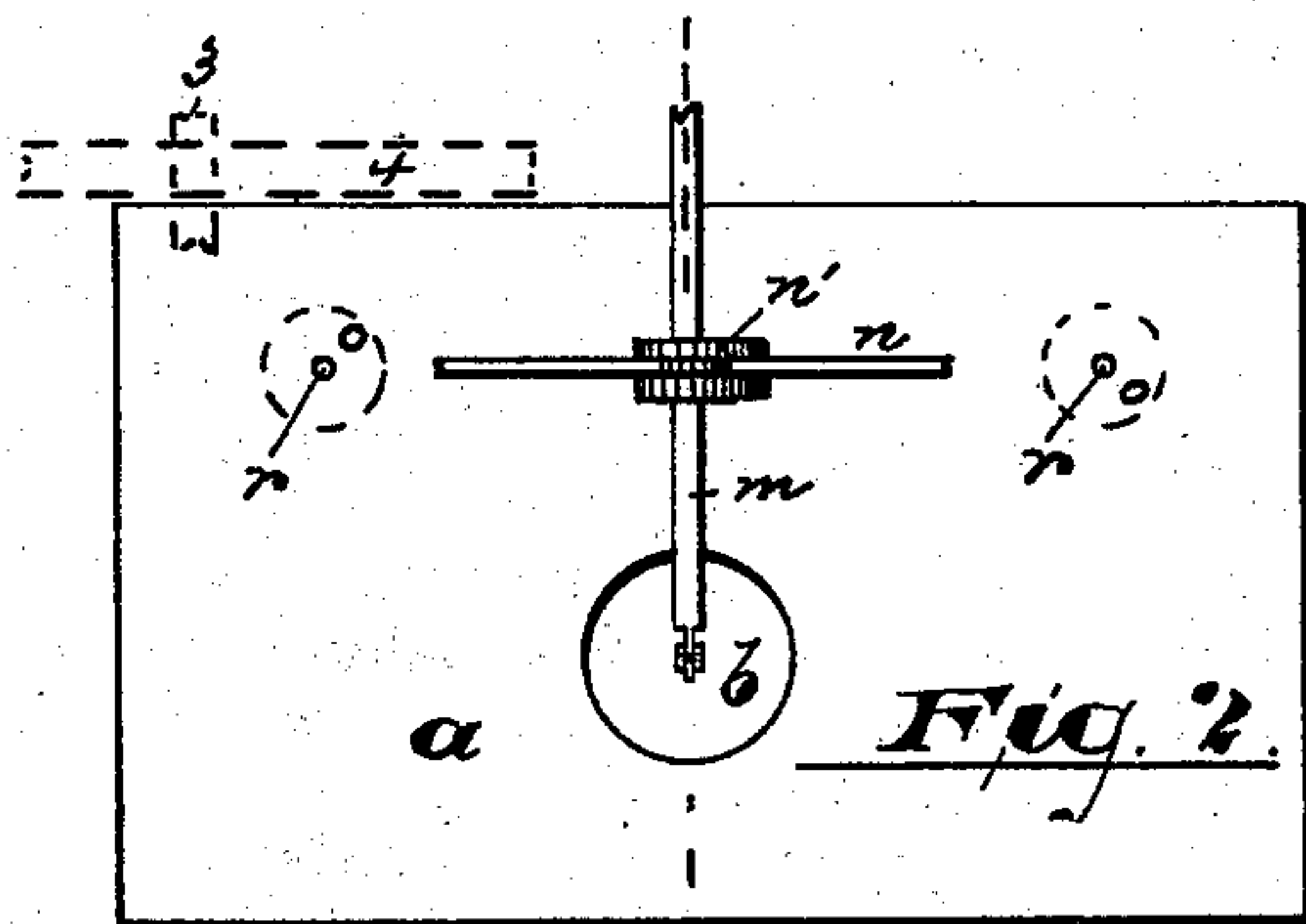
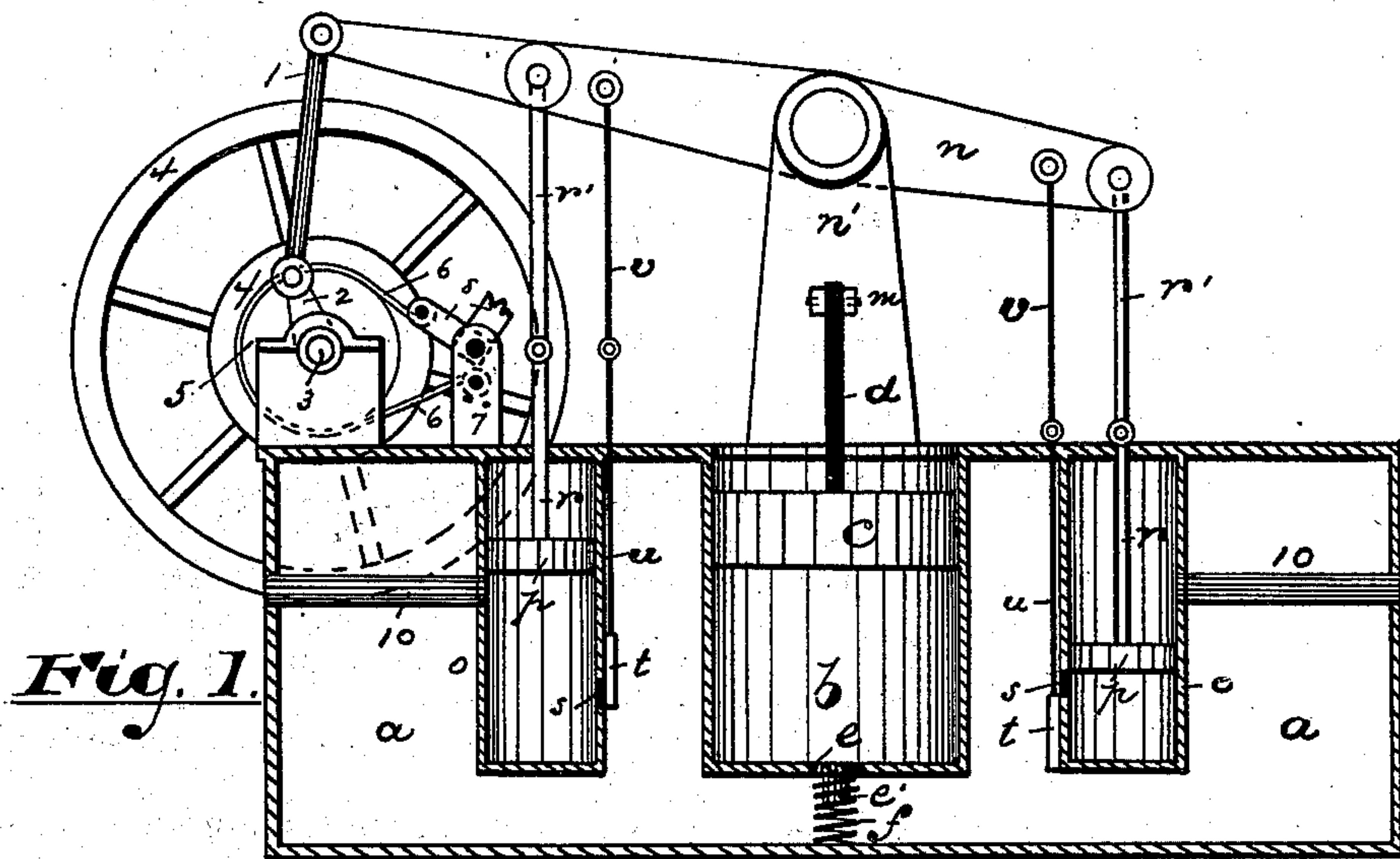
(No Model.)

S. C. HILL.

AIR MOTOR.

No. 402,525.

Patented Apr. 30, 1889.



WITNESSES:

INVENTOR:

Gartner
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UNITED STATES PATENT OFFICE.

SAMUEL C. HILL, OF NEWARK, NEW JERSEY, ASSIGNOR OF ONE-HALF TO
ALBERT A. SCHMIDT, OF SAME PLACE.

AIR-MOTOR.

SPECIFICATION forming part of Letters Patent No. 402,525, dated April 30, 1889.

Application filed February 4, 1889. Serial No. 298,565. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL C. HILL, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Air-Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to simplify the construction of air-motors and make them more compact and easily adjusted and applied to any machine adapted to be operated thereby.

The invention consists in the peculiar construction of the motor and the air-pump, and the combination and arrangement of parts thereof, substantially as hereinafter set forth, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is a front view of an air-motor, partly in section, introducing my improvement. Fig. 2 is a reduced top plan view. Fig. 3 is a top plan view of the piston of the air-pump. Fig. 4 is a section through line *y*, Fig. 3. Fig. 5 is a front elevation of one of the motor-cylinders, showing the valve and parts. Fig. 6 is a section through line *z*, Fig. 5, and Fig. 7 is a section through line *x*, Fig. 2, showing the mode of operating the air-pump.

In said drawings, *a* represents a reservoir for compressed air. *b* is a cylinder of an air-pump with piston *c* and piston-rod *d*. At the bottom of this cylinder is an outlet-valve, *e*, with guiding-rod *e'*, and held in a closed position by a spring, *f*. In the piston *c* are inlet-valves *g g* at the bottom of openings *h h*, and held in closed position by springs *i i*, secured at one end to the valve and at the other end to cross-bars *k k*, as shown in Figs. 3 and 4.

To the top of the piston-rod is pivoted one end of a hand-lever, *m*, fulcrumed at *m'* to a pin secured in an opening in the support *n'*,

on which the beam *n* oscillates. Within the reservoir are also cylinders *o o*, with pistons *p p* and piston-rods *r r*, and connecting-rods *r' r'*, pivotally connecting said piston-rods with the beam *n*. On the sides of these cylinders are inlets or ports *s s*, through which the compressed air can enter under the piston and force it upward.

On the outside of the cylinders and arranged to slide thereon are valves *t t*, of the same configuration as the outer periphery of the cylinders. Attached to these valves are valve-rods *u u* and connecting-rods *v v*, pivotally connecting said valve-rods with the beam *n*.

On the outer end of the beam is pivotally connected a rod, 1, having a pivotal connection with a crank-pin on a crank, 2, rigidly secured to a driving-shaft, 3, running in bearings secured on the top of the reservoir *a*. On the shaft is secured a balance or driving wheel, 4, from which, by means of a belt or any other desired means, power can be transmitted to any desired mechanism.

Upon the side of the balance-wheel and secured to the shaft is a brake-wheel, 5, over which passes a friction-brake spring, 6. This spring is secured at one end to a post, 7, on top of the reservoir, and at the other end is secured to a bell-crank lever, 8, pivoted to the top of said post 7. From the cylinders *o*, at a proper position above the ports *s s*, extend outlet-pipes 10, connecting said cylinder and allowing the air in the cylinder to pass outward.

In the drawings I have shown the motor as being operated by the pressure of the compressed air on the under side of the pistons, so that power would be applied to only one piston at the same time; but when desired the valves can be arranged to allow the air to press upon the top and bottom of the pistons, as is ordinarily done in steam or other engines. The valves *t t*, being on the outside of the cylinders and within the reservoir, are held firmly in position on the cylinder by the pressure of the air in the reservoir, as will be understood.

In operation, when the motor is in the position shown in Fig. 1, the bell-crank operating the brake-spring is moved up so as to

loosen the brake, and the balance-wheel will then be moved by hand enough to throw the crank off from a dead-center. Air will then enter the port-opening s in the right-hand
5 cylinder, forcing up the piston until it has passed above the outlet-pipe 10, when it will be in the same position as shown by the left-hand cylinder in the drawings. By this arrangement I am enabled to drive with this
10 motor a sewing-machine or similar device with much less consumption of compressed air than when upper and lower ports are employed. By arranging the motor-cylinders and the air-pump within the reservoir the
15 completed motor occupies very little space, and is easily attached to a sewing-machine table or machine, as desirable.

Having thus described my invention, what I claim as new, and desire to secure by Letters
20 Patent, is—

1. The improved motor herein described, consisting of a compressed-air reservoir containing therein an air-pump, cylinders with motor-pistons, and operating-valves, and out-

let-pipes, as shown, said pistons being con- 25
nected outwardly with a beam oscillating in a frame secured to the top of said reservoir and pivotally connected with the driving mechanism, as described, and for the purpose set forth.

2. In an air-motor, the combination, with a 30
compressed-air reservoir and air-pump, of a cylinder, motor-piston working in said cylinder, automatic air-valves in said piston, rods connecting said piston with an oscillating 35
beam pivoted to a frame secured on said reservoir, a driving mechanism pivoted to said beam, and a spring-brake, 6, adapted to bear on a wheel of said driving mechanism, all as shown, and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 2d day of 40
January, 1889.

SAMUEL C. HILL.

Witnesses:

CHARLES H. PELL,
E. L. SHERMAN.