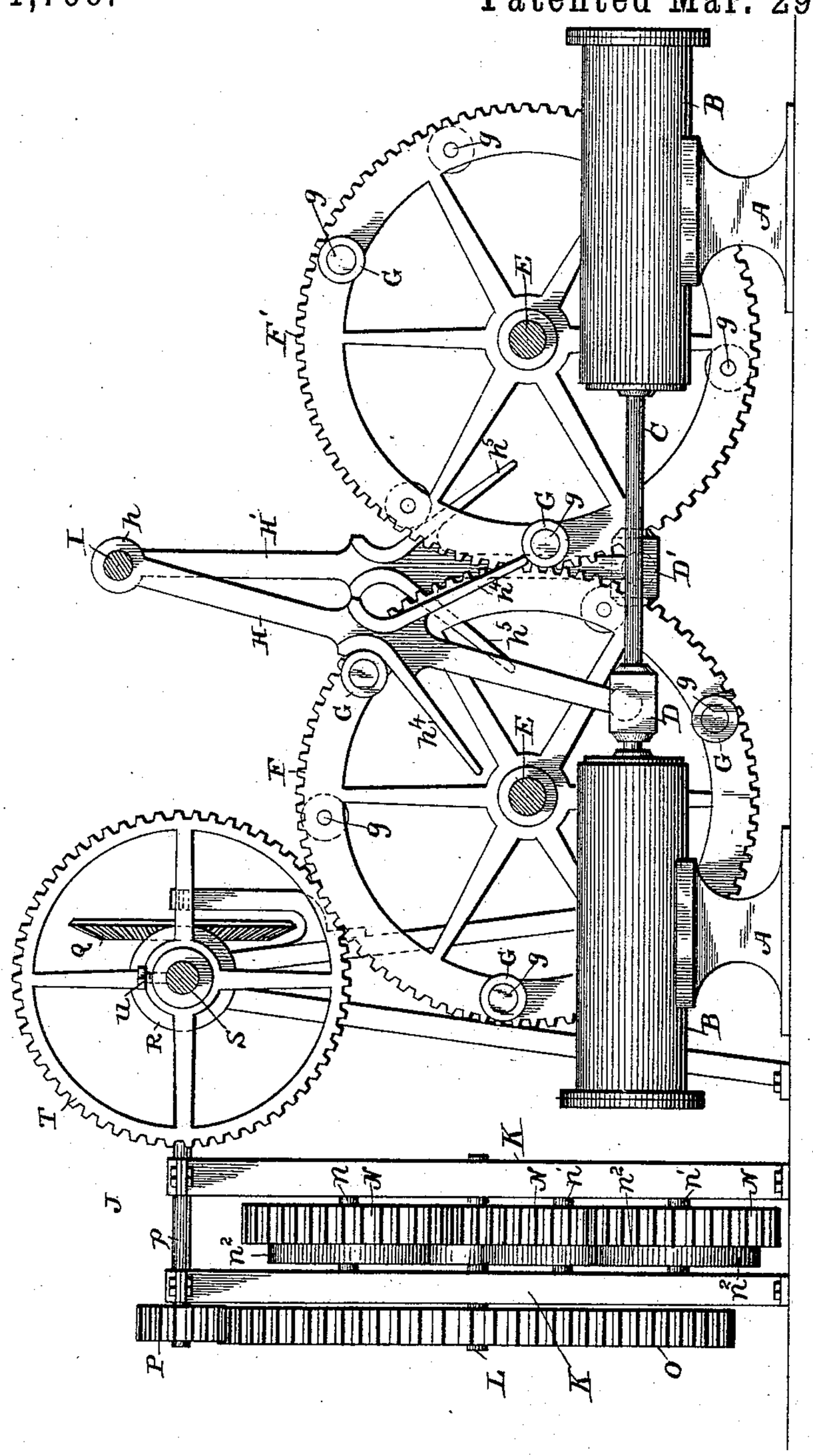
(No Model.) 3 Sheets—Sheet 1.

D. P. BURDON & S. HOUSTON.

AIR COMPRESSOR MOTOR.

No. 471,766. Patented Mar. 29, 1892.

FIG. 1.



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(No Model.) 3 Sheets—Sheet 2.

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FIG. 2.

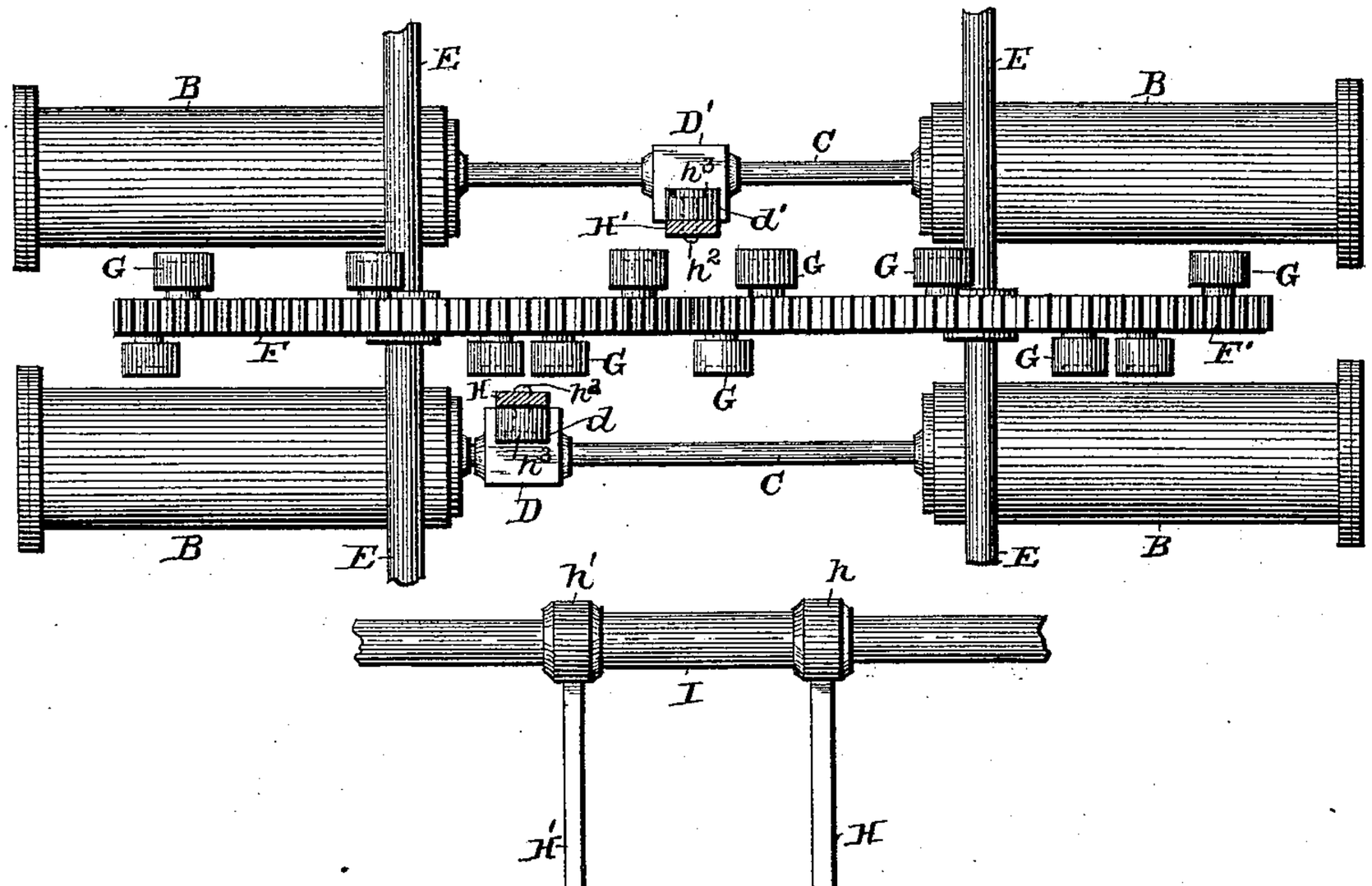

FIG. 3.

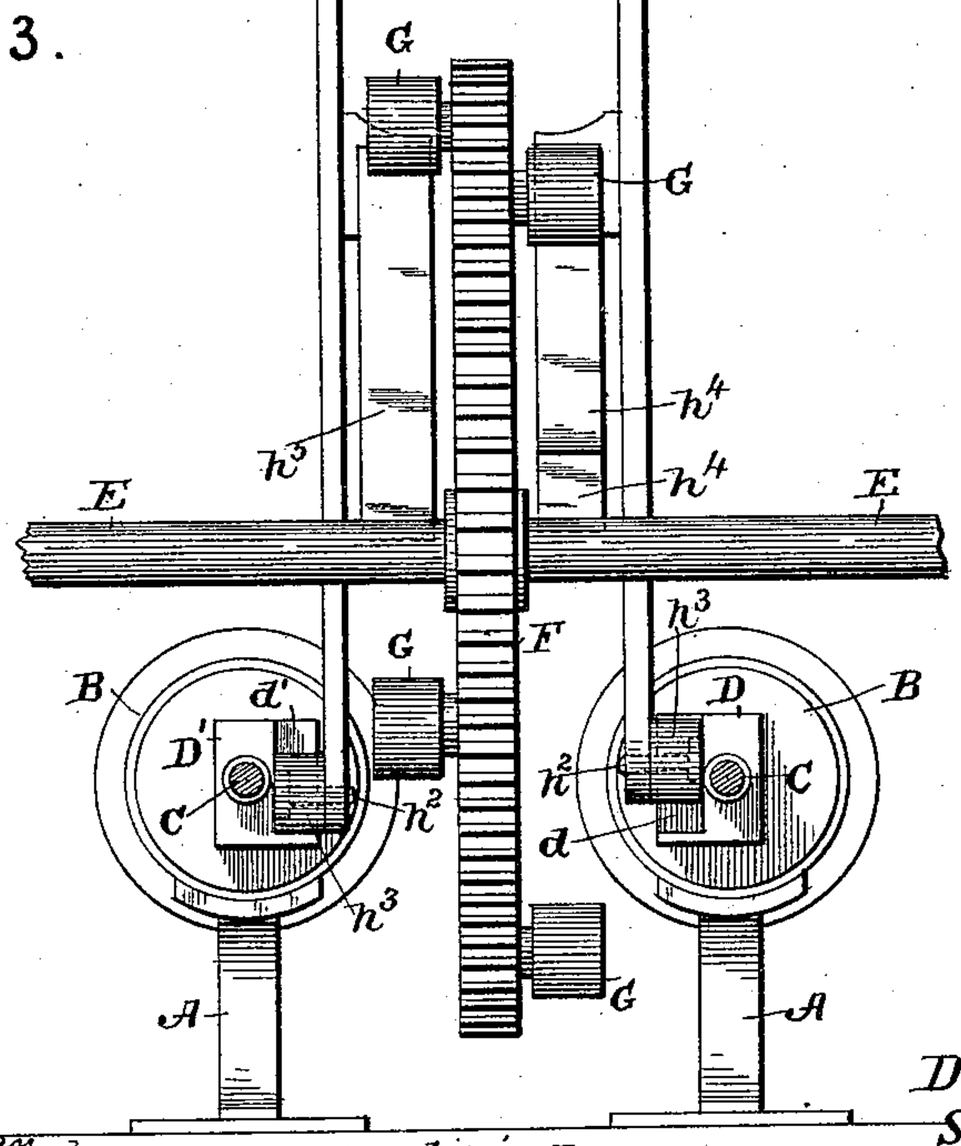

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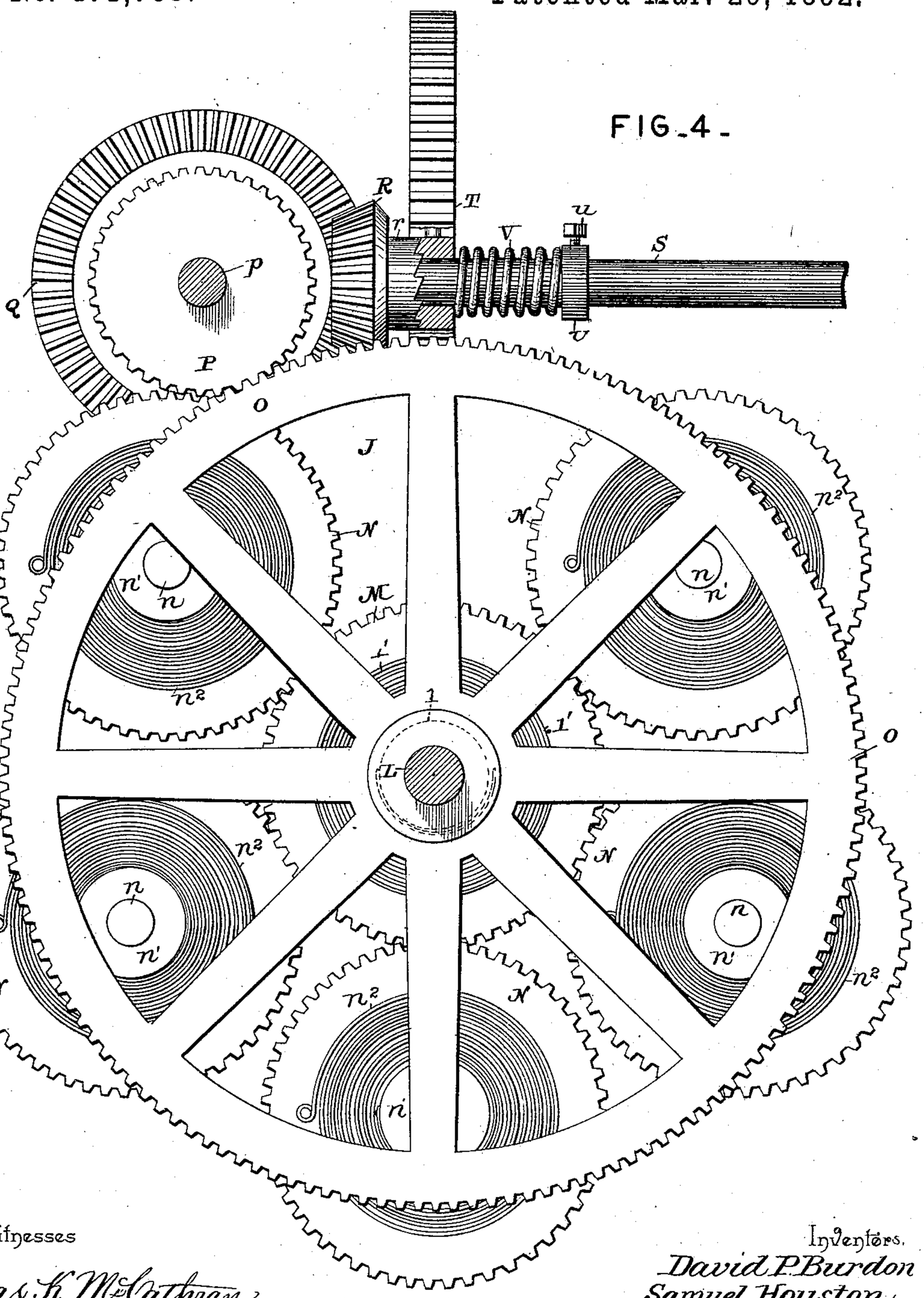
FIG. 4.



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UNITED STATES PATENT OFFICE.

DAVID PATTON BURDON AND SAMUEL HOUSTON, OF JACKSONVILLE, FLORIDA.

AIR-COMPRESSOR MOTOR.

SPECIFICATION forming part of Letters Patent No. 471,766, dated March 29, 1892.

Application filed November 17, 1891. Serial No. 412,176. (No model.)

To all whom it may concern:

Be it known that we, DAVID PATTON BURDON and SAMUEL HOUSTON, citizens of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented a new and useful Air-Compressor Motor, of which the following is a specification.

This invention relates to mechanical motors used in connection with air-compressors; and it has for its object to provide a machine which will automatically operate ordinary air-engines which are used to maintain a pressure for forcing air upon liquids to transfer the same from one vessel to the other, for keeping an equal and steady pressure of air for blast purposes, and for any other purpose where it is necessary that a steady and equal pressure should be always employed, and to this end providing mechanism for automatically operating such devices which will maintain a steady pressure at all times within the limit of the power of the machine.

With these and other objects in view, which will be readily apparent as the nature of the invention is better understood, the invention consists in the improved motor and mechanical movements actuated thereby hereinafter more fully described, illustrated in the accompanying drawings, and specifically pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of an air-compressor motor or mechanism constructed in accordance with this invention. Fig. 2 is a top plan view of the same, the escapements and actuating motor being detached from the same. Fig. 3 is an end elevation of the machine with the motor removed therefrom. Fig. 4 is a detail elevation of the spring power or motor.

Referring to the accompanying drawings, A represents the bases upon which are supported the opposite pair of air-compression cylinders B, constructed in the usual manner and connected with the devices to which air under pressure is designed to be supplied. The said cylinders are provided with the ordinary pistons and valves, the pistons being connected by the parallel continuous rods or stems C, which connect the pistons of the opposite cylinders in parallel pairs, and each piston-rod is provided with the intermediate tappets or shoes D and D′, respectively, each of which is provided with the inner square recessed portions *d* and *d′*, which are engaged by the mechanism to be described, and which actuate, alternately, each continuous piston-rod. Upon suitable supports adjacent to the said cylinders are the stationary transverse shafts E, supported over each end pair of the cylinders and accommodating the large gear-wheels F and F′, loosely mounted thereon and adapted to be revolved by means of the motor located at one end of the cylinders, as illustrated, or underneath, if desired, and connected with the gear-wheel F in the manner which will be hereinafter fully set forth. Each of the intermeshing gear-wheels F and F′ is provided with the contact friction-rollers G, journaled upon the pins *g*, projecting alternately from opposite sides of the rims of each wheel. The said rollers are arranged upon each wheel, so that those upon one side are alternately disposed with relation to those upon the same side of the intermeshing wheel, while the rollers upon the opposite side of the wheel are similarly disposed with relation to those upon the same side of the adjacent wheel, which arrangement is for the purpose of securing the proper alternate reciprocation of the piston-rods C through the medium of the escapement-levers H and H′, respectively. The said levers H and H′ are connected with suitable bearings *h* and *h′*, which oscillate upon the transverse shaft I, supported in suitable bearings in a suitable frame-work designed for its reception. The said levers are further provided at their extreme lower ends with the outwardly-projecting pins h^2, upon which are mounted the friction-rollers h^3, that snugly take within the squared recesses *d* and *d′* in the opposite tappets D and D′, and thereby as the said levers are oscillated cause the alternate reciprocation of the continuous piston-rods. Each of the escapement-levers H and H′ depends from the shaft I centrally between the intermeshing gear-wheels upon both sides thereof, and secured upon the inner faces are the downwardly extending and diverging wings h^4 and h^5, that are engaged by the friction-rollers upon each side of the said gear-wheels, and thus cause a swinging or oscil-

latory motion to be given to the levers. The contact friction-rollers traveling upon said contact-wings are so disposed that just as the friction-roller upon one side of one of the large gear-wheels has just left the lowermost point of one of the wings and has thereby carried the piston-rod to one end of its stroke one of said contact-rollers upon the same side of the adjacent gear-wheel has just begun its travel down the inclined way of the opposite wing of the same escapement-lever, and thereby prevents all jar or click in the movement and provides an alternate continuous reciprocation of said rods, which is further attained by having the contact-rollers disposed, so that when the piston-rod upon one side of the gear-wheel is at either end of its stroke the opposite rod upon the opposite side of said wheel is at the center point or midway of its full stroke.

At the end of the air-compressors adjacent to the large gear-wheel F is the spring power-motor J, from which motion is imparted to the two large gear-wheels and mechanism just described. Upon a suitable base or frame K is centrally mounted the central shaft L, carrying a drum *l*, over which the springs *l'*, fitting one within the other, are wound and the free ends thereof are secured to a suitable adjacent rigid connection, which allows the springs to be wound up and unwound readily. Directly beyond the drum *l* and upon the said shaft L is secured the small gear-wheel M, that meshes with a series of gear-wheels N of the same size and mounted upon the stationary shafts *n*, arranged in a series concentric with relation to the central main shaft L referred to. Upon the series of shafts *n*, arranged in a circle around the central shaft, are mounted similar drums *n'*, around which are wound the springs n^2, connected thereto and with their respective shafts *n*, so that after having once been wound up their tension will revolve the gear-wheels N, which transmit their share of the motion to the central gear-wheel M, with which the same intermesh. Beyond the inner gear-wheel M upon the central shaft is mounted the larger spur-wheel O, which meshes with the pinion P adjacent thereto and rigidly mounted upon the shaft *p*, which also carries directly back of the pinion P the large beveled gear-wheel Q, which is engaged by the small beveled gear-wheel R, carried upon the innermost end of the shaft S, and which is provided upon its outer face with the clutch *r*, securely fastened thereto and designed to engage the notched hub of the spur gear-wheel T, loosely mounted upon said shaft S, and when rotated by the mechanism described communicates motion to the large gear-wheel F, with which the same meshes at one end of the pairs of cylinders.

A collar U is adjustably mounted upon the shaft S by means of the set-screw *u* and is designed to form a stop for the coiled spring V, interposed between the same and the outer hub of the gear-wheel T, and thus normally holds the same into engagement with the clutch *r*. When it is desired to wind the motor, the shaft S is rotated by means of a crank-handle applied to one end thereof, and thus through the beveled pinion R communicates motion from the large gear-wheel O through the various smaller gear-wheels carrying the actuating-springs referred to, during which winding the said gear-wheel T, by means of its ratchet connection with the clutch *r*, is not revolved; but when it is desired for the motor to work the tension of the various springs causes motion to be given to the large central wheel O, which in turn, through the small pinion and bevel-gear, causes the wheel T to revolve and in turn operates the gear-wheel F, which causes the mechanical movement herein described to operate in the manner as fully set forth.

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

1. In a machine of the class described, the combination, with the cylinders and the continuous piston-rods connecting the same in pairs, of the intermeshing gear-wheels mounted between said cylinders and provided with contact projections alternately arranged upon both sides thereof, levers connected with said piston-rods and adapted to be oscillated by the projections upon said wheels, and means for actuating said wheels, substantially as set forth.

2. In a motor for air-pumps, the combination, with the cylinders and the continuous piston-rods connecting the same in pairs, of intermeshing gear-wheels mounted between said cylinders and provided with contact projections, oscillating escapement-levers connected with the piston-rods and adapted to be controlled by said contact projections, and means for actuating said wheels, substantially as set forth.

3. In a motor for air-pumps, the combination, with the double cylinders and the continuous piston-rods connecting the same in pairs, of the intermeshing gear-wheels mounted between said cylinders and provided with contact projections alternately arranged upon opposite sides thereof, oscillating escapement-levers supported upon both sides and intermediate of said wheels, the same being connected with said piston-rods and provided with oppositely-disposed contact-faces adapted to be alternately engaged by the projections of each wheel, and means for actuating said wheels, substantially as set forth.

4. In a motor for air-pumps, the combination, with the double cylinders and the continuous piston-rods connecting the same in pairs, of intermeshing gear-wheels mounted between said cylinders and provided with contact projections upon both sides of the rims, oscillating escapement-levers supported upon both sides and intermediate of said wheels, the said escapement-levers being connected with said piston-rods and provided with the

opposite downwardly extending and diverging wings or contact-faces that are designed to be alternately engaged by the contact projections upon each wheel, and means for actuating said wheels, substantially as set forth.

5. In a motor for air-pumps, the combination, with the cylinders and the continuous piston-rods, of notched tappets mounted upon each piston-rod, intermeshing gear-wheels between said cylinders and provided with contact-rollers alternately arranged upon both sides of the rims, oscillating escapement-levers supported upon both sides and intermediate of said wheels, the said escapement-levers being provided with contact-rollers at their lower ends engaging said notched tappets, and the opposite downwardly extending and diverging wings or contact-faces that are adapted to be alternately engaged by the contact-rollers upon each side of each wheel, and means for actuating said wheels, substantially as set forth.

6. In a motor for air-pumps, the combination, with the cylinders and piston-rods thereof, of the intermeshing gear-wheels provided with contact projections, oscillating escapement-levers connected with said piston-rods and adapted to be controlled by said contact projections, a spur-wheel meshing with one of said gear-wheels, and a series of spring-actuated gear-wheels intermeshing with each other and connected with and operating said spur-wheel, substantially as set forth.

7. In a motor for air-pumps, the combination, with the cylinders, of the intermeshing gear-wheel, escapement-levers connected with the piston-rods and controlled by said wheels, a spur-wheel meshing with one of said gear-wheels, a large spring-actuated gear-wheel connected in gear with said spur-wheel, and a series of concentrically-arranged and spring-actuated smaller gear-wheels intermeshing with said central gear and assisting in the revolutions thereof, substantially as set forth.

8. In a motor for air-pumps, a main central shaft, a drum mounted upon said shaft, springs wound upon said drum and connected with a rigid connection, a small gear-wheel mounted upon said central shaft, a series of independent shafts arranged concentric with the main shaft, a series of drums and springs mounted upon and connected with said independent shafts, a series of small gear-wheels actuated by said springs and drums and meshing with the small central gear-wheel, a large gear-wheel mounted upon said central gear, a shaft located adjacent to said large gear-wheel and provided with a large beveled gear-wheel and a small pinion meshing with said large central gear-wheel, a transverse shaft above the central gearing, a small beveled gear provided with a clutch and meshing with said large beveled gear-wheel, and a spring-pressed spur-wheel engaged by said clutch and meshing with the piston-operating mechanism, substantially as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

DAVID PATTON BURDON.
SAMUEL HOUSTON.

Witnesses:
N. A. HULL, Jr.,
P. D. CASSIDEY.