(No Model.) 2 Sheets—Sheet 1.

L. S. CHICHESTER.

ROTARY AIR COMPRESSOR.

No. 308,061. Patented Nov. 18, 1884.

Fig: 1.

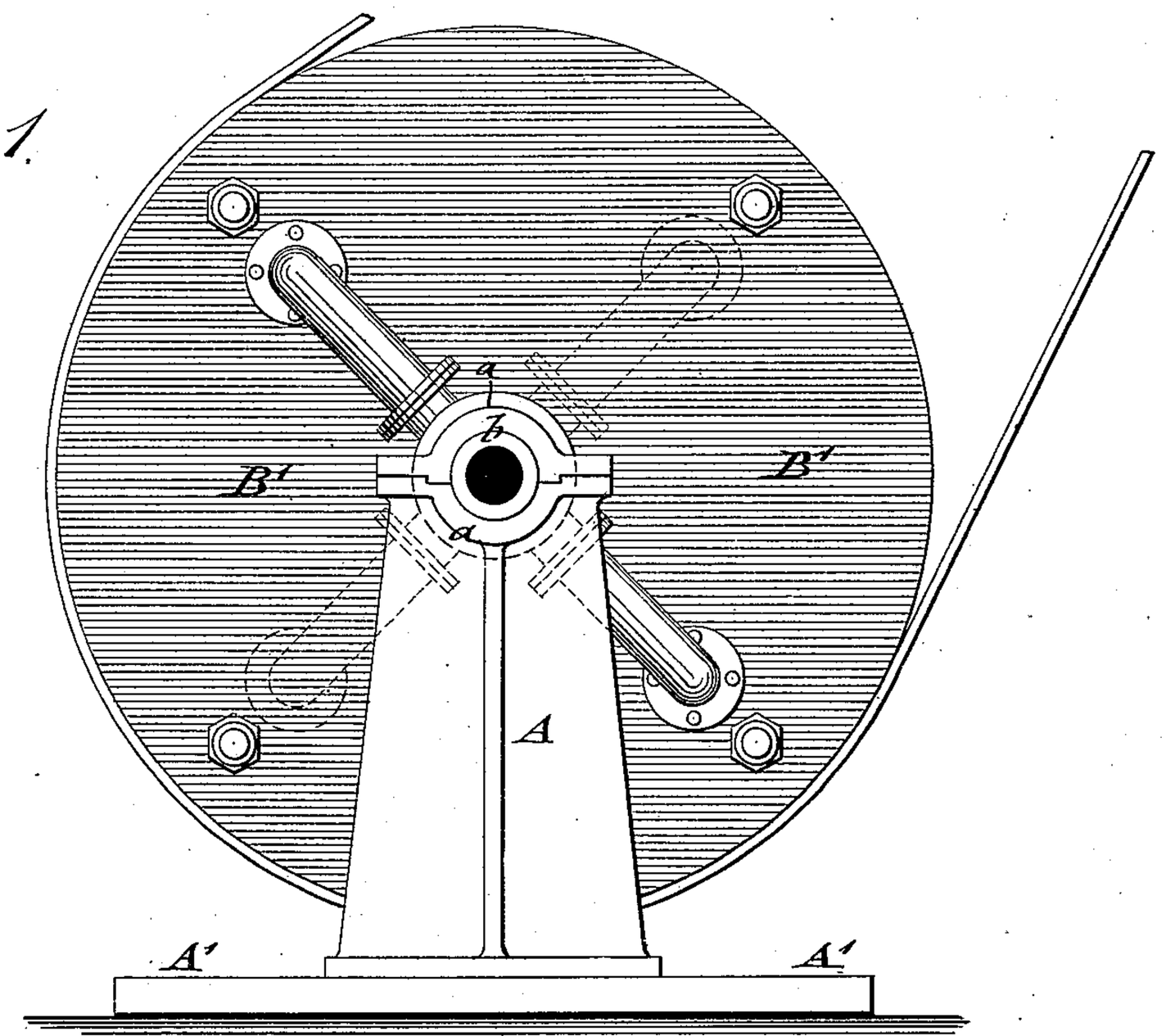
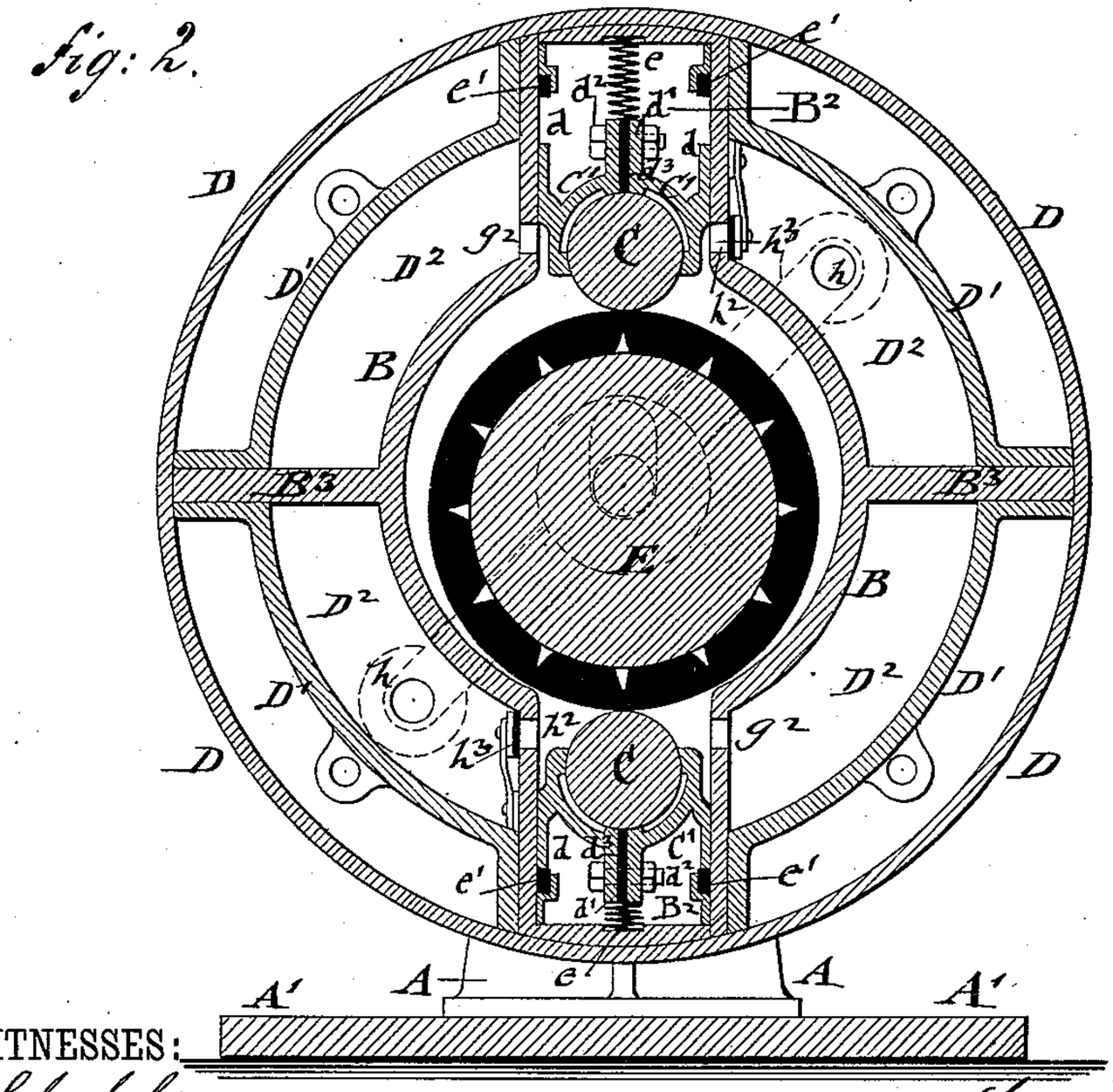


Fig: 2.



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Otto Risch.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

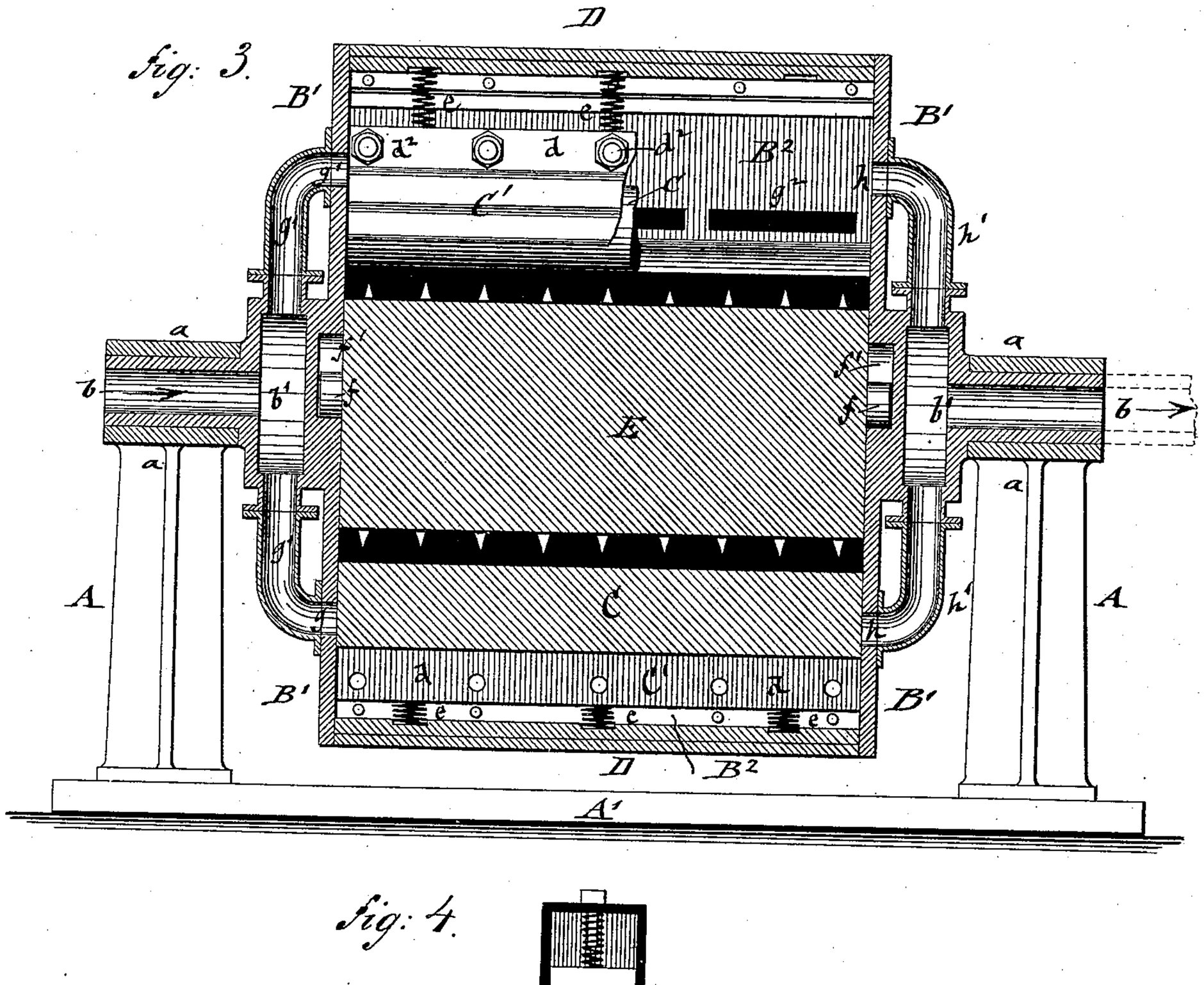
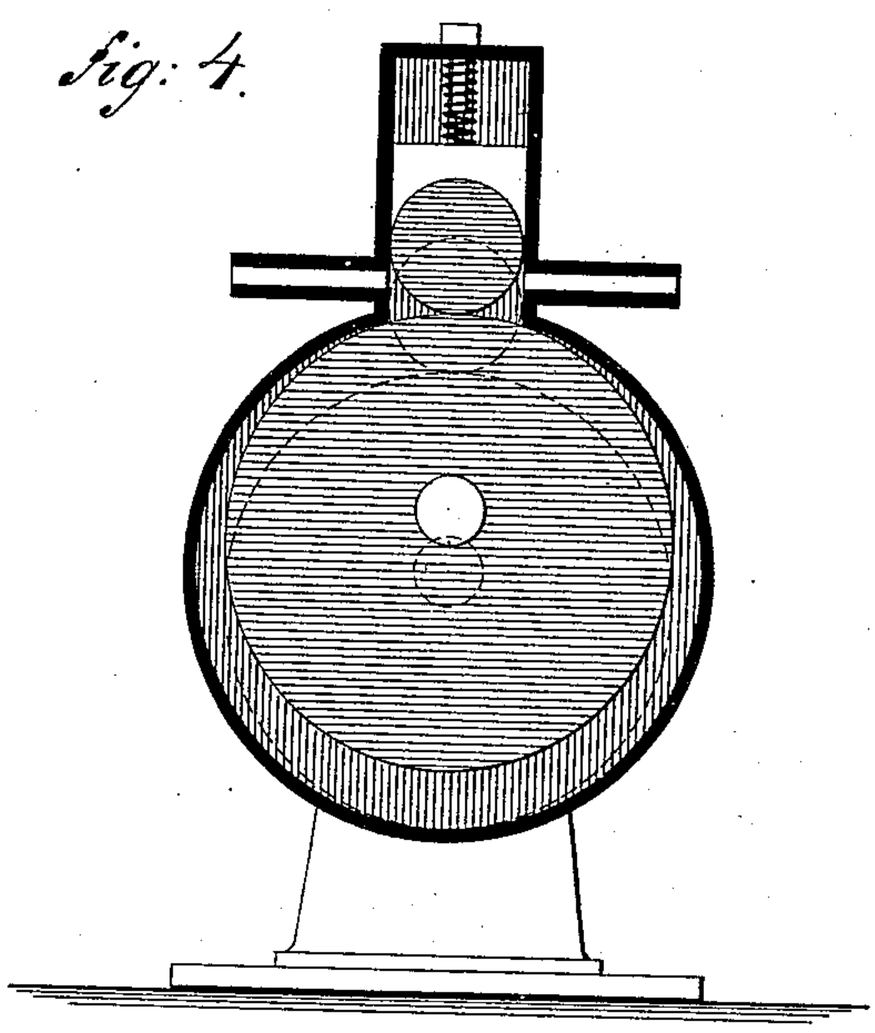


Fig. 4.



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UNITED STATES PATENT OFFICE.

LEWIS S. CHICHESTER, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO C. M. EDWARD SCHROEDER, OF SAME PLACE.

ROTARY AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 308,061, dated November 18, 1884.

Application filed December 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, LEWIS S. CHICHESTER, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Air-Compressors, of which the following is a specification.

This invention has reference to an improved rotary air-compressor in which the exterior casing is rotated around an interior cylinder or piston, instead of making the casing stationary and rotating the interior piston, as heretofore.

The invention consists of an air-compressor, the casing of which is provided with an exterior pulley and supported by hollow end shafts in bearings of side standards. An interior cylinder or piston is eccentrically supported by fixed shaft ends in slotted interior bearings of the casing-heads. The casing revolves around the interior cylinder and in contact therewith. One or more contact-rollers are supported in spring-cushioned bearings, which are guided in extension-chambers of the casing. The rollers are in frictional contact with the interior cylinder, and are rotated around their axis by the rotations of the casing. The air is drawn in through the hollow end shaft at one side of the casing, connecting-pipes and compartments surrounding the casing into the space at the inside of the same, compressed by the rotations of the casing in the space between the interior cylinder, rollers, and casing, and forced through valved openings of the compartments surrounding the casing, conducting-pipes, and a hollow shaft at the opposite end of the casing to a receiver or other point of use.

In the accompanying drawings, Figure 1 represents a side elevation of my improved air-compressor. Fig. 2 is a vertical transverse section of the same. Fig. 3 is a vertical longitudinal section with parts broken away; and Fig. 4 is a vertical transverse section of a simple form of air-compressor with a revolving piston on the principle heretofore in use.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A A represent the supporting-standards of my improved air-compressing machine. These standards are applied to a bed-plate, A′, that is supported on a suitable foundation. The standards A support in bearings *a a*, at their upper ends, hollow hubs *b b*, which are cast integral with the heads B′ B′ of a cylindrical air-compressing casing, B. The casing B is provided at two or more points with radial extension-chambers B^2, within which the contact rollers C C are guided. An exterior pulley, D, is either cast integral with the casing B or secured in suitable manner to radial partition-walls B^3 of the same, said pulley being concentric to the casing B, and of a diameter equal to the distance between the outer ends of the diametrically-located extension-chambers B^2. Power is applied to the pulley D by a transmitting-belt, whereby the pulley and exterior casing, A, is revolved, in place of keeping the same stationary, as in air-compressing machines of this class heretofore in use. The contact-rollers C C are made of hard wood or steel, preferably of lignum-vitæ, and supported in bearings or shells C′ of suitable anti-friction metal, which shells extend around the greater part of the circumference of the rollers, and are guided by parallel side plates, *d*, along the side walls of the extension-chambers B^2 of the casing. Each bearing or shell C′ is made of two symmetrical sections, which are united at their adjoining flanges *d′* by screws d^2, and by an intermediate elastic packing-plate, d^3, which latter imparts a certain degree of elasticity to the shell-sections, so that they move easily in the extension-chambers B^2 and exert no unnecessary friction upon the roller C. The shells C′ are cushioned by spiral springs *e e*, which are interposed between the jointed center flanges, *d′ d′*, and the end walls of the extension-chambers B^2. When the shells C′ arrive at their outermost position, their side flanges, *d d*, abut against elastic side stops, *e′ e′*, of the chambers B^2, as shown in Fig. 2. The spiral cushioning-springs *e e* serve to keep the rollers in intimate contact with the surface of an interior cylinder, E, that is supported by short eccentric end shafts, *f f*, in slots *f′ f′* at the inside of the heads B′. The interior cylinder, E, is made of suitable metal and covered by a thick layer of rubber that is secured to spurs of the cylinder. A second concentric cylinder,

formed of four sections. D′ D′, is interposed between the casing B and pulley D, the sections being secured by end flanges to the side walls of the extension-chambers B^2 and the radial partition-walls B^3 of the casing B, as shown in Fig. 2. The intermediate cylinder-sections, D′ D′, form with the interior casing, B, the partition-walls B^3, and the side walls of the extension-chambers B^2, four compartments, D^2, that extend from one head B′ to the other. Two opposite compartments D^2 communicate by openings *g g* in one head and bent pipes *g′ g′* with an enlarged cylindrical portion, *b′*, of the hollow hub *b*, through which air is admitted to said air-chambers. The same compartments D^2 communicate, by air-inlet ports g^2 in the side wall of the extension-chambers B^2, with the spaces formed between the interior casing, B, cylinder E, and contact-rollers C. The intermediate compartments, D^2, communicate by openings *h h* in the opposite head B′, and bent pipes *h′ h′*, with a second cylindrical portion, *b′*, of the opposite hub *b*, which latter is connected by a conduit-pipe to a receiver for the compressed air. These compartments communicate likewise with the spaces inclosed by the cylinder E, casing B, and rollers C C by outlet-ports h^2 in the opposite side walls of the extension-chamber B^2, said ports being closed by tightly-fitting and spring pressed valves h^3 that open toward the inside of the compartments D^2. While the first two compartments D^2 serve to admit the air to the interior compressing-spaces, the remaining compartments serve to receive the compressed air and conduct it through the pipes *h′ h′* and outlet-hub *b* to the compressed-air reservoir. As the rollers C C are held in tight contact with the rubber-covered cylinder E, and as the casing B is also in contact with the interior cylinder, the latter is carried along by the friction therewith in the direction of motion imparted to the casing. As it is supported by eccentric-shafts in the slots *f′ f′* of the heads B′, the cylinder E is always in contact at one point with the casing and with the rollers C C. By the rotations of the casing B the air is drawn in and conducted to the space between the casing and the interior cylinder at one side of the rollers, then simultaneously compressed and discharged at the opposite side of the rollers, as shown. For one half of a revolution one inlet-port and its corresponding outlet-port are called into action, while for the other half-revolution the other inlet and outlet ports are used. The greater the speed at which the casing is revolved the quicker follow the successive compressions each other. From the reservoir air is supplied at any required pressure to the place of use. As the driving-belt *h* has a great lap around the exterior pulley, D, and as the combined casing and pulley act in the nature of a fly-wheel, the machine runs easily and compresses the air drawn in at regular intervals.

Owing to the large circumference of the rubber-covered cylinder and the durable material of which the contact-rollers are made, the compressor can be worked for a considerable length of time with little, if any, repairs.

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

1. The combination of an interior eccentrically-supported cylinder or piston, an inclosing-casing having diametrical extension-chambers, spring-cushioned contact-rollers guided in said extension-chambers, exterior compartments connected with the casing by air-inlet and valved air-outlet ports, and an exterior pulley that is secured rigidly to the casing and rotated with the same around the central cylinder or piston, substantially as set forth.

2. The combination of an interior eccentrically-supported cylinder or piston, an inclosing-casing having diametrical extension-chambers, spring-cushioned contact-rollers guided in said extension-chambers, an exterior pulley secured to the casing, intermediate compartments communicating by air-inlet and valved outlet ports with the interior of the casing, and communicating pipes by which the air-compartments are connected with the hollow inlet and outlet hubs of the heads of the casing, substantially as set forth.

3. The combination of a cylindrical casing, B, having diametrical extension-chambers B^2 and heads B′, an interior cylinder or piston, E, supported eccentrically in slotted bearings of said heads, spring-cushioned contact-rollers guided in the extension-chambers of the casing, an exterior pulley secured to the casing, intermediate compartments communicating by air-inlet and valved outlet ports with the interior of the casing, exterior pipes or channels by which said compartments are connected with the hollow hubs of the casing heads, and upright standards supporting the hubs of the casing, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LEWIS S. CHICHESTER.

Witnesses:
CARL KARP,
SIDNEY MANN.