No. 709,683. Patented Sept. 23, 1902.

L. ROEDEL.

ROTARY SLIDE VALVE FOR PUMPS, COMPRESSORS, OR MOTORS.

(Application filed June 28, 1900. Renewed June 10, 1902.)

(No Model.) 4 Sheets—Sheet 1.

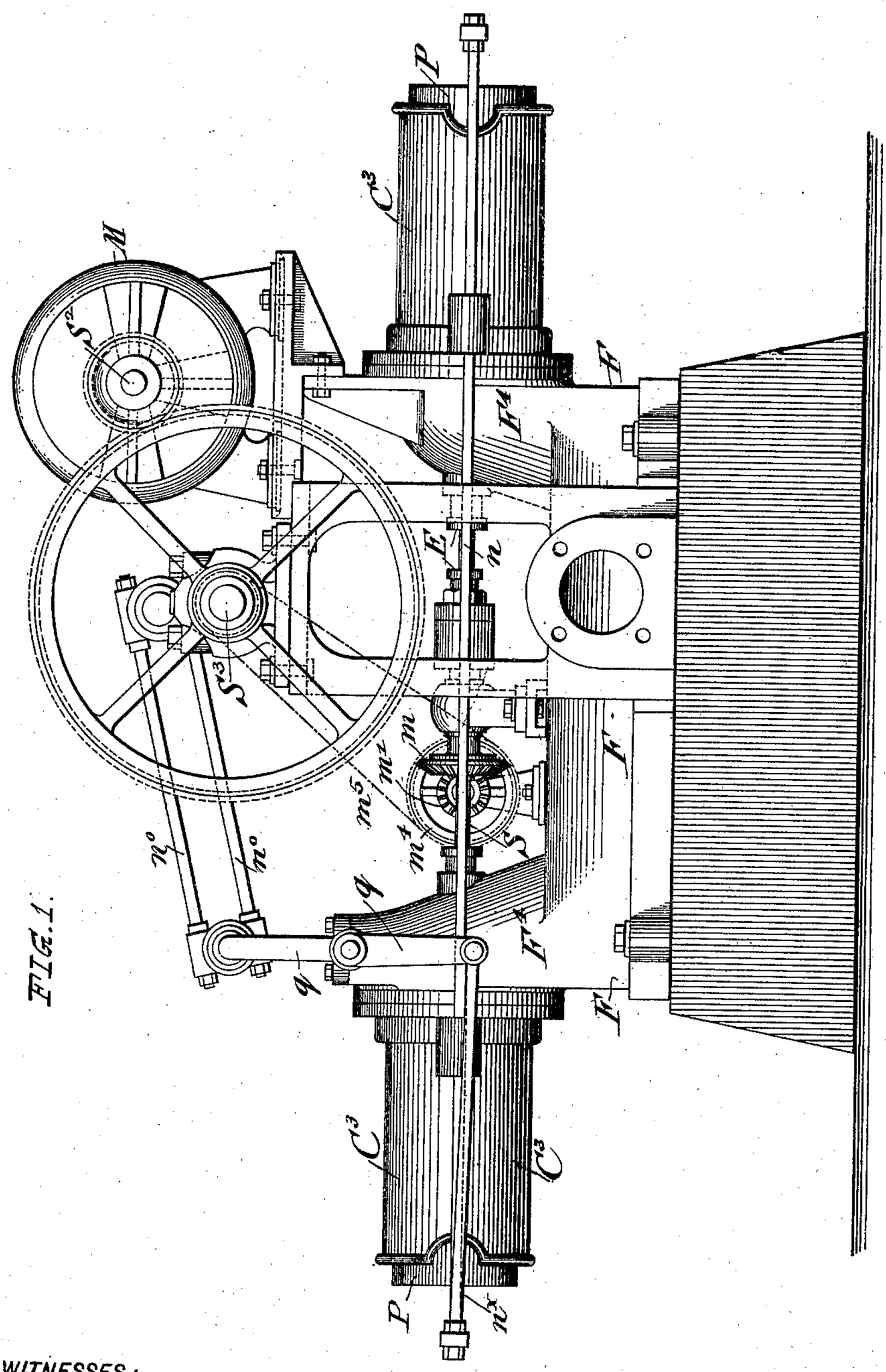

FIG. 1.

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J. H. Niles.

INVENTOR

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BY Lauer & Wagner

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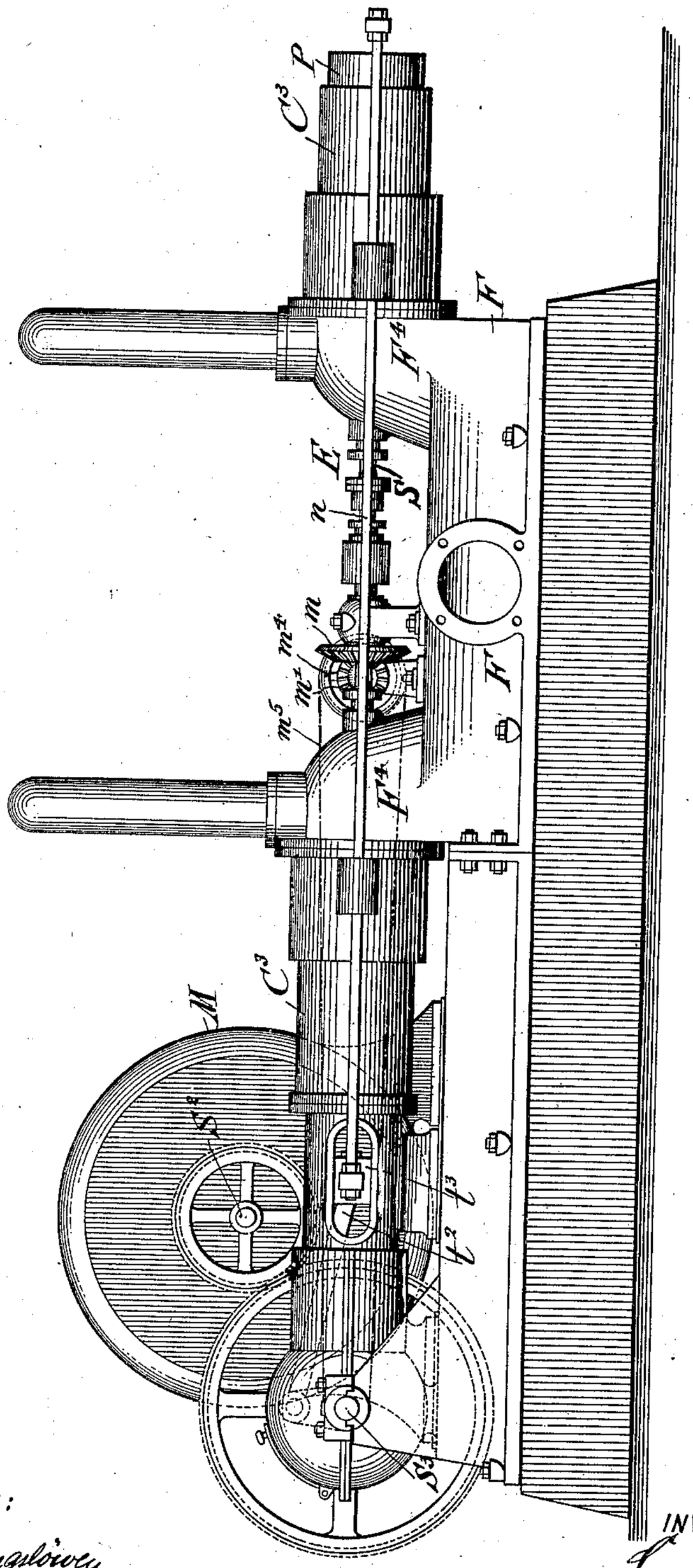
FIG. 2.



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(No Model.) 4 Sheets—Sheet 3.

FIG. 3.

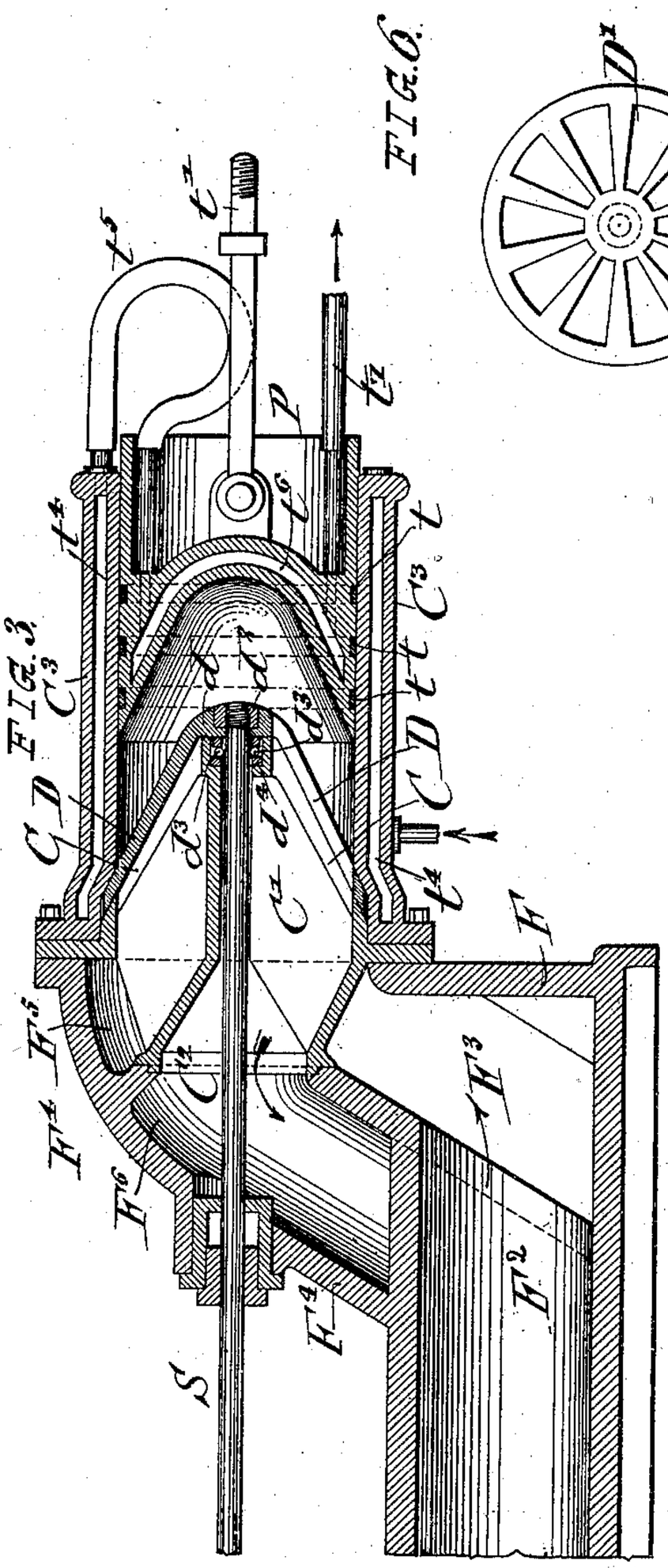


FIG. 4.

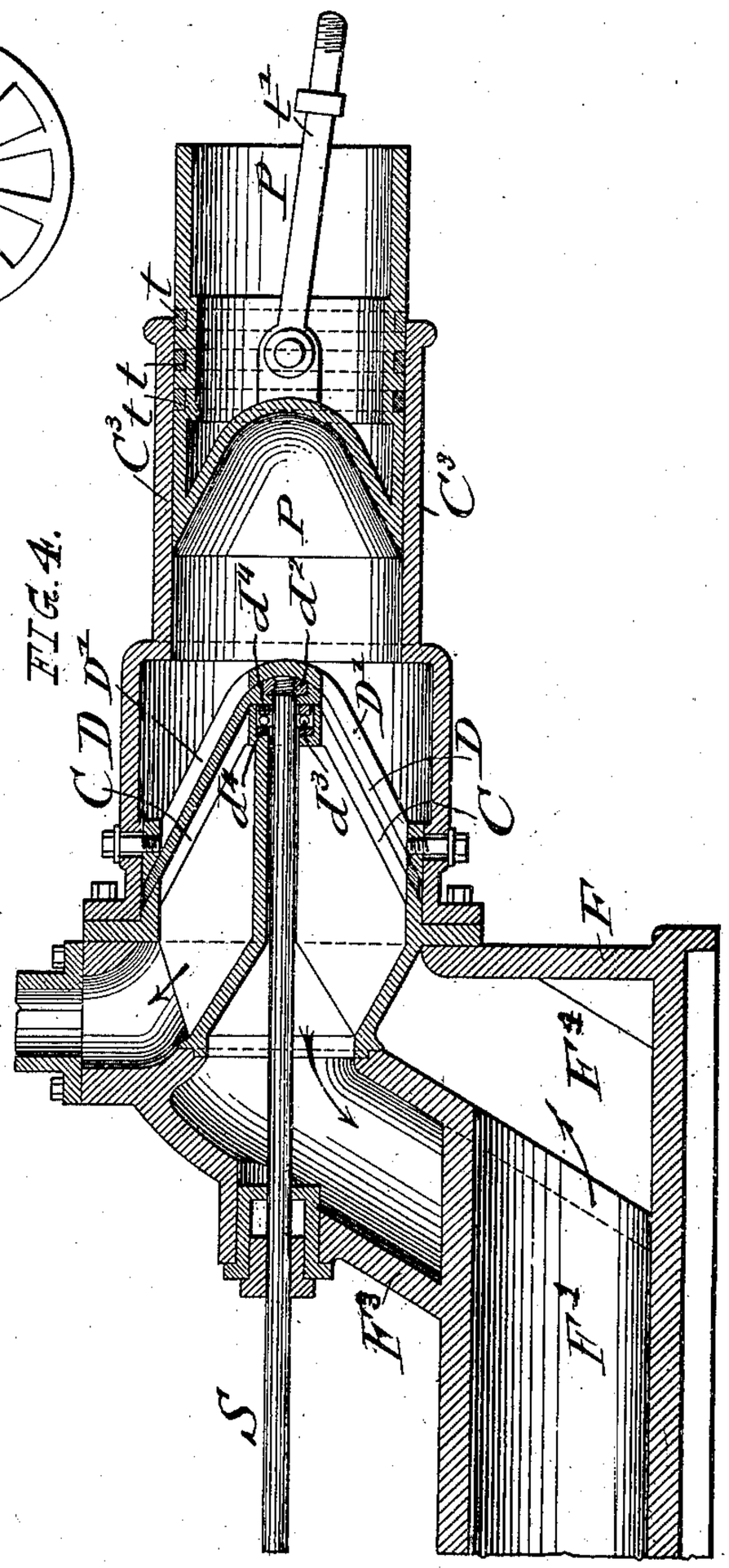
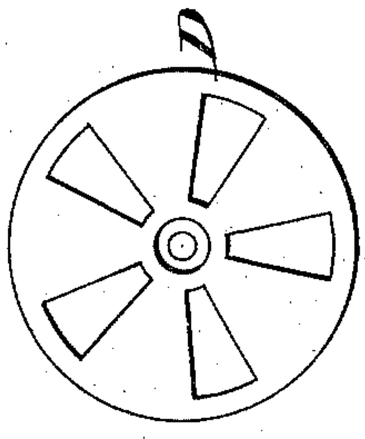


FIG. 5.



WITNESSES:

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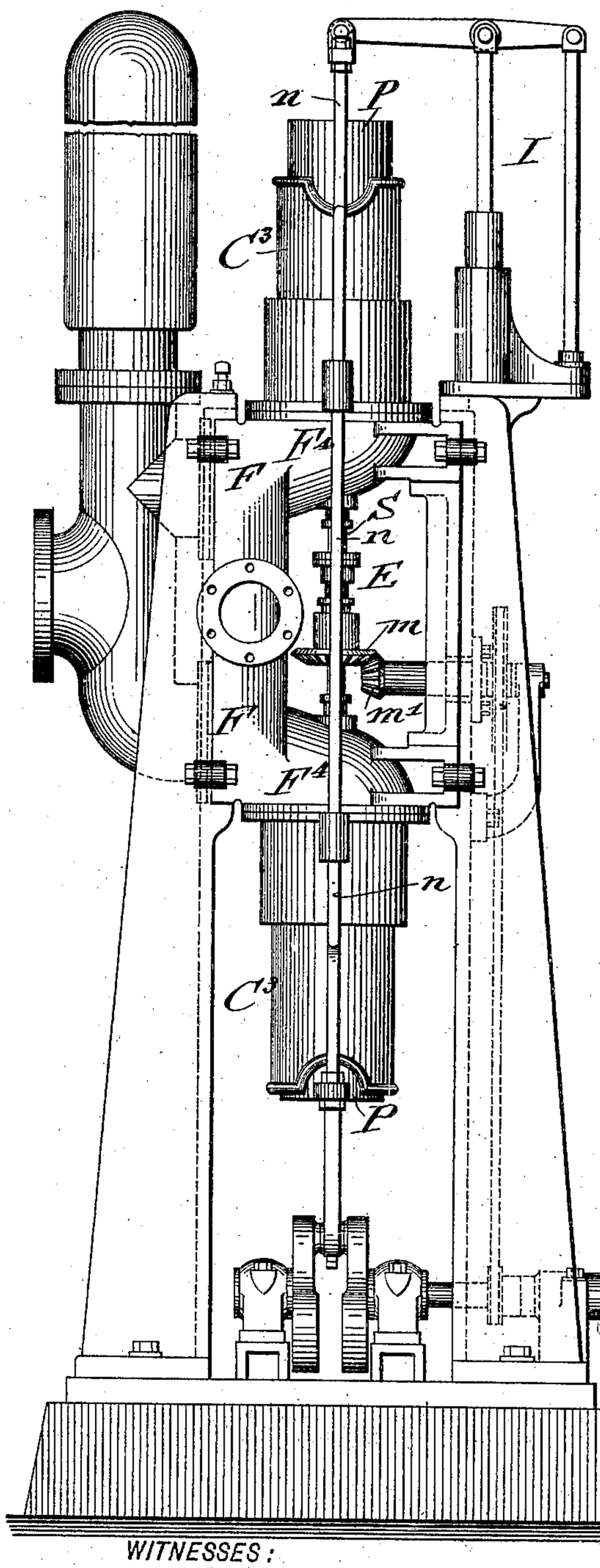

FIG. 1.

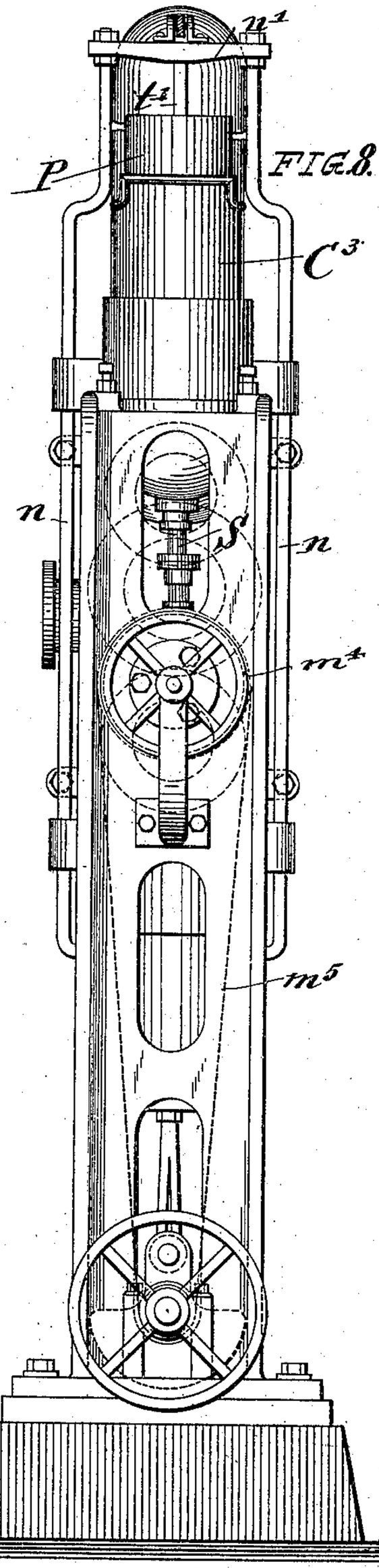

FIG. 8.

WITNESSES:

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INVENTOR

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BY Howard Raegener

ATTORNEYS

UNITED STATES PATENT OFFICE.

LOUIS ROEDEL, OF PASSAIC, NEW JERSEY.

ROTARY SLIDE-VALVE FOR PUMPS, COMPRESSORS, OR MOTORS.

SPECIFICATION forming part of Letters Patent No. 709,683, dated September 23, 1902.

Original application filed March 24, 1900, Serial No. 10,026. Divided and this application filed June 28, 1900. Renewed June 10, 1902. Serial No. 111,007. (No model.)

To all whom it may concern:

Be it known that I, LOUIS ROEDEL, a citizen of the United States, residing in Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Rotary Slide-Valves for Pumps, Compressors, or Motors, of which the following is a specification.

This invention relates to an improved slide-valve having in general the construction of the slide-valve set forth in my application, Serial No. 10,026, filed March 24, 1900, of which this application is a division. In some cases it is advantageous instead of having the plunger move upon the outside of the cylinder to locate it within the same. The valve may also be provided with a pressure-receiving plate for reducing the pressure on the bridges of the valve; and this invention consists of certain combinations of these parts with others, which will be more fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a double-cylinder blower or compressor provided with my improved rotary slide-valves. Fig. 2 is a side elevation of a double-cylinder pump for water or other liquid provided with my improved valve. Figs. 3 and 4 are vertical longitudinal sections through one of the cylinders, slide-valves, and plungers. Figs. 5 and 6 are plan views, respectively, of the slide-valve and pressure-receiving plate; and Figs. 7 and 8 are respectively a front elevation and a side elevation, with parts broken away, of a pump or compressor arranged with vertical cylinders, slide-valves, and plungers.

Similar letters of reference indicate corresponding parts.

In the drawings, F indicates the body portion, which may also serve as the supporting-frame of the pump, compressor, or motor, provided with the supply and discharge channels F' F^2, which are connected by inclined channels F^3 F^4 with rim-spaces F^5 F^6, communicating, respectively, with the rear ends of the inlet and outlet ports of the cone-shaped end or head of the cylinder C. The bridges between said alternating V-shaped inlet and outlet ports may be provided with recesses, as shown in my prior application referred to, into which the liquid enters to balance part of the pressure exerted on the opposite side of the slide-valve D, which is made cone-shaped, so as to fit the cylinder, and provided with a recessed hub d and keyed to a shaft S, turning in a thrust-bearing at the apex of the cylinder. A screw-nut d^2 connects the parts. The antifriction-balls d^3 or rollers are retained between thrust-rings d^4. The slide-valve is provided with half the number of ports as the total number of ports in the cylinder. Continuous rotary motion is imparted to the shaft S from the driving-shaft S^2 of the electric or other motor M or from the shaft S^3 of a transmission-wheel connected therewith by suitable gearing and sprocket-and-chain transmission m m' m^4 m^5.

Within an extension C^3 of the stationary cylinder C is supported a reciprocating plunger P, having a conical head at its inner end corresponding approximately in shape with the slide-valve and cylinder-head and provided with suitable packing-rings t. At the plunger side of the valve D is located a pressure-receiving plate D', provided with openings opposite the ports of the cylinder, so that pressure on the valve is much reduced.

It is preferable for the advantageous use of my improved rotary slide-valve that the pump, compressor, or motor be provided with two cylinders axially in line with each other and oppositely arranged and that between the inner ends of the shafts be interposed a balancing device E, which may be of the construction shown in my application referred to.

In the blower or compressor shown in Fig. 1 motion is imparted from the armature-shaft of the motor M to the plungers P by means of an intermediate gear-wheel upon the crank-shaft S^3, connecting-rods n°, fulcrumed levers q, connecting-rods $n^\times$ and n, transverse rods, such as n' in Fig. 8, and plunger-rods t', each suitably jointed to the apex of the conical plunger-head.

The plungers of the pump (shown in Fig. 2) are actuated by the motor M through an intermediate gear-wheel on the crank-shaft S^3, a connecting-rod t^2, connected with the cross-head t^3, supported to reciprocate in line with

the plungers, and suitable connecting-rods *n*, applied to the cross-head at one end and to a cross-rod at the other end.

In Figs. 7 and 8 my improved slide-valve is applied to an upright arrangement of pump, blower, or compressor. In case of a pump momentum of the moving parts on the down-stroke is balanced by an air-cushioning device I, Fig. 7, which for clearness is omitted from Fig. 8.

In compressors it is advantageous to cool the parts, as they become more or less heated by the heat given off by the air as it is compressed. For this purpose the cooling medium—for instance, water—is conducted through the annular space t^4 of the cylinder extension C^3, thence by a flexible pipe t^5 to the plunger P and through the channel t^6 in the same, and out through the pipe t^7. By this circulation of the cooling medium through both the cylinder and the plunger both are kept thoroughly cooled, so that the compressor can be maintained in rapid operation for any length of time.

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

1. The combination, with two stationary cylinders arranged axially in line with each other and provided with interior inlet and outlet channels, of conical slide-valves at the ends of said cylinders, means for imparting rotary motion to the slide-valves, plungers guided in said cylinders, and means for imparting reciprocating motion to said plungers, substantially as set forth.

2. The combination, with a stationary cylinder having interior inlet and outlet channels, of a rotary slide-valve on the head of said cylinder, a stationary pressure-receiving plate having ports corresponding to the ports of the cylinder, and a reciprocating plunger for said cylinder, substantially as set forth.

3. The combination, with a stationary cylinder having interior inlet and outlet channels, of a rotary slide-valve on the head of said cylinder, a stationary pressure-receiving plate having ports corresponding to the ports of the cylinder, a reciprocating plunger for said cylinder, and a balancing device at the inner end of the valve-shaft, 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.

LOUIS ROEDEL.

Witnesses:
PAUL GOEPEL,
M. H. WURTZEL.