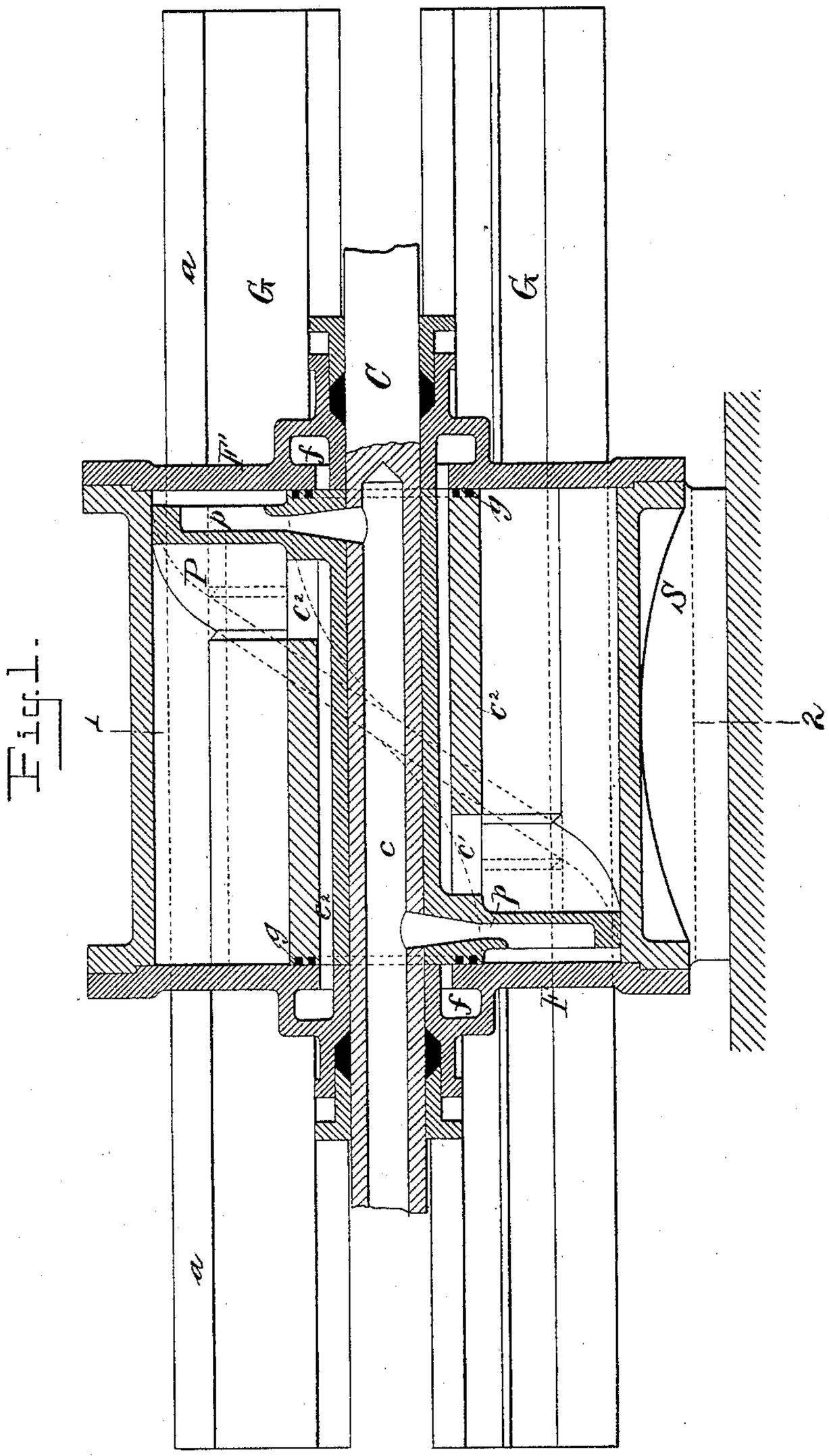
(No Model.) 3 Sheets—Sheet 1.

E., J. & G. FILTZ.

ROTARY MOTOR.

No. 453,043. Patented May 26, 1891.

Fig. 1.



WITNESSES:

George Baumann

Albert Popkins

INVENTORS.

Ernest Filtz, Joseph Filtz and George Filtz

BY

Howson and Howson

their ATTORNEYS.

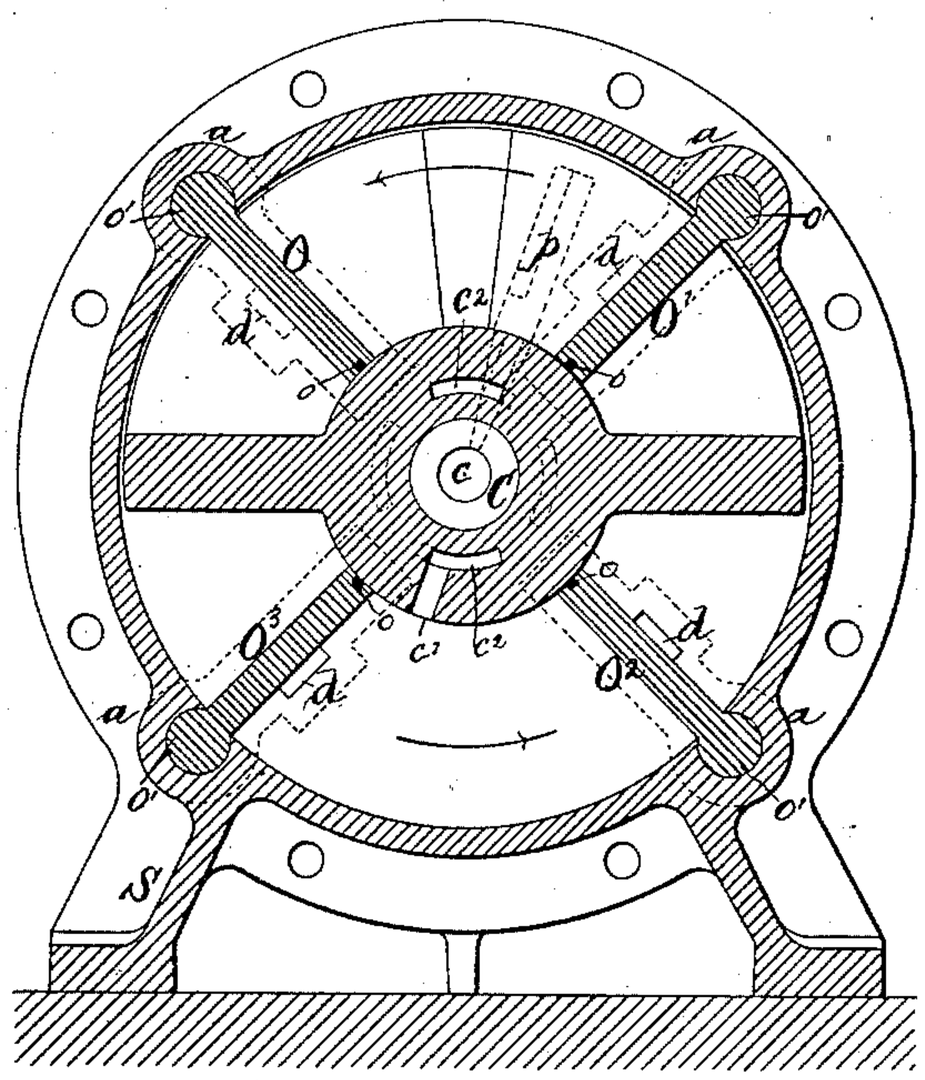
(No Model.) 3 Sheets—Sheet 2.

E., J. & G. FILTZ.

ROTARY MOTOR.

No. 453,043. Patented May 26, 1891.

Fig 2.



WITNESSES:

George Baumann

Albert Popkma

INVENTORS.

Ernest Filtz, Joseph Filtz, George Filtz

BY

Howson and Howson

their ATTORNEYS

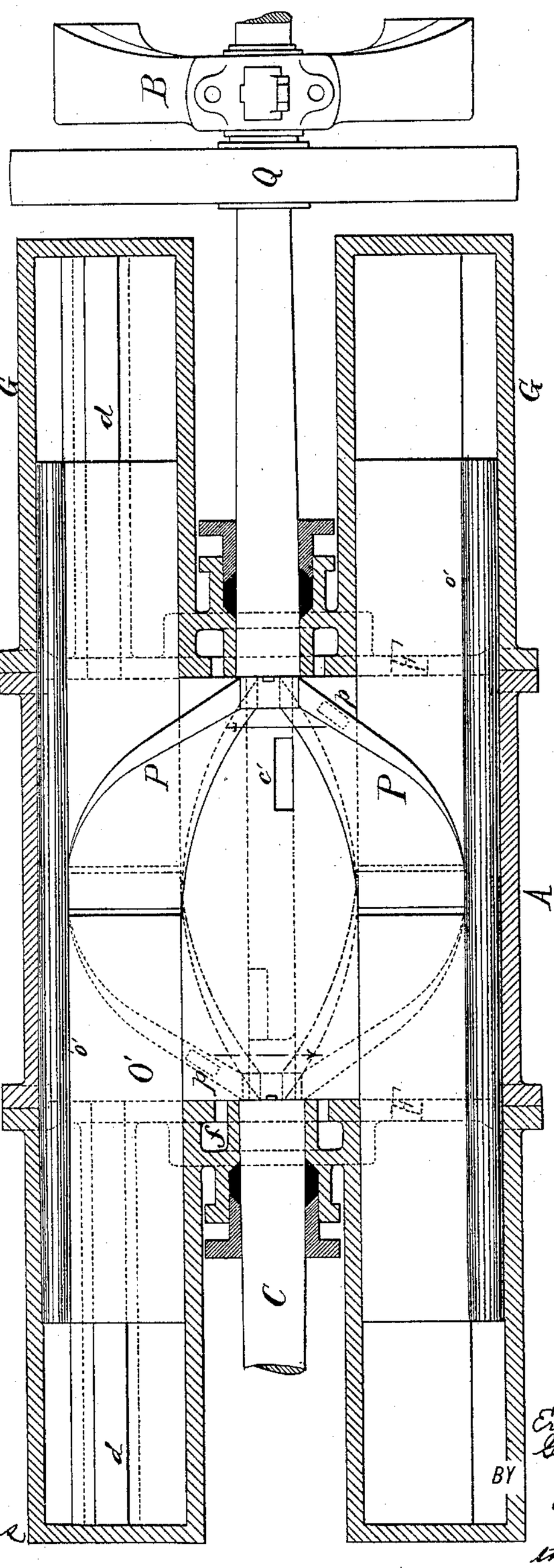
(No Model.) 3 Sheets—Sheet 3.

E., J. & G. FILTZ.

ROTARY MOTOR.

No. 453,043. Patented May 26, 1891.

Fig. 3.



WITNESSES:

George Baumann

Albert Popkins

INVENTORS.

Ernest Filtz, Joseph Filtz

George Filtz

BY

Howson and Howson

their ATTORNEYS.

UNITED STATES PATENT OFFICE.

ERNEST FILTZ, JOSEPH FILTZ, AND GEORGES FILTZ, OF PARIS, FRANCE.

ROTARY MOTOR.

SPECIFICATION forming part of Letters Patent No. 453,043, dated May 26, 1891.

Application filed November 21, 1890. Serial No. 372,268. (No model.) Patented in France May 9, 1890, No. 205,570.

To all whom it may concern:

Be it known that we, ERNEST FILTZ, JOSEPH FILTZ, and GEORGES FILTZ, all of Paris, in the Republic of France, have invented an Improved Rotary Motor, (for which we have obtained a French patent, dated May 9, 1890, No. 205,570,) of which the following is a specification.

The rotary motor which forms the object of our invention is characterized by the arrangement of the piston, which is helicoidal, and of the partitions which divide or subdivide the interior of the cylinder into compartments. In this motor the admission of the steam or other fluid employed to work the motor and the "exhaust" are controlled by the combined action of the helicoidal piston and of the partitions which move to and fro as the piston revolves about its axis. Thus without any special mechanical appliance being employed for the purpose the admission of the steam or other fluid, by means of which the motor is actuated, and the exhaust are controlled by the rotation of the helicoidal piston and the displacement of the sliding partitions, which consist in parts embracing the helicoidal piston and arranged to be slid to and fro longitudinally.

In order that the principle, arrangement, and working of the motor constructed according to our invention may be thoroughly understood, we shall proceed to describe such motor with reference to the accompanying drawings, which represent, by way of example, a motor constructed according to our invention.

Figure 1 is a longitudinal section taken as a whole through the axis of the motor, but in part in planes other than the vertical plane passing through the axis of the motor, in order that certain features of the motor may be more clearly shown. Fig. 2 is a transverse section made on the plane indicated by the line 1 2 of Fig. 1. Fig. 3 is a horizontal section in which the exterior of the helicoidal piston is shown, and in which the sliding partitions are represented as being in the plane of the figure, although they are actually in planes inclined thereto.

As is illustrated in the accompanying drawings, the motor comprises a cylindrical envelope or cylinder A, which is provided with ends or covers F F′, which are formed with recesses, a central shaft C, passing through the ends or covers F F′ of the cylindrical envelope or cylinder A, a helicoidal piston P in one with the shaft C, and sliding partitions or movable parts O O′ O^2 O^3, dividing the interior of the cylindrical envelope or cylinder A into independent compartments.

The cylindrical envelope or cylinder A is formed in one with or secured to a pedestal S of sufficient size and strength to insure the stability and the fixing of the motor. The cylindrical envelope or cylinder A, which, for convenience, we shall hereinafter refer to as the "cylinder A," is provided with hollow ribs *a*, in the interior of each of which and arranged so as to be capable of being slid therein is one edge or part of one of the sliding partitions O O′ O^2 O^3. Each of the ends or covers F F′ of the cylinder A is provided with an annular chamber *f*, which is separate from the stuffing box or gland provided upon such end or cover F or F′, and is put into communication by means of the shaft C with the compartments of the cylinder in order that the escape of the steam or fluid employed to actuate the motor may take place when required.

For convenience we shall generally refer to the motor constructed according to our invention as being actuated by steam.

The shaft C, which is hollowed in the interior, serves for the admission of steam to and the escape of steam from the interior of the cylinder A. For the admission of steam to the interior of the cylinder A the shaft C is provided with a central canal or passage *c*, connected by means of any suitable joint with any suitable source of steam, and the distribution of the steam is effected by the openings *p*, formed in the piston P. In order that the escape or exhaust of the steam may take place when required, the shaft C has formed in it orifices *c′*, which communicate, by means of canals or passages c^2, with the chambers *f f*. Between the ends or covers F F′ of the cylinder A and the adjacent parts of the shaft C suitable packings *g* or other suitable appliances are provided, in order that steam may not escape from the interior of the cylinder A into the annular chambers *f*, except by means of the orifices *c′* and canals

or passages c^2. On the shaft C is mounted a pulley Q or any other suitable means by which rotary motion may be transmitted from the shaft C. The ends of the shaft C may be supported by pedestals B, so that the shaft C may not be moved out of proper position.

The piston P is formed of a helicoidal rib cast with the shaft C or secured upon the said shaft C. The said rib is inclined in both directions and may be made of any suitable length, and may be made so that in its revolution it will generate a cylinder of any suitable diameter.

The sliding partitions O O′ O^2 O^3 have parts of rectangular form placed in the space between the cylinder A and the shaft C, and the extremities of the said sliding partitions passing through the covers or ends F F′ pass into sheaths G, of corresponding form, cast with or secured upon the said covers or ends F F′. In the middle of each of the sliding partitions O O′ O^2 O^3 is formed a notch, giving passage to the helicoidal rib. The said sliding partitions O O′ O^2 O^3 divide the interior of the cylinder A into independent compartments, in each of which a part of the helicoidal rib serves the purpose of a piston. Each of the said compartments communicates by a longitudinal conduit *d* with the extremity of each of the corresponding sheaths G, in order that the steam may act on the ends of the sliding partitions. Between each of the sliding partitions and the shaft C a packing *o* is provided, and the enlarged swelling part *o′* of each of the sliding partitions O passes into the corresponding hollow rib *a* of the cylinder A.

We will now assume that the piston P and the sliding partitions O O′ O^2 O^3 are in the position in which they are represented in the accompanying drawings—that is to say, when, for example, the orifice *p* of the helicoidal piston P nearest to the cover or end F′ of the cylinder A ceases to be covered by the sliding partition O′—and consider what will happen in the corresponding compartment comprised between the partitions O and O′. It may be remarked, first, that the portion of the helicoidal rib of the piston P included in the compartment being considered is near the end or cover F′ of the cylinder A—that is to say, near the end of its stroke. The steam admitted by the orifice *p* presses on the piston and tends to move it forward; but as the said piston is helicoidal and is in one with or fast upon the shaft C the shaft C receives a rotary movement. The admission of steam to the said compartment of the cylinder A continues during one-quarter of a revolution of the shaft C until under the influence of the rotation of the shaft C the orifice *p* reaches and passes the partition O. From this time the steam in the said compartment expands in such manner that as much useful effect as is possible is obtained. The expansion of the said steam continues during the next quarter of the said revolution of the shaft C. Then the orifice *c′*, opposite to the orifice *p*, by which steam was admitted to the said compartment, is brought into communication with such compartment by the revolution of the shaft C, and the steam, finding an outlet, escapes by this orifice *c′* through the canal or passage c^2 and chamber *f*. The escape or exhaust of the steam takes place during a quarter of a revolution of the shaft C. The same effects are produced at the same time in the compartment diametrically opposite and successively for each of the compartments.

In effect when the motor is at work there are always two compartments into which steam is being admitted at full pressure, two compartments in which the steam is expanding, two compartments from which the exhaust or escape of steam is taking place, and two compartments empty of steam. The motor constructed according to our invention, in virtue of the double inclination of the helicoidal piston is double acting. The said motor may be made triple or quadruple, acting, if in place of four sliding partitions six or eight are employed. If two sliding partitions only were employed, a single-acting motor would be produced. It would, however, be convenient to adapt the piston to the number of partitions employed and to provide such piston with a suitable number of orifices for the admission and escape of steam.

In all cases it is to be remarked that when steam is admitted into any of the compartments of the cylinder steam passes by means of the corresponding conduit *d* freely into the corresponding sleeve G, where it presses upon the end of the sliding partition in such sleeve G with the effect of facilitating the longitudinal movement of the said sliding partition and of reducing as much as possible the effort required to be exerted by the piston P in moving the said partition. In this manner friction is reduced, and also the sliding partition in "making joint" with the piston P assists in turning such piston.

Although we have hitherto in most cases referred to the motor constructed according to our invention as being worked by steam, we would have it understood that water under pressure may quite as well be employed to produce the rotation of the shaft C.

The motor constructed according to our invention may also be employed as a pump.

Although the accompanying drawings show certain forms and proportions of the parts of the motor, we reserve to ourselves the right to vary such forms and proportions in practice.

The motor constructed according to our invention may be made in any required size and of any suitable material.

As has been stated above, we reserve to ourselves the right to employ any number whatever of sliding partitions, and in like manner we may cause the admission and exhaust or escape of the steam or other fluid employed to be effected in any other suitable manner without departing from the principle of our invention.

What we claim, and desire to secure by Letters Patent, is—

1. In a rotary motor, the combination of a cylinder and a hollow shaft provided with a helicoidal piston within the cylinder, with sliding partitions forming compartments in the cylinder, and passages in the shaft and piston for the inlets and outlets to the different compartments, substantially as and for the purpose set forth.

2. In a rotary motor, the combination of a cylinder provided with heads having recesses therein for the exhaust, and a shaft provided with a helicoidal piston in the cylinder, with passages through the shaft and piston for the inlet to the cylinder, and passages connecting with the said recesses in the cylinder-heads for the exhaust, all substantially as set forth.

3. In a rotary motor, the combination of a cylinder, sheaths G, a shaft provided with a helicoidal piston in the cylinder, and partitions sliding to and fro in the sheaths and cylinder, with passages in the shaft for the inlets and outlets and passages *d* in the walls of the sheaths, all substantially as and for the purposes specified.

4. In a rotary motor, the combination of a cylinder provided with hollow ribs *a*, with a hollow shaft provided with a helicoidal piston and sliding partitions having enlarged edges *o'*, guided in the hollow ribs *a*, substantially as and for the purposes set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ERNEST FILTZ.
JOSEPH FILTZ.
GEORGES FILTZ.

Witnesses:
LÉON FRANCKERD,
ROBT. M. HOOPER.