

No. 645,650.

Patented Mar. 20, 1900.

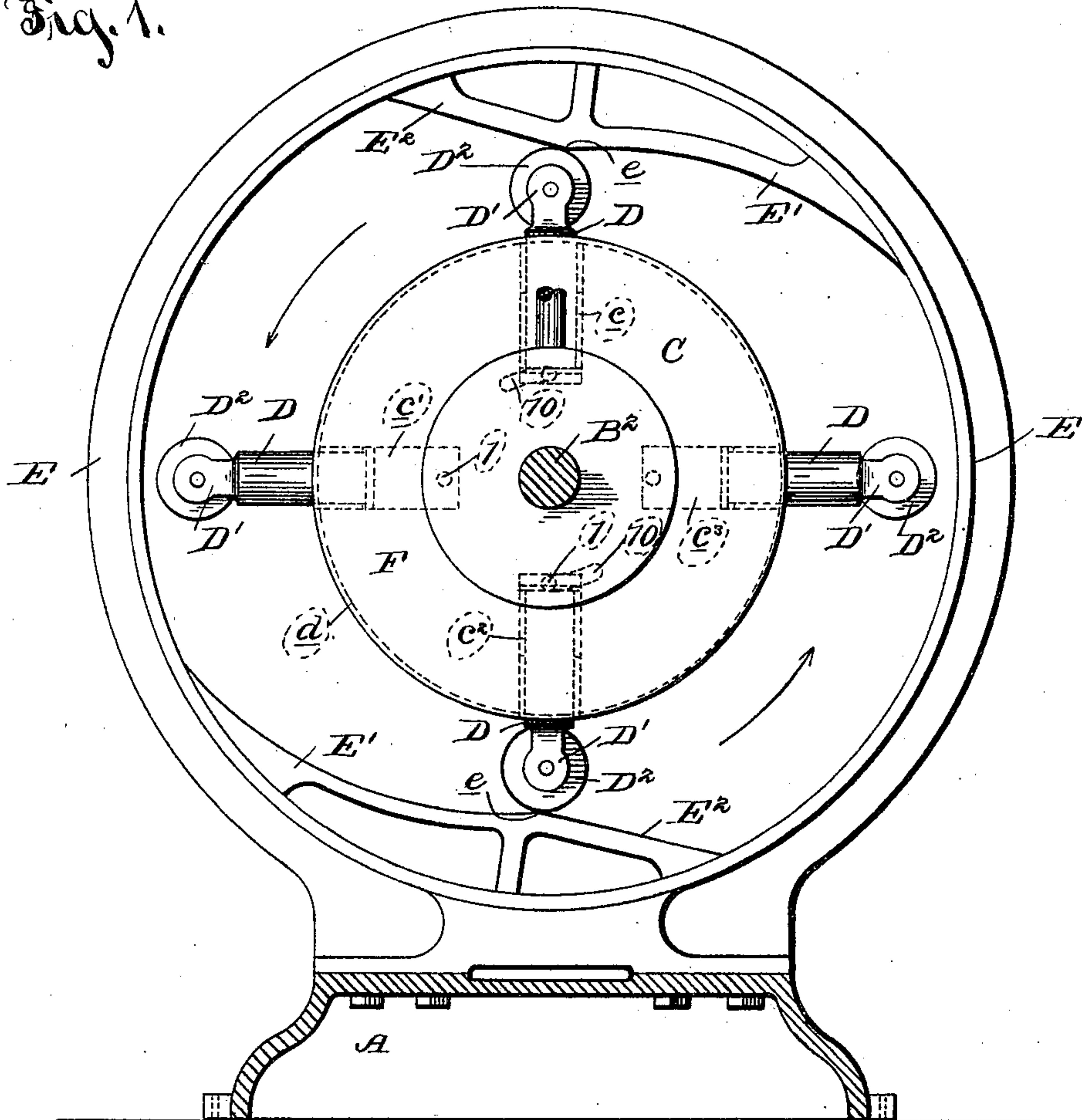
J. B. SAMPLE.  
ROTARY MOTOR.

(Application filed Sept. 30, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

*A. C. Morrison*  
*J. S. Milane*

INVENTOR;

*James B. Sample,*  
BY  
*R. S. Bacon*  
ATTORNEY

**No. 645,650.**

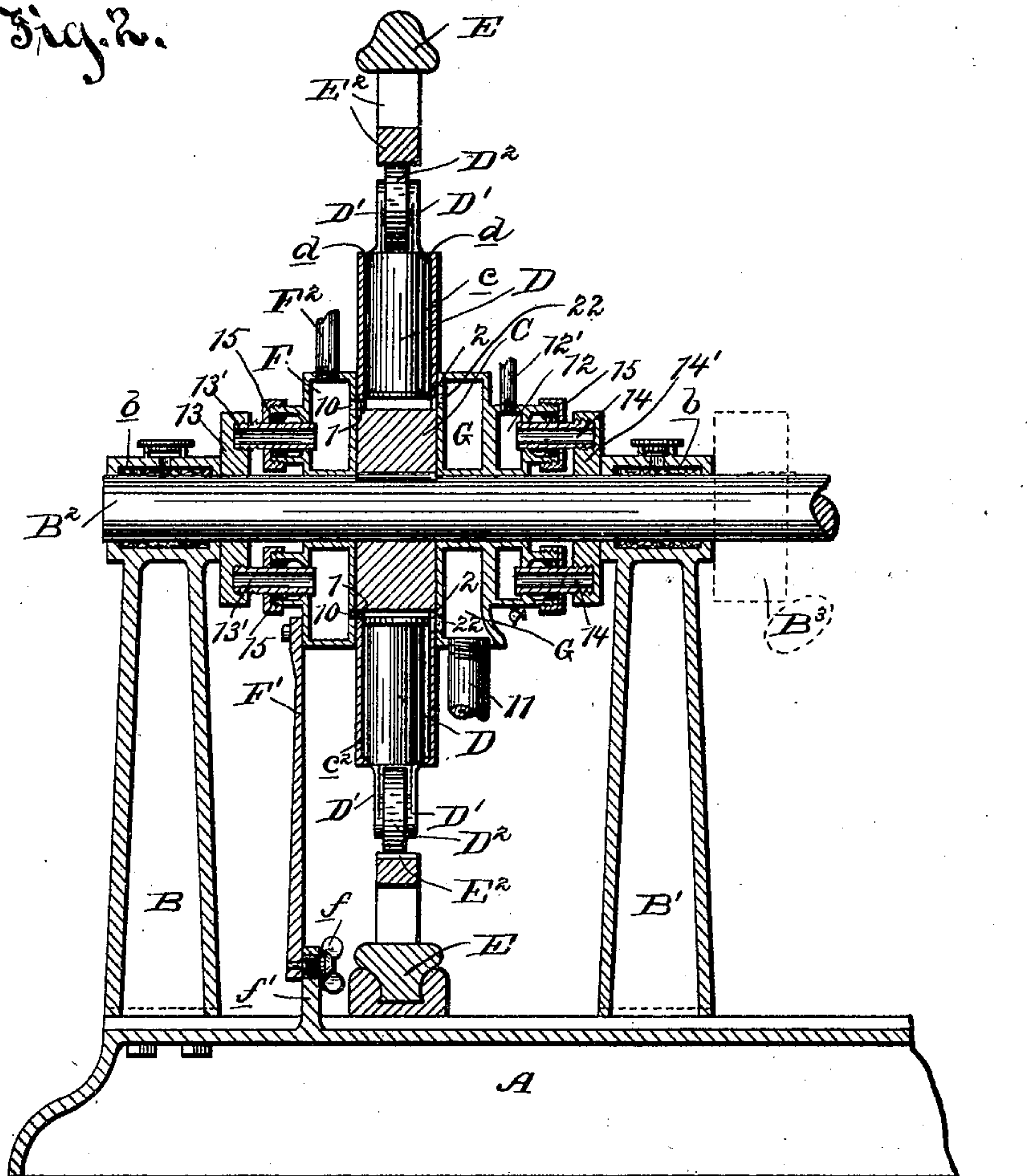
**Patented Mar. 20, 1900.**

**J. B. SAMPLE.**  
**ROTARY MOTOR.**

(Application filed Sept. 30, 1899.)

(No Model.)

**2 Sheets—Sheet 2.**



**WITNESSES:**

N. C. Johnson.  
Genl Milan

INVENTOR

James B. Sample,

BY

51  
A. J. Bacon

ATTORNEY



# UNITED STATES PATENT OFFICE.

JAMES BEARD SAMPLE, OF COLUMBUS, GEORGIA, ASSIGNOR OF ONE-HALF  
TO WILLIAM BALLINGER, OF CHENOA, ILLINOIS.

## ROTARY MOTOR.

SPECIFICATION forming part of Letters Patent No. 645,650, dated March 20, 1900.

Application filed September 30, 1899. Serial No. 732,224. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES BEARD SAMPLE, a citizen of the United States, residing at Columbus, in the county of Muscogee and State of Georgia, have invented certain new and useful Improvements in Rotary 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.

This invention relates to an improvement in motors, and more particularly to that class wherein revolving pistons are employed for driving the transmitting-shaft; and it consists in the construction and arrangement of parts as hereinafter described, and defined in the claims.

The object of my invention is to provide a motor wherein the employment of the mechanical principle of an inclined plane may be successfully used in conjuncture with the outwardly-propelled pistons moving on the inclination of the plane, the contacting surfaces being such as to rapidly carry the motor forward or propel it.

Many attempts have been made heretofore to provide a satisfactory machine of this character which would effectively meet the requirements of the particular use and commercial utility; but as far as I am aware the efforts in this line have been more or less unsuccessful, owing largely, in the first instance, to an unusual and objectionable friction between the various parts, and, further, in the complication of mechanisms involving valve-gearings and adjustable features which, while rendering the devices interesting, destroyed their practical utility. My invention is designed to provide an engine of the particular type above indicated which will involve simplicity in structure, ease in operation, and a relatively-small amount of friction.

With this end in view a constructive embodiment of the invention is shown in the accompanying drawings, wherein—

Figure 1 is an end elevation showing the shaft in section. Fig. 2 is a longitudinal vertical section through one of the motors, it being understood that in the completed machine four motors of the same type will be used, the same being duplicates of the first.

In the drawings, A represents the base of the engine, which is of any convenient or approved form, and B B' are vertical standards containing the journal-boxes *b*, in which the shaft B<sup>2</sup> is journaled, the shaft carrying any suitable transmitting structure, such as a pulley B<sup>3</sup>. Mounted on the shaft and conveniently keyed or fixedly secured thereto is a cylinder disk or wheel C, having four cylinder-cavities *c*, *c'*, *c*<sup>2</sup>, and *c*<sup>3</sup> therein, extending radially and arranged equal distances apart—that is, the adjacent cylinders being at an angle of forty-five degrees to each other. These cylinders have at their lower ends on opposite sides admission-ports and exhaust-ports 1 and 2, respectively. The cylinder-base is formed with a slight projection to retain the piston D in a position to be quickly acted upon by the incoming motive fluid. The pistons D are so fashioned as to work in the cylinders and are held therein against complete outward movement by a flange or collar *d*, located at the outer end of the cylinders, which abut against the shoulder portion of the pistons. The ends of the pistons extend beyond the cylinders and have secured thereon suitable brackets D', in which are mounted antifriction rolls or wheels D<sup>2</sup>, the same being carried by suitable shafts mounted in the brackets.

Mounted on the base A and surrounding the cylinders, but spaced therefrom, are the rings or tracks E, each being rigidly constructed and firmly bolted or secured in any convenient manner to the base. These rings are provided with the gradually-inclining ways or tracks E', which extend some considerable distance and terminate at the point *e*, from which point a very abrupt inclined plane or way E<sup>2</sup> is formed, terminating at the face of the wheel. These ways are of rigid formation and are permanently secured to the ring. There are two ways or tracks E' and E<sup>2</sup>, located diametrically opposite each other, as shown in Fig. 1, and their distance toward the center is such that as an antifriction-wheel of a piston comes in contact with the gradual inclination of the way E<sup>2</sup> it will ride up thereon and by that means be forced back into the cylinder.

To form a convenient, economic, and du-



rable valve or portage system to the engine, I place on opposite sides of the wheels or disks C the steam-chest F and exhaust-chest G. The former is conveniently secured loosely on the shaft and is held in its proper position by an adjustable flexible arm F', secured adjust-  
 5 ably to the base by a suitable bolt or screw f' engaging the projection f' on the base, and also by the induction-pipe F<sup>2</sup>. The steam-chest is shown fashioned so as to fit snugly the side of the disk and is provided with the inlet-ports 10, with which the inlet-ports 1 of the cylinders register during the movement of the disk. In this type of construction it is necessary to have a close joint formed between the steam-chest and disk to prevent the escape of steam or other fluid through the space between the chest and disk. To accomplish this, I mount on the shaft a block 13, the same having its outer face resting against the end of the journal-box of the standard B. This box carries a series of longitudinally-extending hollow nipples 13', which project through the stuffing-boxes 15, carried by the steam-chest, and through apertures formed in the side walls of the steam-chest. This construction enables the steam-chest to slightly vibrate longitudinally on the shaft, the spring-standard and pipe holding it in its normal position slightly out of contact with the disk.

When the steam is forced into the steam-chest, it will find a permanent backing against blocks 13, and owing to the steam-chest having slight movement the pressure of the steam against the fixed surfaces will have a tendency to move the chest toward the disk. This, however, is not accomplished until the steam issuing from the ports 10 will sufficiently lubricate the sides of the disk to prevent any undue friction therebetween. The pressure of the steam exerted against the steam-chest will, however, very quickly close the space between the same and the disk sufficiently tight to prevent the escape of steam.

The exhaust-chest is largely a duplicate of the steam-chest, except that the chest is provided with an exhaust-pipe 11 at its base for the carrying off of the exhaust and water of condensation. This exhaust-chest is also provided with exhaust-ports 22. To hold the exhaust-chest in proper relation to the disk, a steam-chest 12 is formed at the side thereof, into which the small steam-pipe 12' enters. This chest is also provided with stuffing-boxes, through which the nipples 14 project into the chest, the nipples being carried by the block 14', mounted on the shaft and held in position by the journal-boxes of the standard B' or in other convenient manner. To permit the water of condensation to escape from the steam-chest 12, a suitable petcock is provided.

In operation the pistons are arranged, as shown in Fig. 1, with the antifriction-rolls resting on the point between two inclined planes. The steam is then admitted to the steam-chest and, issuing through the ports with great force, forces the pistons outward,

carrying the rolls onto the inclined propelling-plane, and thereby advancing the cylinders very rapidly, and the momentum given the cylinders and their pistons is such as to cause the same to move rapidly around; but owing to the duplication of the engines the power is being constantly applied every sixteenth of a revolution, the engine being set to accomplish this result. The momentum and assisting force of the first engine carries the antifriction-wheels into engagement with the inclined way E<sup>2</sup>, which gradually and without sudden shock forces the piston back into the cylinder ready for repeated action. It will be noticed that in this machine during the greater part of the movement of the piston the antifriction-wheel is wholly out of contact with the ring, thus largely reducing the friction during that interval.

I have shown in the drawings a structure which is susceptible of various modifications, and I desire it understood that many changes and alterations can be made without departing from the nature and principle of the invention.

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

1. In a rotary motor, the combination with a base, of a hollow frame mounted thereon, standards on the base, a shaft journaled in the standards, a cylinder-disk fixedly secured to the shaft and having a series of cylinders formed therein with supply and exhaust ports at their base, pistons working in the cylinder having brackets carrying antifriction-rolls, inclined tracks mounted in the frame in the path of the rolls and oppositely arranged, the inclined surfaces being divided into two sections having different inclinations, a steam-chest and an exhaust-chest mounted on opposite sides of the cylinder-disk and stationary means associated with the chests acted against directly by the steam entering thereinto for forcing the chests against the cylinder-disks, substantially as described.

2. In a rotary motor of the character described, the combination with the revolving cylinder-disk, and means for revolving the same, a steam-chest movable toward and from the disk, a fixed abutment, and a sliding hollow connection between the abutment and chest communicating with the latter, substantially as described.

3. In a rotary motor, the combination with a cylinder-disk, means for driving the same, of a steam-chest having movement toward and from the disk, a block having nipples extending therefrom into the chest having a sliding engagement with the chest and means for preventing the movement of the block in an outward direction, substantially as described.

4. In a rotary motor, the combination with a cylinder-disk and means for driving the same, of a steam-chest having a movement toward and from the disk, stuffing-boxes at the side of the chest, nipples projecting loosely



through the stuffing-boxes into the side of the chest, a support for the nipples, a standard and a bearing against which the support rests, substantially as described.

5 5. In a rotary motor, the combination with a cylinder-disk having pistons, means for driving the same, of a steam-chest, an exhaust-chest having a steam-chest at the side thereof, and an abutment carrying nipples  
10 loosely passing through the walls of the said steam-chest on the exhaust side, substantially as described.

6. In a rotary motor, the combination with the base, standards on the base and a shaft  
15 journaled in the standards, of a disk fixedly mounted on the shaft having radial cylinders therein, provided with inlet and outlet ports at their bases, pistons mounted in the cylinders

carrying antifriction-wheels at their outer ends, inclined planes fixedly secured in the 20 path of the wheels and arranged opposite each other, the inclination of the planes being relatively different to form a propelling and replacing portion, steam-chests and means for causing the same to closely and 25 yieldingly rest against the side of the cylinder-disk comprising a stationary abutment and hollow steam-conduit carried thereby entering the chest, substantially as described.

In testimony whereof I affix my signature 30 in presence of two witnesses.

JAMES BEARD SAMPLE.

Witnesses:

F. E. JOHNS,

G. F. WITTEKIND.