(Model.)

2 Sheets—Sheet 1.

A. H. GLEASON.

ROTARY ENGINE.

No. 290,035. Patented Dec. 11, 1883.

Fig. 2.

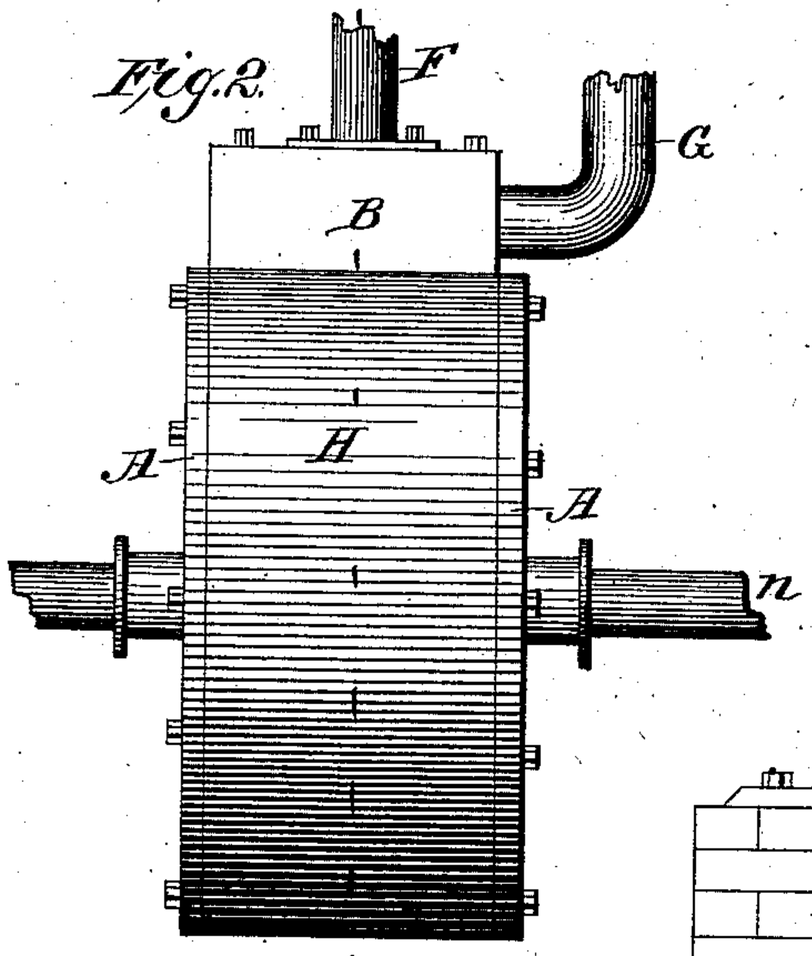
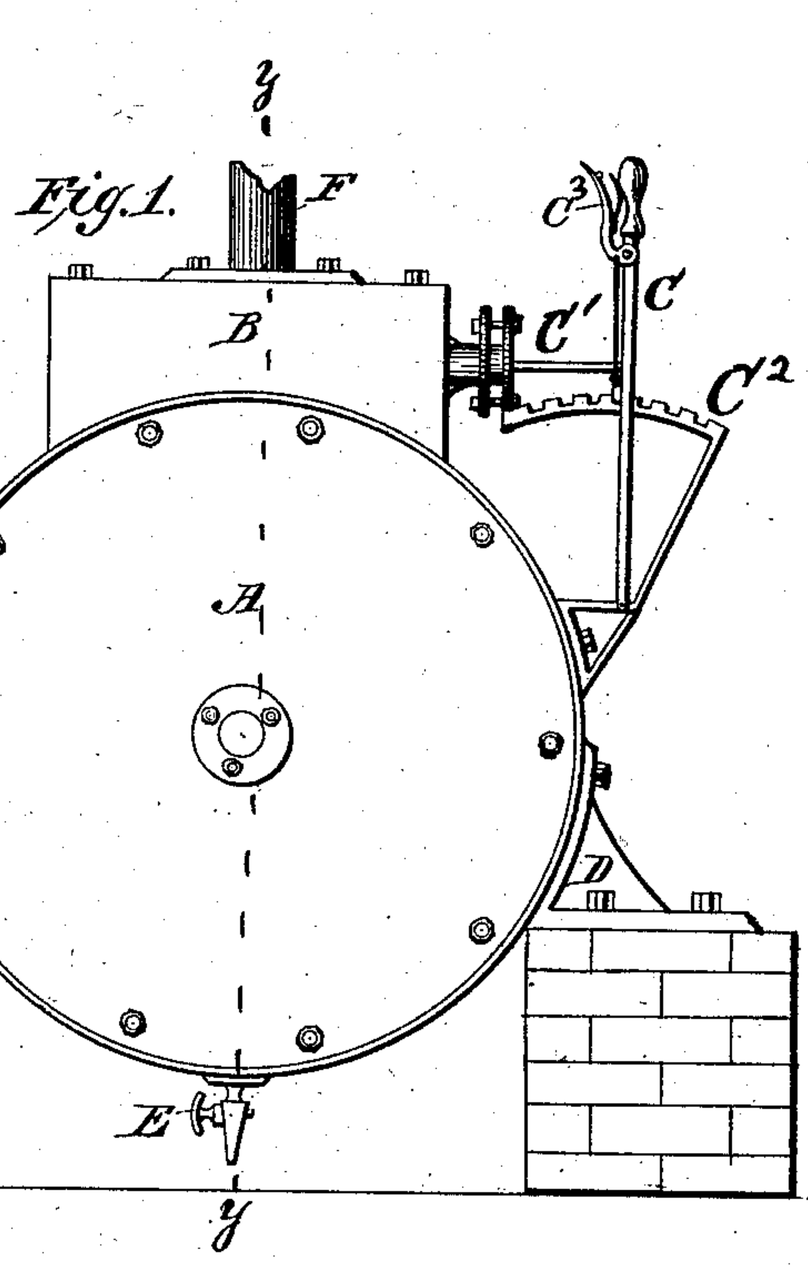


Fig. 1.



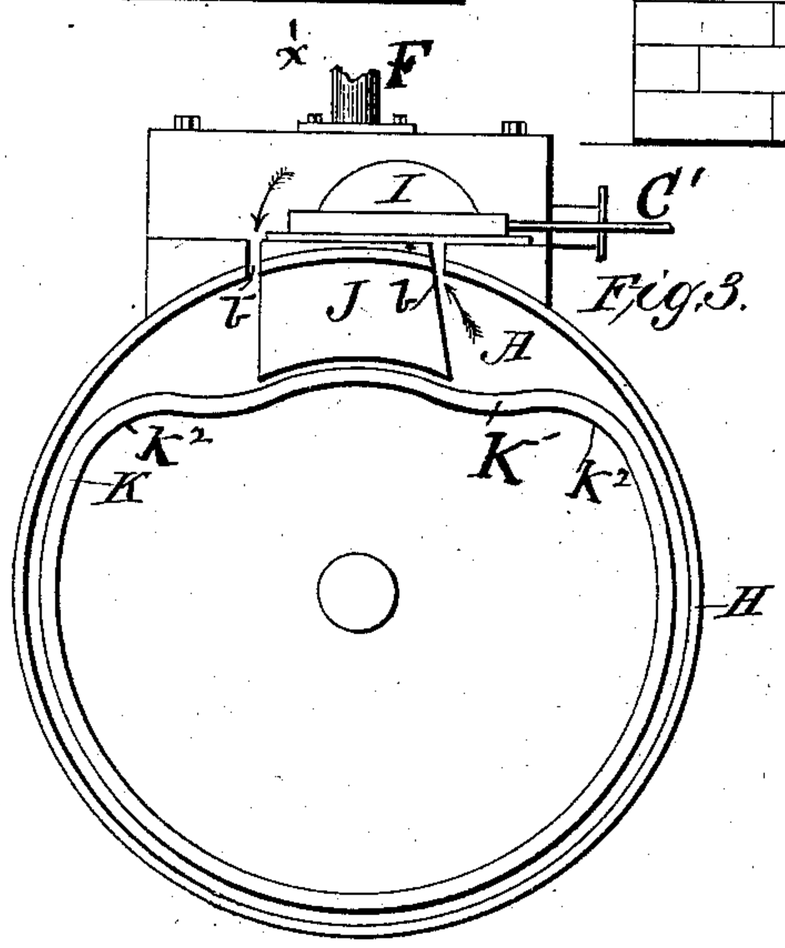


Fig. 3.

Fig. 4.

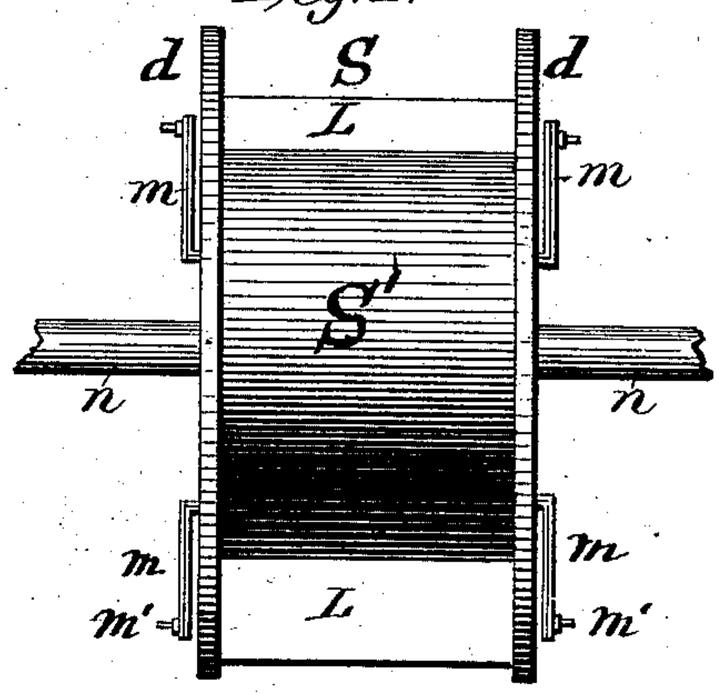
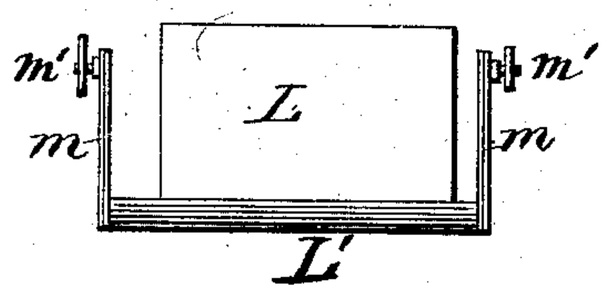


Fig. 5.



Witnesses.
Andrew J. Ross
James P. Ross

Inventor.
Albert H. Gleason

(Model.)

2 Sheets—Sheet 2.

A. H. GLEASON.

ROTARY ENGINE.

No. 290,035. Patented Dec. 11, 1883.

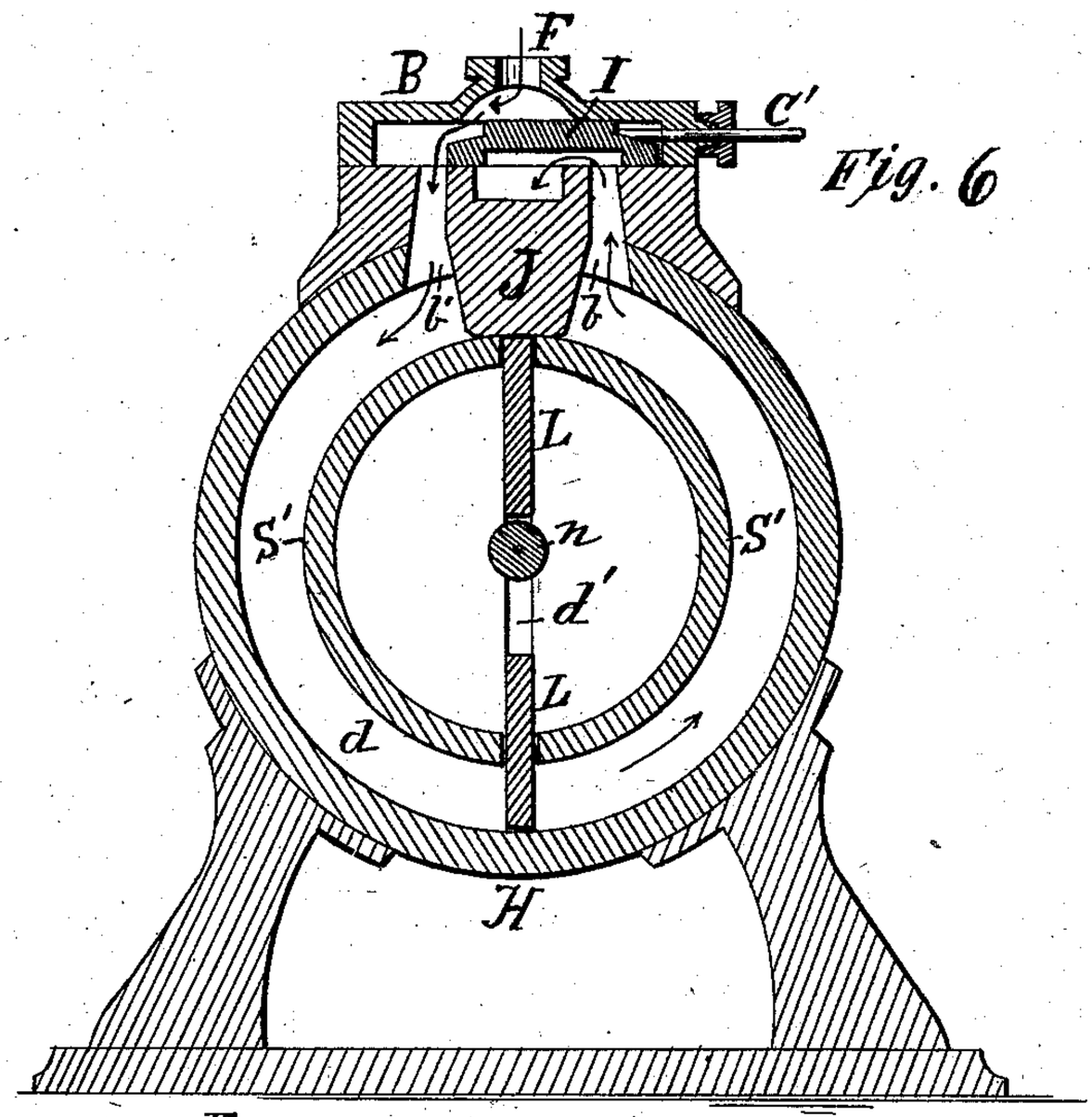


Fig. 6

Fig. 7.

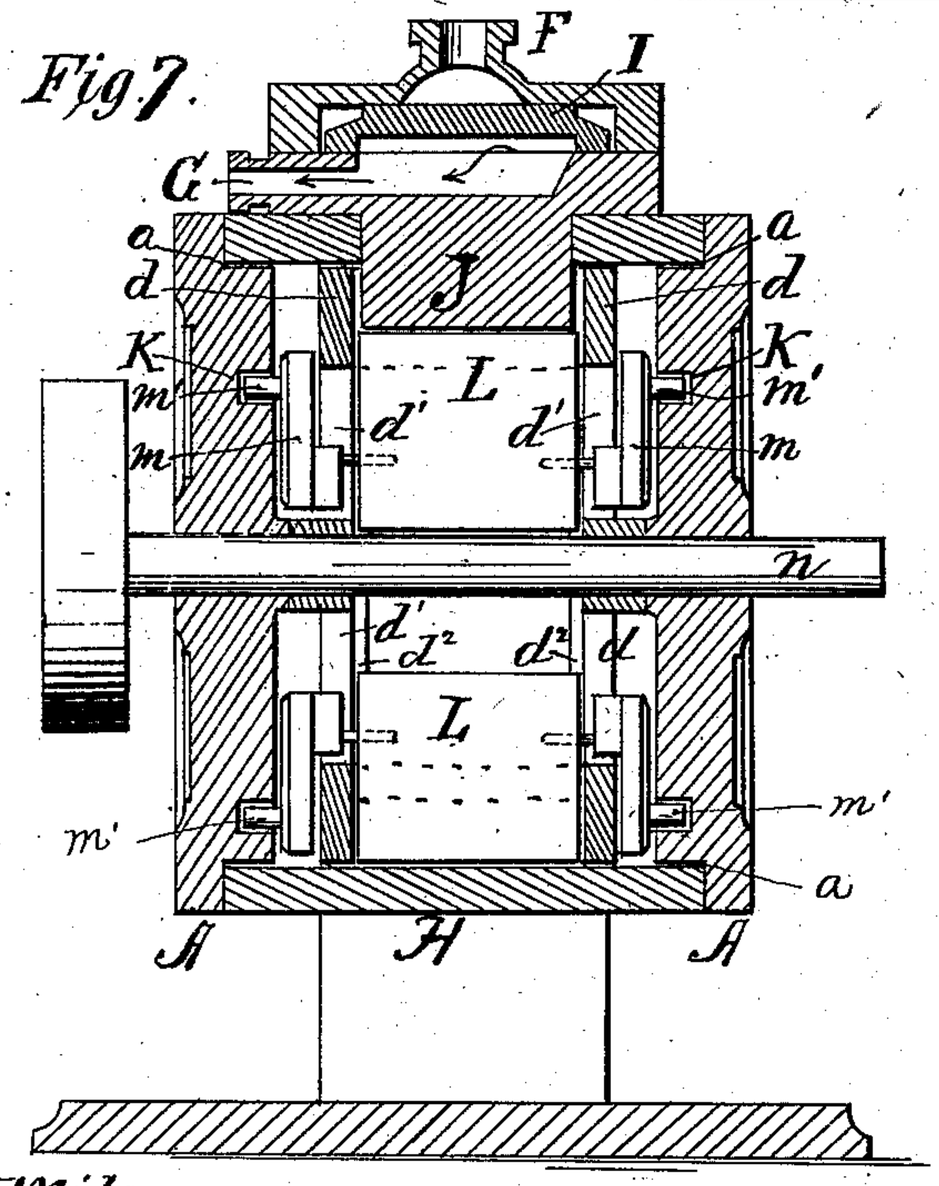
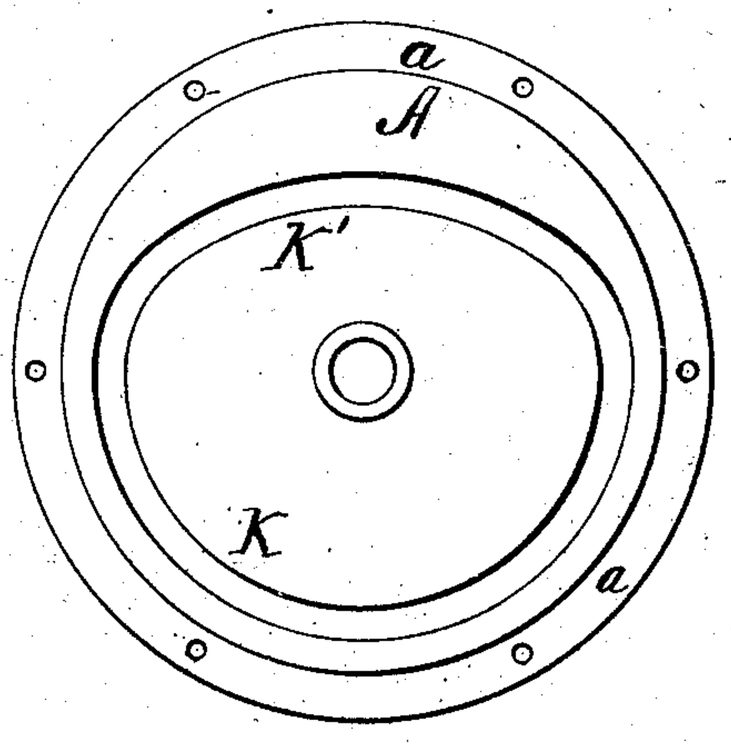


Fig. 8.



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UNITED STATES PATENT OFFICE.

ALBERT H. GLEASON, OF WABASH, INDIANA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 290,035, dated December 11, 1883.

Application filed May 22, 1882. (Model.)

To all whom it may concern:

Be it known that I, ALBERT H. GLEASON, a citizen of the United States, residing at Wabash, in the county of Wabash and State of Indiana, have invented new and useful Improvements in Rotary Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention consists in the construction and arrangement of the several parts hereinafter described, and pointed out in the claim.

In the drawings, Figure 1 is an end elevation, and Fig. 2 is a side elevation, of a steam-engine constructed according to my invention. Fig. 3 is an end elevation of the outer or main casing, having the outer end plate and the piston removed. Fig. 4 is a side elevation of the piston and blades. Fig. 5 shows one of the blades. Fig. 6 is a vertical section of the engines on line *x x*, Fig. 2. Fig. 7 is a vertical section on lines *y y*, Fig. 1; and Fig. 8 shows the inner face of one of the heads or end plates of the main casing.

The main casing is composed of cylinder H and the end plates or heads, A A. The end plates are made of same diameter with the cylinder H, and have rabbets *a* cut near their peripheries, so as to provide snugly-fitting joints.

B is the steam-chest, mounted on the cylinder H, and in it is the valve I. The valve is provided with a valve-rod, C′, which extends outward to and is connected with reversing-lever C. The lever C is arranged to move alongside of a segment-rack or ratchet-bar, C^2, and is provided with a suitable catch or pawl, whereby it may be set at any desired point.

F is the steam-supply pipe, and G the exhaust-pipe.

E is the drain-cock for the cylinder.

J is a resistance-block, which projects into the cylinder just below the steam-chest. It is placed between the steam-ports *b b′*, which lead from the steam-chest into the cylinder. The arrangement of the resistance-block immediately below the steam-box enables me to convey the steam instantly from the box B to the piston-blades and to employ the same two ports *b b′*, between the steam-box and cylinder, for the passage of steam in both the direct and reverse motions of the piston.

K K are cam grooves or channels cut into the inner faces of the heads A A. These cams throughout the greater part of their length are circles concentric with the cylinder H, and are formed near to points of junction between the heads and inner surface of the said cylinder. On that side next the steam-chest the channels K are formed farther inward toward the center of the heads and on a line just below the end of the resistance-block J, (shown at K.) The purpose of this formation will appear hereinafter.

S is the piston, which is composed of the two semicircular concentric plates, S′ S′, the disks *d d*, the slides L L, and the arms *m m*, for operating the slides. The piston is supported on the shaft *n*, which is journaled in the heads A concentric with the cylinder H. The disks *d d* are of the same diameter with the inner diameter of the cylinder, and they are fixed firmly on the main shaft *n*. Their peripheries fit steam-tight against the inner surface of said cylinder. The block J has a length equal to the width apart at which the disks *d d* are placed, and the outer portions or rims of said disks fit snugly against the ends of said block, as shown in Fig. 7. The cylindrical portion or body composed of the plates S′ S′ is arranged so that its periphery touches the end of the block J and forms a steam-tight joint between the steam-chambers on the opposite sides of said block, as shown in Fig. 6. The two plates S′ S′ are made a little less than a half-circle, so that when fixed in place slots or openings will be provided between their adjacent ends, through which the slides L move back and forth in the operation of the engine. The semicircular plates S′ S′ have their ends made fast to the disks *d d* concentric with the cylinder H. The disks *d d* have each two radial slots, *d′ d′*, formed on the same line with the opposite openings between the ends of the plates S′ S′, as shown in Figs. 6 and 7, and they also have channels d^2 d^2 coincident with the slots *d′ d′*, as shown in Fig. 7. The slots *d′* extend from near the axis to the inner surface of the plates S′, and the channels d^2 d^2 extend to the periphery of the disks and serve as guideways in which the slides L travel. It will be seen that the axial length of the piston S is less than the inner axial length of the cylinder H between the heads A A. This leaves a slight space between the disks and the heads of the cylinder, as seen in Fig. 7.

In these spaces I place the arms *m*, which are provided on their outer ends with pins *m'*, which project into the cam-grooves K. The inner ends of the arms *m* are connected to the inner ends of the slides L by suitable screws or bolts put through the slots *d'* in the disks *d*. The slides may be constructed as shown in Fig. 5, wherein is shown a supporting-bar, L', to which the slide is made fast, and which has its ends extended beyond the ends of the slide far enough to project through the slots d^2. The arms *m* are secured to the projecting ends of the bar, as shown. I prefer this construction to that shown in Fig. 7, though the latter gives very excellent results.

By means of the construction above described, I am enabled to use a cam-groove of much larger diameter than where the stud operating within the cam-groove is connected in a horizontal line with the slide. This is desirable, for the reason that the curves in the cam-groove of large diameter are less acute than those of a smaller one and less friction is experienced, and an easier operating device is consequently provided.

It will also be seen that the L-shaped arm, being secured rigidly and directly to the slide at its inner end, transmits its motion promptly to the said slide. The arm also being extended outward in line with the slide, its action thereon is either a direct pull or push, and the motion of the arm in or out as it traverses the cam-slot is transmitted to the slide in a positive manner, as clearly set forth. The inner portion or end of the arm *m* being carried through slots *d'*, and fitted thereto, as set forth, and secured to the slide L, serves to retain said slide in its true radial position, and prevents any motion laterally of its inner end.

The cam-groove K throughout the greater part of its length is a circle concentric with the cylinder H and piston S. It is flattened on the side next the steam-chest, as shown at K', and passes just below the line of the inner end of the block J, as hereinbefore described. The pins *m'* on the arms of the slides moving in the cam-groove hold the ends of the slides against the cylinder H during the greater part of a revolution of the piston. The portion K' of the cam turns almost at a right angle at the turns K^2, where it deflects from the direction of the main part. These short turns give an almost instantaneous throw to the slides when the latter are drawn into the piston or thrown out against the cylinder. By reason of the construction hereinbefore described, the inlet and exhaust ports are brought close together, and I am enabled to utilize the pressure of a given amount of steam for a greater length than can be done in engines of this class where the inlet and exhaust ports are at a greater distance apart. The slides in my engine are not connected together, but each has an independent action. I employ but two slides.

It will be seen that my piston is much shorter than the main cylinder. The steam is held between the disks *d d*, while outside of these disks are chambers between them and the heads of the cylinder. I reduce thereby the capacity of the steam-chambers around the piston, and at the same time retain the maximum lever-power of the slides. The open chambers between the disks *d* and cylinder-heads soon become heated, and thus materially aid in preserving the degree of heat in the steam around the piston.

In the engine hereinbefore described I have furnished a light-running and almost noiseless engine. The weight of the piston, by reason of its skeleton form, is reduced to a minimum, while the lever-power is preserved at the maximum. The slides are moved by power applied to their inner ends, while the actuating-arms *m* extend nearly to a point on the same horizontal line with the periphery of the plates S', and are actuated by the cam K, having a circumference almost coextensive with inner circumference of the cylinder H, all of which construction gives to my engine the qualities of light running and noiselessness, accompanied by great power in its application. The piston could be composed of more than two plates S', if more than two slides were desired. The plates should be so formed that when brought together slide-openings would be provided between their adjacent ends in the same manner as shown in the drawings, where only two plates are employed. The object of this construction is to provide a skeleton piston.

It will be seen the resistance-block J is of the same length with the axial length of the plates S' of the piston, and that the disks *d d* fit steam-tight against the ends of said block.

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

The rotary engine, substantially as described and shown, composed of the casing provided with induction and eduction ports, and having cam-grooves, as K, formed in the inner faces of its end plates, the piston composed of plates S' S', and disks *d*, provided with radial slots *d'*, the slides L, working through between the adjacent ends of plates S' S', and in line with slots *d*, and the arms *m*, arranged between the piston and the end plates of the casing, and having their inner ends fitted to and extended through slots *d'*, and made fast to the slide L, near the inner edge of the latter, and having their opposite ends extended outward in radial line with the slide L, and provided on said outer end with the lateral stud or extension operating within the cam-groove, all substantially as and for the purposes specified.

ALBERT H. GLEASON.

Witnesses:
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PETER HIPSKIND.