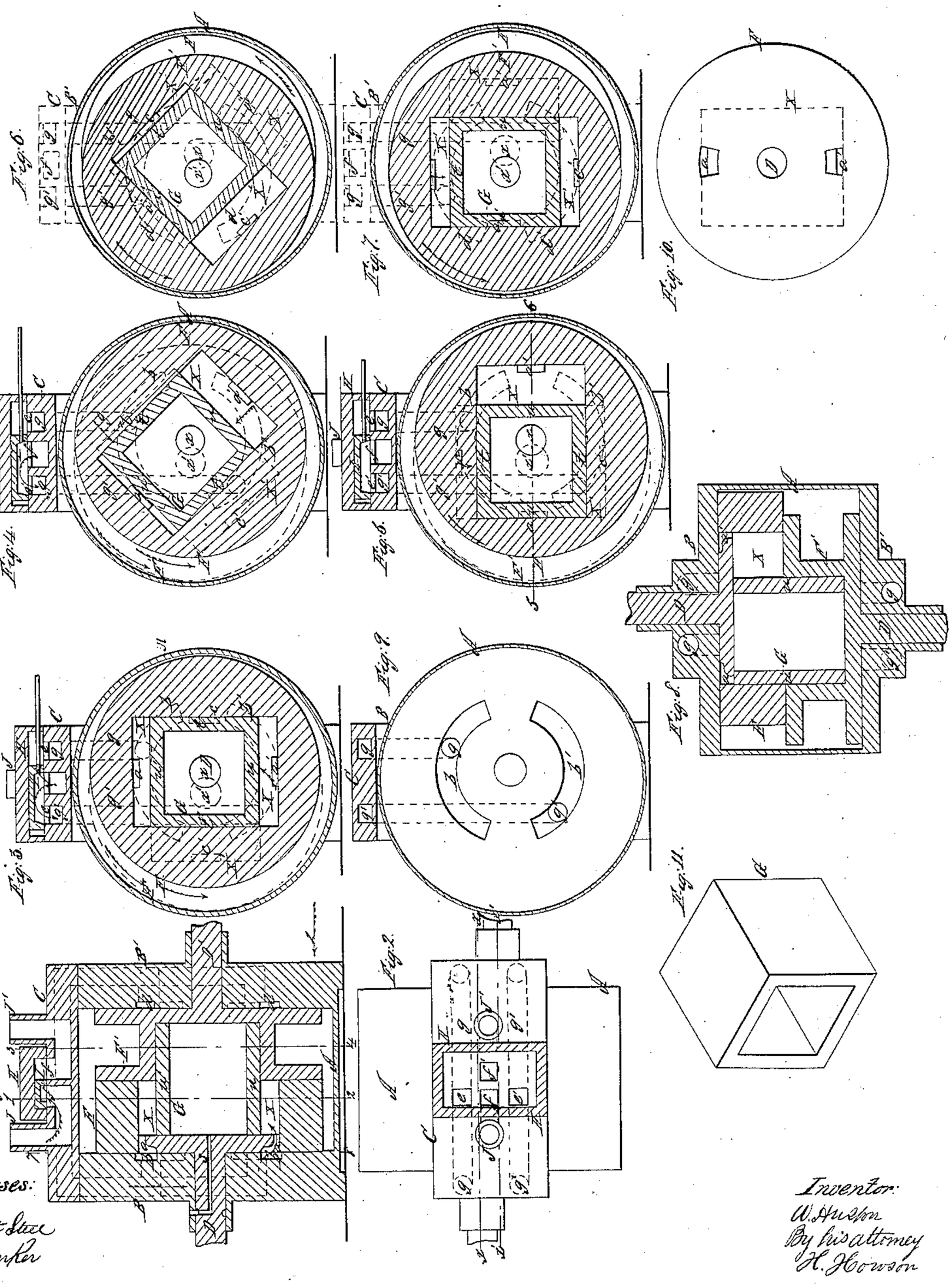
W. Huston,

Motor,

No. 61,339, Patented Jan. 22, 1867.



Witnesses:

Wm. Hunt Steel

John Parker

Inventor:

W. Huston

By his attorney

H. Howson

United States Patent Office.

WILLIAM HUSTON, OF WILMINGTON, DELAWARE, ASSIGNOR TO HIMSELF AND H. N. WICKERSHAM, OF SAME PLACE.

Letters Patent No. 61,339, *dated January* 22, 1867; *antedated January* 19, 1867.

IMPROVEMENT IN APPARATUS FOR OBTAINING AND APPLYING MOTIVE POWER.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM HUSTON, of Wilmington, Delaware, have invented an Improved Apparatus for Obtaining and Applying Motive Power; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention consists of certain eccentric disks, each connected to a shaft, and having a recess, in which fits a portion of a block or piston, the whole being constructed and arranged as fully described hereafter, so that steam or other fluid admitted into the said recess shall so act on the piston as to impart a continuous rotary motion to the disks and their shafts.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation. On reference to the accompanying drawing which forms a part of this specification—

Figure 1 is a sectional elevation of my improved apparatus.

Figure 2, a plan view, partly in section.

Figure 3, a vertical section on the line 1-2, fig. 1, looking in the direction of the arrow 1.

Figures 4 and 5, the same as fig. 3, showing the parts in different positions.

Figures 6 and 7, vertical sections on the line 3-4, fig. 1, looking in the direction of the arrow 1, and showing the parts in different positions.

Figure 8, a sectional plan on the line 5-6, fig. 5.

Figure 9, a vertical section on the line 7-8, fig. 1, looking in the direction of the arrow.

Figure 10, a detached view of part of the apparatus; and

Figure 11, a perspective view of the piston.

Similar letters refer to similar parts throughout the several views.

A is a hollow cylindrical casing, the heads or ends B B′ of which are connected together at the top by a cross-piece, C, the whole being secured to a suitable foundation. In the head B turns a shaft, D, to the inner end of which is secured a metal disk, F, the opposite faces of the latter being planed so as to fit closely to the face of the head B, and to the face of a similar disk, F′, which is secured to a shaft, D′, turning in the head B′. The two shafts D D′ are so situated in respect to each other, that while the axis of the shaft D coincides with a line *x x*, (fig. 2,) that of the shaft D′ coincides with a parallel line *x′ x′* on the same horizontal plane as the line *x x*; the peripheries of the two disks must therefore be eccentric in respect to each other, as shown in figs. 6, 7, and 8. In the disk F is oblong chamber X, and in the disk F′ is a similar chamber, *x′*, which is always at right angles to the chamber X, and into each chamber projects one-half of a hollow cubical block or piston, G, which slides in both chambers, as fully described hereafter. In the shaft D is an opening, *s*, which communicates with the interior of the piston G, and with the external air, for a purpose described hereafter. In the disk F are two openings, *a a′*, the opening *a* communicating with the chamber X on one side of the piston, and the opening *a′* with the same chamber on the opposite side of the piston, and both communicating, during a portion of the revolution of the disk, with two curved recesses, *b b′*, in the inner face of the head B, (fig. 9.) In the disk F′ are openings, *c c′*, which communicate (as in the former case) each with one end of the chamber X′, and, during a portion of the revolution of the disk, with curved recesses, *d d′*, in the inner face of the head B′, (the said recesses being shown in fig. 1, and in dotted lines, figs. 6 and 7.) In the face of the cross-piece C are four "ports," *e e′*, *f f′*, which are covered by a valve-chest, H, and in the latter, over the ports *e*, *f*, *e′*, slides the valve I. With the ports *f′* and *f* communicate the steam pipe J, and exhaust pipe J′, and in the cross-piece C, and in the heads B and B′ are two channels, *g* and *g′*, the former communicating with the port *e*, and with the recesses *b* and *d′*, and the latter with the port *e′*, and with the recesses *b′* and *d*. The communication between the steam chest and exhaust pipe J′, through the port *f*, is always open, and the valve I is so constructed that by adjusting it within the chest, the steam may be directed from the port *f′* into either of the ports *e* or *e′*. Owing to the arrangement of the piston within two chambers situated at right angles to each other as described, four narrow steam recesses are formed, one at each side of the piston between the latter and the adjacent end of one of the chambers X X′, each recess being equal in width to one-half the entire width of

the piston, so that the steam, when admitted to either of the recesses, will act on only one-half of the face of the piston, the other half of the said face being in contact with one of the sides of the chamber in the opposite disk.

The parts of the machine being in the position shown in figs. 1 and 3, and steam being introduced into the pipe J, and into the casing A round the disks, the operation of the engine will be as follows: The steam will pass from the pipe J through the ports *f'* and *e'* and channel *g'*, to the curved recesses *b'* and *d*. As the openings *c* and *c'* in the disk F' are opposite that portion of the face of the head B' between the ends of the recesses *d* and *d'*, the escape of steam from the recess *d* is prevented; after reaching the recess *b'*, however, the steam passes through the opening *a'* into the chamber X, beneath the piston, (fig. 3.) As the steam presses against the lower face of the piston, the latter is moved towards the top of the chamber X, and that portion of the piston in the chamber *x'* is caused to bear against the upper side of the said chamber, near one end of the latter, and will thus impart a rotary motion to the disk F' on its axis *x'*, in the same manner as if a force was applied to a pin on the face of this disk F' at *x*, (fig. 3.) When the disks have been turned slightly, the openings *c* and *c'* of the disk F will be brought opposite the ends of the recesses *d* and *d'*, (fig. 6,) and the steam admitted to the former recess from the channel *g'* will pass through the opening *c*, into the upper portion of the chamber X', and will press against the side *t* of that portion of the piston G which projects into this chamber, figs. 4 and 6. As, when the steam is admitted to the chamber *x'*, the piston G is above the centre *x* of the chamber X in the disk F, it will be apparent that the pressure of the steam against the piston in the direction of the arrow 2, (figs. 4 and 6,) will turn the disk F in the direction of its arrow. When one-fourth of a revolution has been completed, the openings *a a'* in the disk F will be between the ends of the recesses *b b'*, and the steam will be cut off from the chamber X, (as shown in figs. 5, 7, and 8,) although it still passes into the chamber X', and presses on the upper side, *t*, of the piston. As the revolution of the disk continues, however, the openings *a* and *a'* will be brought opposite the ends of the recesses *b* and *b'*, the steam from the recess *b'* will be admitted through the opening *a* to the lower part of the chamber X, and will force the piston towards the upper end of this chamber, while the steam in this portion of the chamber escapes through the opening *a'* recess *b*, channel *g*, and port *e*, into the valve chest, and will pass through the port *f* and escape pipe J. The piston is now in such a position, near one end of the chamber X', that, by its upward motion in the chamber X, it will force the disk F' still further round in the direction of its arrow. As, during the movement just described, the opening *c* is brought opposite the recess *d'*, and the piston is moved towards this opening, the steam will escape through this opening from the lower part of the chamber X' into the recess *d'*, and will pass through the channel *g* and port *e*, into the steam chest, and from the latter through the port *f* to the escape pipe J'. It will be seen without further description that the steam is always pressing against one, and generally against two sides of the piston, and that this pressure is exerted when the piston is at one side of the centre of one or both of the chambers, so that a rotary motion will be imparted to the disk in which such chamber is situated, the motion of one disk being communicated to the other, and the constant alteration of the position of the piston, and the corresponding change of the pressure from one side to the other of the same, causing a continuous simultaneous revolution of both the disks and their shafts. When it is desired to reverse the motion of the disks and their shafts, the valve I is brought over the port *e*, so that the steam will enter the chambers through the recesses *b* and *d'*, and escape through the recesses *b'* and *d*; it will be apparent, however, that this valve chest may be dispensed with, where it is not desired to reverse the engine, the steam being conducted by pipes directly to the openings *b* and *b'*, and from the openings *d* and *d'*. Steam which may find its way into the interior of the piston G, will escape through the opening *s*, any pressure within the piston which would tend to separate the two disks being thus prevented. Any tendency of the steam to escape from the chambers X X' is effectually prevented by surrounding the disks with a body of steam at the same pressure as that within the chambers; the steam in the outer casing, however, may be replaced by oil, water, or other fluid, and, should it be deemed advisable, the casing itself may be dispensed with. By means of adjustable plates secured within the recesses *b* and *d*, the length of the latter may be varied at pleasure, so as to cut off the steam from the chambers at any desired point of the revolution of the disk, the steam admitted to the chamber continuing to act in consequence of its expansion. Although I have alluded to steam only as being used for driving the engine, compressed air, water, or other suitable fluid, may be employed.

Without confining myself to the precise arrangement and construction of parts herein described, I claim as my invention, and desire to secure by Letters Patent—

1. The combination of the disk F and its chamber X, and the disk F' and its chamber X', with the piston G, the whole being arranged for joint action, substantially as and for the purpose herein set forth.

2. In combination with the above, I claim the heads B and B', with their recesses and openings, arranged substantially as described

3. The combination of the said disks, piston, and heads with a casing, A.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM HUSTON.

Witnesses:

CHARLES E. FOSTER,

JOHN WHITE.