No. 694,403. Patented Mar. 4, 1902.

E. Y. MOORE.

ENGINE BRAKE.

(Application filed Apr. 19, 1901.)

(No Model.)

Fig. 1.

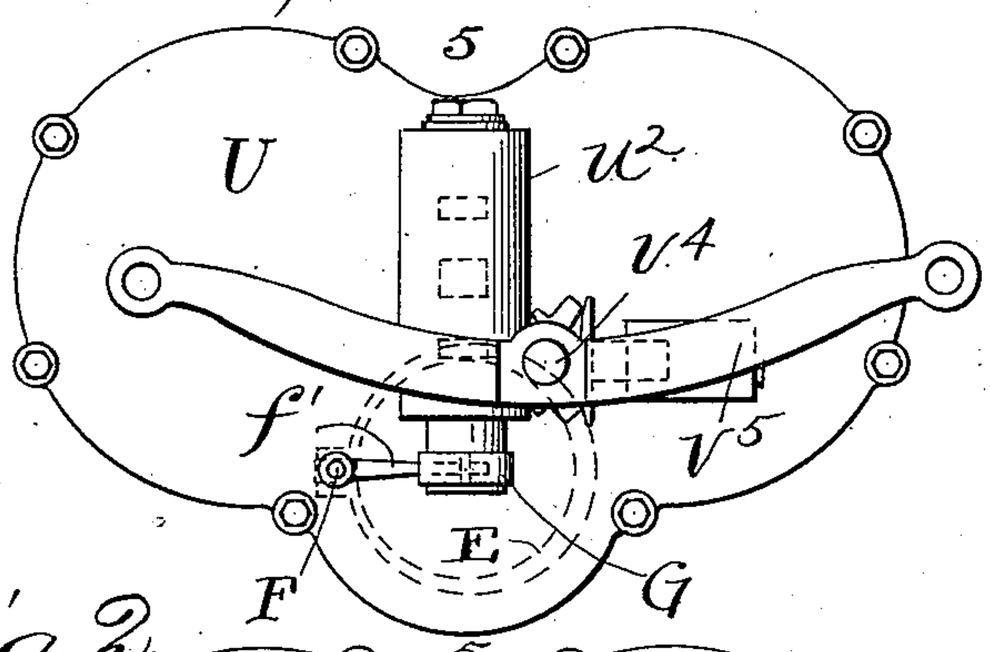


Fig. 2.

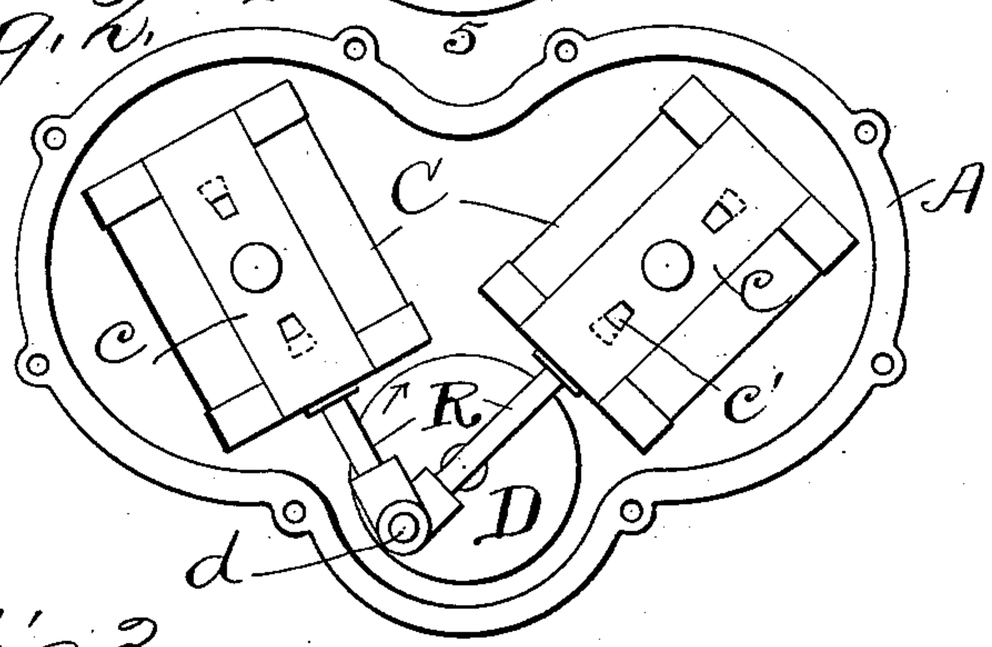


Fig. 3.

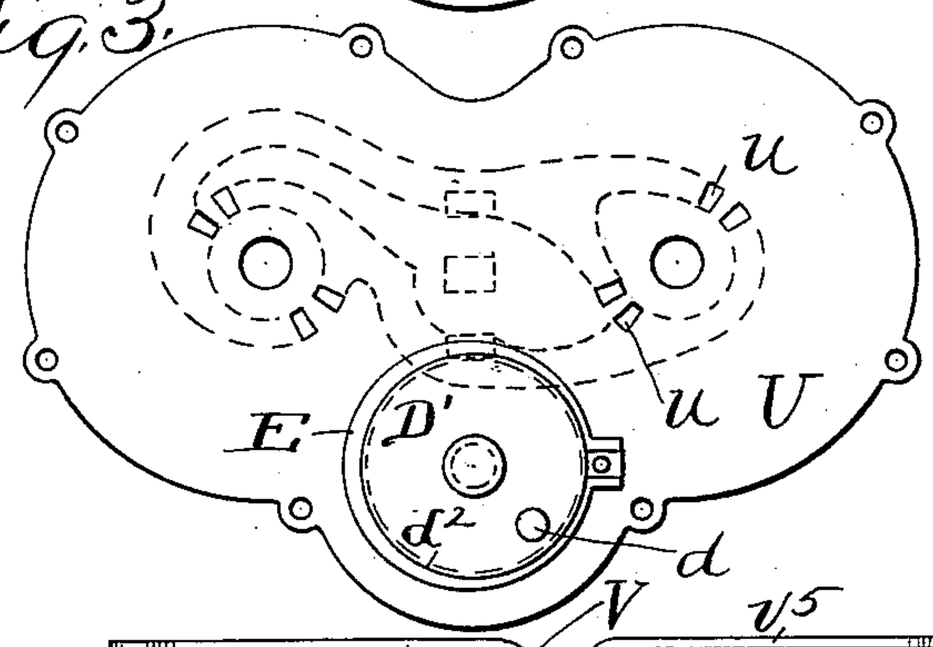


Fig. 4.

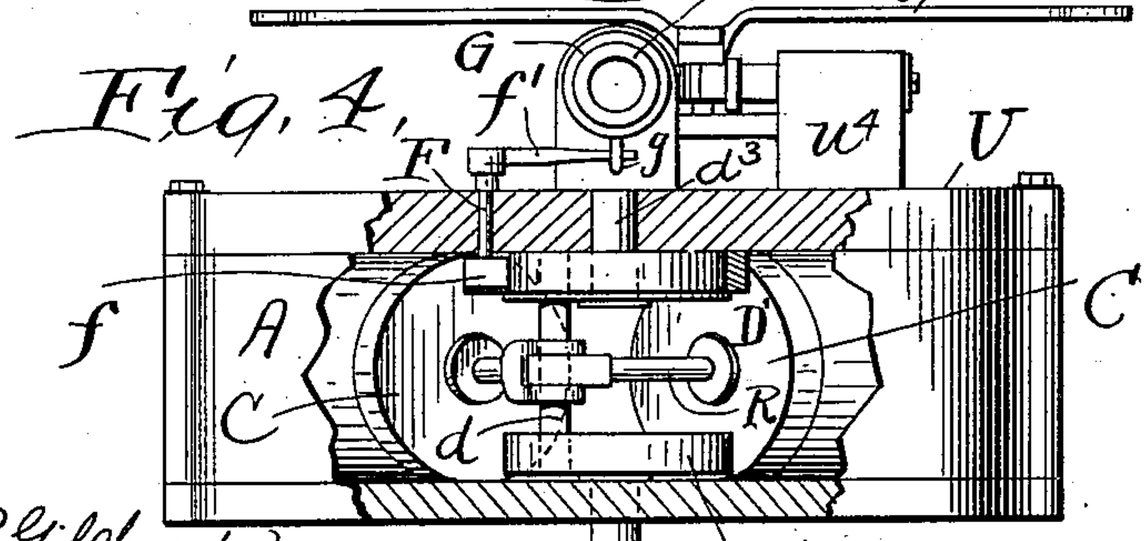


Fig. 5.

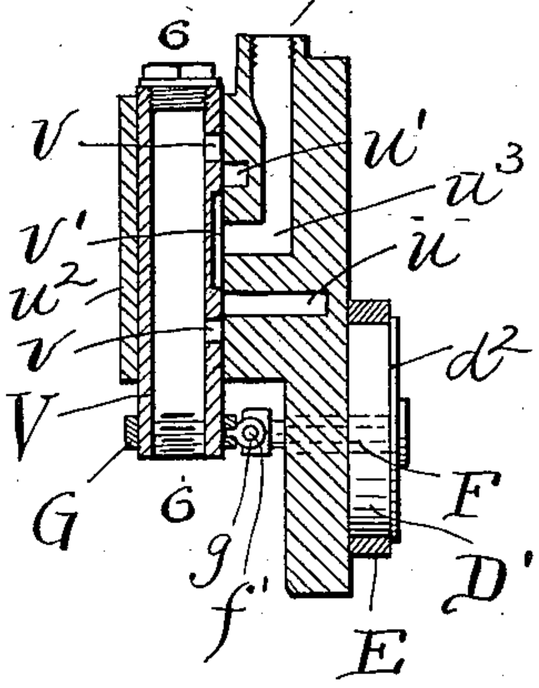


Fig. 6.

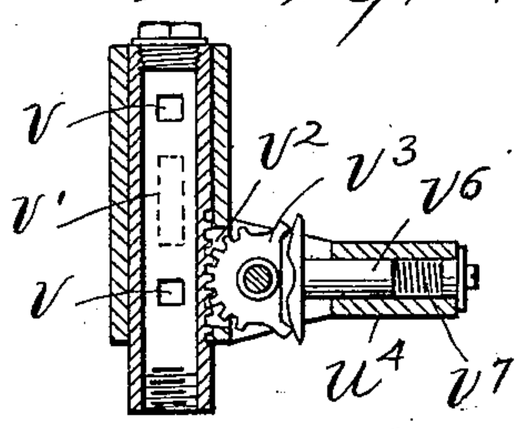


Fig. 7.

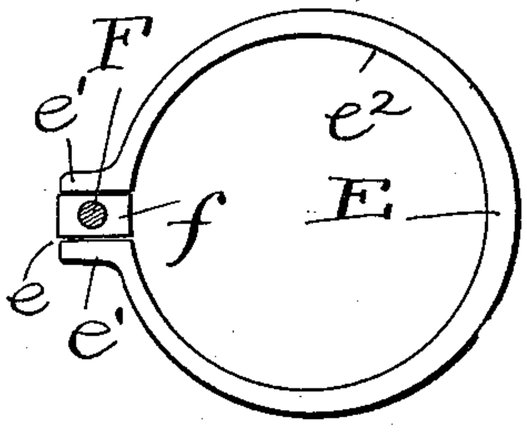
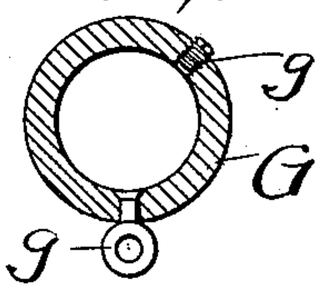


Fig. 8.



Witnesses.
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H. M. Wise.

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By his Attorneys,
Thurston & Bates.

UNITED STATES PATENT OFFICE.

EDWARD Y. MOORE, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CHICAGO PNEUMATIC TOOL COMPANY, A CORPORATION OF NEW JERSEY.

ENGINE-BRAKE.

SPECIFICATION forming part of Letters Patent No. 694,403, dated March 4, 1902.

Application filed April 19, 1901. Serial No. 56,598. (No model.)

To all whom it may concern:

Be it known that I, EDWARD Y. MOORE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Engine-Brakes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

In using hoisting engines or motors driven by compressed air it is common practice for the operator to maintain the load in an elevated position by shutting off the incoming air to the motor-cylinder and relying upon the air entrapped within the cylinder to sustain the load which has been elevated; but it is found very difficult to prevent the air so entrapped from leaking past the piston and permitting the load to sink. This sinking may be obviated by providing an automatically-operated brake for holding the mechanism of the motor fixed against movement by the load when the elevating operation ceases.

The object of the present invention is to provide such a brake adapted for use with an incased motor which, while being very efficient in service, shall require few extra parts and no extra room. In accomplishing this I provide an extra crank-disk for the motor, which serves the double purpose of supporting one end of the crank-pin and of carrying a braking-surface.

The invention includes the employment of such a disk broadly and the more specific embodiment of it as hereinafter shown and described.

In the drawings, Figure 1 is a front elevation of an air-hoist constructed in accordance with my invention. Fig. 2 represents the same with its cover-plate removed. Fig. 3 is an elevation of the inner side of the cover-plate. Fig. 4 is a bottom plan of the motor, the casing being partly broken away to disclose the interior. Fig. 5 is a vertical central section through the main or reversing valve and cover-plate, showing my brake in its relation to the valve. Fig. 6 is a vertical section at right angles to the plane of that taken in Fig. 5. Fig. 7 is an enlarged detail of the brake-band. Fig. 8 is a horizontal section of the collar which embraces the lower end of the valve.

As shown in the drawings, A represents a casing in which are mounted the two oscillating cylinders C C, whose piston-rods K K connect with a common crank-pin d upon the crank-disks D D'. These cylinders are provided with finished flat faces c c, containing ports c', which coöperate with properly-connected port-openings in the cover-plate U, so as to control the admission and exhaust of air from the cylinders C, and port-openings u', communicating with these, open into a valve-chamber u^2. Between these port-openings u' u' lies an exhaust-port u^3, which communicates with the outer air. The port-openings are connected by passages in the cover. (Shown by the dotted lines in Fig. 3.)

The valve shown consists of a hollow tubular body V, adapted to receive the air from below (through a flexible hose screwed into it) and provided with ports v v, cut through its wall, which may communicate, respectively, with the port-openings u' u', and when either of these ports v is thus placed the other port u' communicates with the exhaust-passage u^3 via the recess v' in the outer wall of the valve. The valve V is provided on one side with rack-teeth v^2, which are in engagement with a segmental gear v^3. This segmental gear is rigidly secured to a pin v^4, which pin is pivoted in the housing u^4 (part of the cover U) and carries rigidly an operating-lever v^5. The head of a plunger v^6, which is constrained by a spring v^7, contacts with this segmental gear in a manner adapted to maintain the valve V normally in mid-position, giving it a tendency to return thereto when moved in either direction.

I will now describe the parts of my invention as I apply it to a motor of the kind I have above described.

The crank-disk D' is rotatably journaled upon a stub-shaft d^3, mounted in the upper cover U. This disk receives the end of the crank-pin d' loosely to allow the convenient

removal of the cover-plate. The periphery of this disk D′ is enveloped in a brake-strap E. This strap may be held in position by a light flange d^2 on the disk D′. Its construction is best shown in Fig. 7. It consists of an incomplete metal hoop, at the opening *e* of which are formed two outward extensions or noses *e′*. The metal of this hoop is preferably deepest at a point opposite this opening, and the bore e^2 of this strap is of slightly-smaller diameter than the disk D′, whereby it normally grasps the periphery of the same. A block *f* is rigidly mounted upon a rotatable pin F in the upper cover-plate, and this block lies in the opening *e* referred to above. It may be of any convenient eccentric shape, as the rectangular form shown, so that if the pin F, which supports it, is slightly rotated the opposite ends of the block will force apart the noses *e′* and expand the strap E so that its grasp upon the disk D′ is relaxed.

The pin F carries on its outer end a lever-arm *f′*, which extends through the swiveled eye *g* on the collar G, which is secured to the lower end of the valve V, as by a set-screw *g′*. The idle position of the lower block *f*, as shown in Fig. 7, corresponds to the "off" position of the valve, while any movement of the valve operates to displace the arm *f′*, and this tips the block *f*, with the effects noted above. Hence when the motor is at rest the disk D′ is under restraint of the brake-strap E; but upon moving the valve V to start the motor and as long as the motor is running the restraint of the brake-strap is automatically removed. When the load has been elevated and the air shut off, the brake prevents the settling of the load due to slight leakage of the air past the pistons, as would otherwise result.

What I claim is—

1. The combination of an incased engine, an additional crank-disk therefor within the casing, said crank-disk removably engaging the crank-pin, and means for establishing braking frictional engagement between said disk and a non-rotative member, substantially as described.

2. The combination of a casing with an engine within the casing driving a crank and crank-pin, a crank-shaft for said crank at the side of the casing opposite the cover, a crank-disk carried by the cover and axially alined with the crank-shaft, said crank-disk removably engaging the end of the crank-pin, and means for establishing braking friction between said disk and a non-rotative body, substantially as described.

3. The combination of a casing and a cover-plate therefor, with a cylinder, piston, crank and crank-pin within the casing, a crank-shaft for said crank, a crank-disk journaled axially with the crank-shaft on the inner side of the cover-plate, said crank-disk having an opening loosely receiving the end of the crank-pin, and mechanism for applying braking friction to said crank-disk, whereby the disk serves the double purpose of an additional support for the crank-pin and of a brake but may be removed with the cover, substantially as described.

4. The combination of a casing and cover-plate therefor, with an engine within the casing driving a suitable crank and crank-pin, a crank-disk on the inner side of the cover-plate journaled on a stub-shaft carried by the cover-plate, said crank-disk removably receiving the end of said crank-pin, a brake-strap surrounding said crank-disk and mechanism extending through said cover for operating said brake, substantially as described.

5. In a motor, in combination, a casing, a cylinder, piston, crank, and crank-pin therein, a cover-plate for the casing, a crank-disk on the inner side of the cover-plate journaled on a stub-shaft carried thereby, a resilient brake-strap surrounding said disk, a block for releasing said strap, and a pin extending through said cover-plate for operating said block from the outside, substantially as described.

6. The combination of a casing including a cover, with a cylinder, piston, crank and crank-pin within the casing, and a disk within the casing journaled axially with the crank-shaft and engaging the crank-pin, said disk carrying a friction-surface, mechanism for causing engagement between such surface and another surface to establish frictional braking, a valve for governing the motor and a connection between it and such mechanism, substantially as described.

7. In a motor, in combination, a casing, a crank-disk therein, a resilient brake normally in contact with the peripheral surface thereof, a rotatable pin extending through the casing and adapted to release said brake, an arm carried by said pin, a valve adapted to control the operation of said motor, said arm being mechanically connected to said valve, substantially as described.

8. In a motor, in combination, a disk adapted to rotate when the motor operates, a resilient brake-strap enveloping the peripheral face thereof, said strap having an opening through it, a block occupying said opening and adapted to move therein to expand the strap, a valve for controlling said motor, and an operative lever mechanically connected with both said valve and said block and adapted to simultaneously move the two, substantially as described.

9. The combination of a casing including a cover-plate, an engine within the casing, a reversing-valve on the outer side of the cover for controlling the engine, a crank-disk within the casing engaging the crank-pin, a resilient brake normally applied to said disk within the casing, a rotatable pin extending through the cover and adapted to release said brake, and a lever on the outer end of said cover connecting with said valve whereby the

movement of the valve releases the brake, substantially as described.

10. In a motor, in combination, a crank-disk, a resilient brake normally in contact therewith, a rotatable pin, a block rigid with said pin which may release said brake, an arm carried by said pin, a valve, an eyebolt whose shank is rotatably mounted on said valve, the eye whereof receives said arm, and means for shifting said valve, substantially as described.

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

EDWARD Y. MOORE.

Witnesses:

ALBERT H. BATES,

H. M. WISE.