

(No Model.)

W. J. KAYSER.
HOISTING APPARATUS.

No. 483,323.

Patented Sept. 27, 1892.

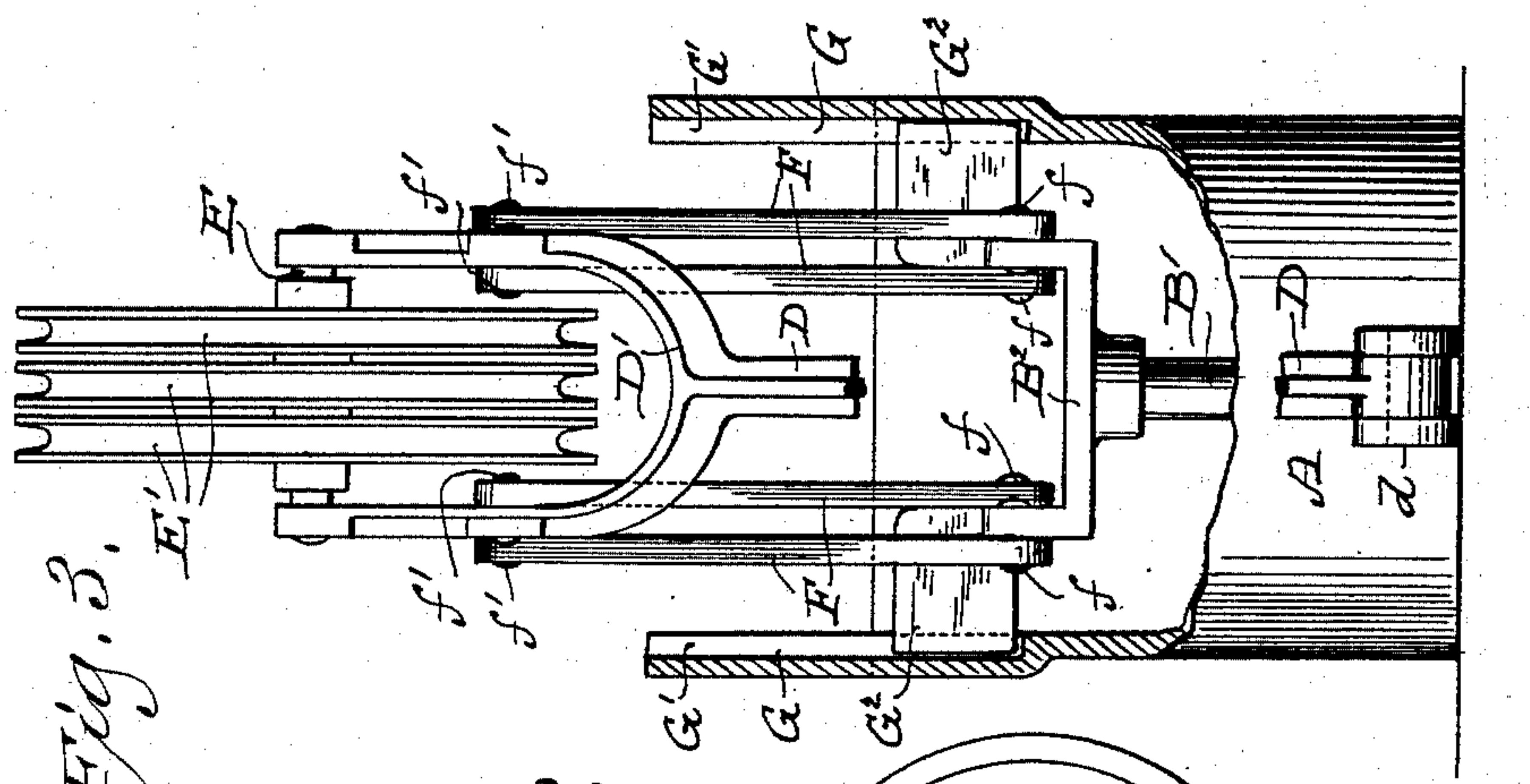


Fig. 3.

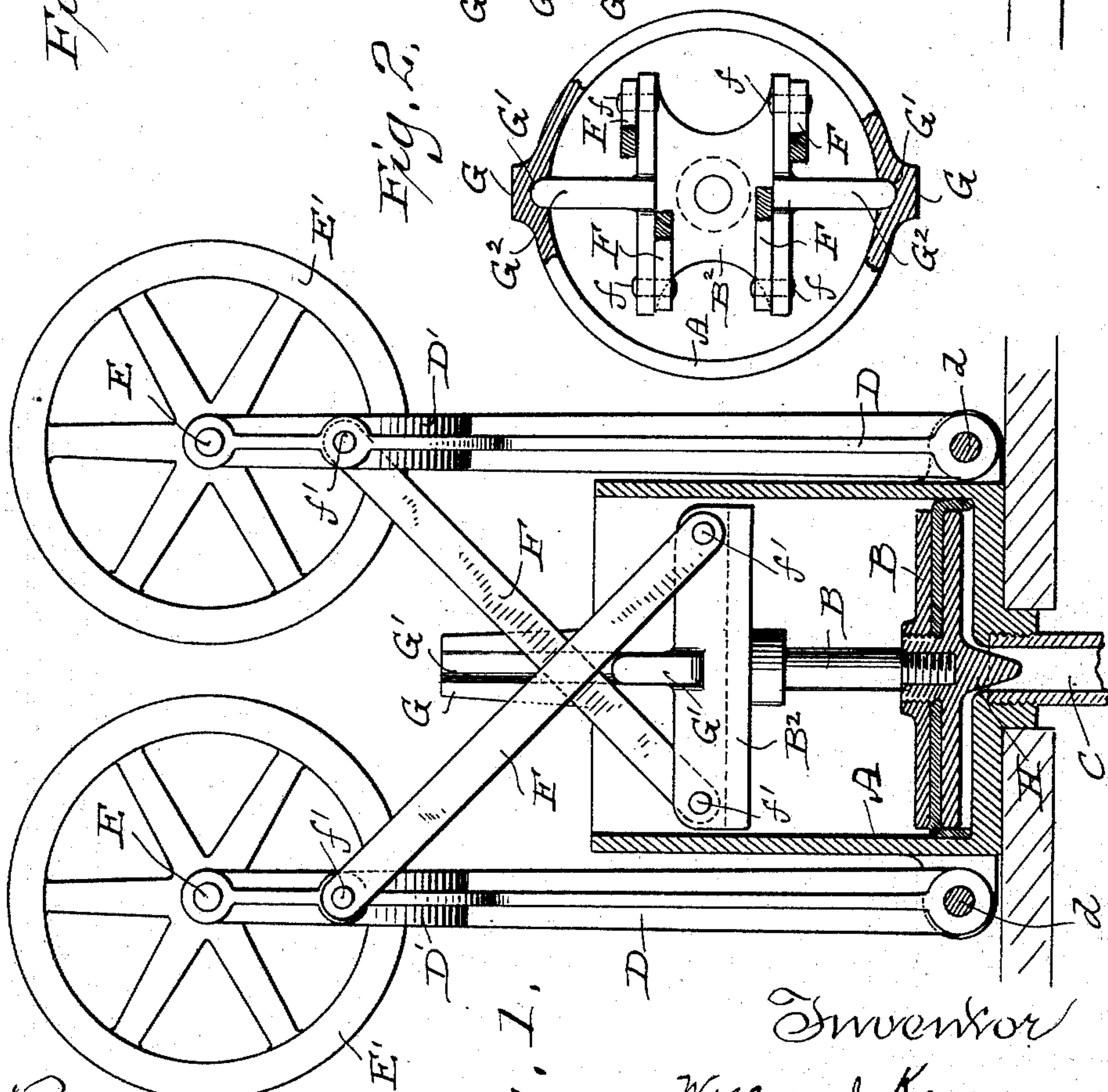


Fig. 2.

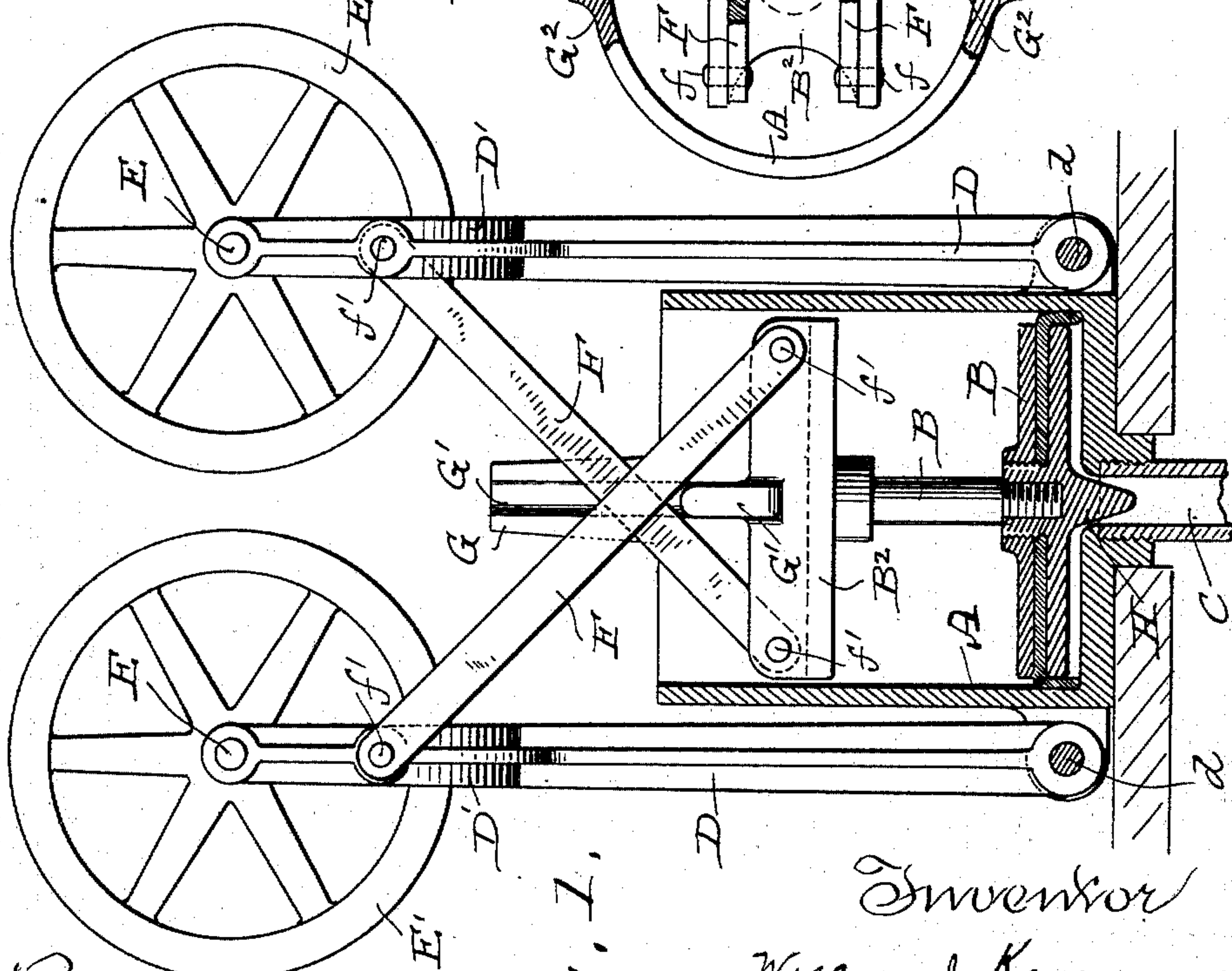


Fig. 1.

Inventor

William J. Kayser

By H. G. Underwood

Attorneys

Witnesses
Geo. W. Young.
John E. Miles.

UNITED STATES PATENT OFFICE.

WILLIAM J. KAYSER, OF MILWAUKEE, WISCONSIN.

HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 483,323, dated September 27, 1892.

Application filed December 15, 1891. Serial No. 415,129. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. KAYSER, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Hoisting-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to certain new and useful improvements in hoisting-machines, and relates more particularly to improvements in that class of hoisting-machines in which a piston is employed to operate one or more pulleys or sheaves arranged in a movable frame so as to wind up or unwind a rope one end of which is connected with a stationary fastening and the other with the object to be raised.

The object of my invention is to provide an improved form of device of this nature of such construction that with a comparatively short movement of the piston a long movement of the pulleys or sheaves is produced and a correspondingly great amount of rope is wound or unwound upon said pulleys or sheaves.

The various features of my invention will be fully hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a view of an improved apparatus constructed in accordance with my invention, illustrating the pulleys and their supporting-frames in elevation and the cylinder and piston in section. Fig. 2 is a view, partly in section and partly in plan, of the same. Fig. 3 is a side elevation of the apparatus, taken at right angles to Fig. 1 and showing the upper part of the cylinder in section.

In said drawings, A represents the cylinder, and B the piston, of a hoisting-machine, and C a pipe communicating with the interior of said cylinder and through which a supply of steam or water may be admitted to said cylinder to raise the piston, and through which the steam or water passes when the piston descends.

D D represent vibrating arms or levers pivotally secured to the sides of the cylinder or other stationary part of the apparatus, as at

d d. The upper ends of these arms or levers are bifurcated, and between the furcations of each of said arms is provided a transversely-extending shaft E, suitably engaged with said arms and upon which are mounted one or more pulleys or sheaves E' E', over which the rope may be passed in the usual manner. Upon the upper side of the piston B is secured an upwardly-projecting standard B', to the upper end of which is secured a suitable head or table B². At any desired points upon the arms or levers D are connected suitable links or arms F F, which extend diagonally from their pivotal connections f f therewith to the side of the head B² opposite to said connections, and to which the lower ends of the said links or arms are connected by similar pivotal joints f' f'.

Upon the upper portion of the cylinder A are provided suitable guide-arms or brackets G G, upon the inner sides of which are provided grooves G' G', and lateral wings G² G² are provided upon the sides of the head B² and arranged to engage with said grooves G' G', so as to prevent any lateral motion of the head B² within the cylinder A. A further object of this construction is to afford means for keeping the piston B from tilting, so as to cause it to bind in the cylinder.

Upon the lower side of the piston-head B is preferably provided a downwardly-extending tapered or conical projection H, arranged to enter the aperture through which the water or steam enters and leaves the cylinder at the time when the said piston-head is at the lower part of its stroke, so as to partially fill or obstruct said aperture.

The operation of my improved device is as follows: When steam or water is admitted to the cylinder A and the piston begins to rise, this upward movement of the piston will, by the described connection with the diagonal or oblique arms or links F F, elevate the lower ends of said arms or links and cause the upper ends of the same to spread apart in an obvious manner, so as to increase the pivotal connections f f. This movement of the links or arms will, by the connection of said arms with the arms or levers D D, obviously operate to spread the upper ends of said arms D D, so as to increase the distance between the centers of the two sets of pulleys

or sheaves E' E'. This movement of the parts will obviously operate to wind in the rope at the end which is attached to the elevator or other object to be lifted. It will be
 5 observed in this connection that both sets of pulleys or sheaves are moved and in opposite directions, so that a greater change in the relative positions of their centers is effected than if only one set of pulleys were moved,
 10 and a greater length of rope is consequently drawn in than if only one set of the pulleys were moved.

The amount of movement of the two sets of pulleys relative to the length of stroke of the piston may obviously be lengthened or
 15 increased by placing the connections of the links or arms F F with the levers D D closer to the pivotal connections of said arms D D with the cylinder or other stationary part of
 20 the apparatus, with a corresponding decrease of power, while the power may be increased with a corresponding decrease of motion by placing said connections farther away from said pivotal connections of said levers D D.
 25 It will be also seen that by the construction described a greater outward pressure is exerted upon the sets of pulleys to wind in the rope than would be produced by a straight thrust of the piston toward or from the centers thereof, and I am therefore enabled to
 30 lift a greater load with an apparatus provided with a given-sized piston that can be lifted by the ordinary forms of devices of this nature.

When the piston descends by reason of the escape of the steam or water from the cylinder A, it will be seen that as said piston approaches the lower end of its stroke the lower end of the conical projection H upon the under side of the piston will enter the aperture through which the steam or water is escaping, thereby reducing the area of said aperture and lessening the flow of steam or water, and as the piston continues to descend said
 40 conical projection will enter farther into said aperture, so as to further reduce the area of said outlet, until by the time the piston has reached the lower limit of its stroke said conical projection will almost entirely fill said
 50 aperture, as illustrated in Fig. 1 of the drawings. By this means the movement of the piston as it approaches the lower end of its stroke is gradually retarded, so as to prevent any sudden shock or jar when the piston stops
 55 its downward movement.

By my improved construction it will be seen that I am enabled to provide a very compact yet powerful apparatus, and one in which with a short stroke of the piston a compara-

tively great amount of adjustment of the pulleys or sheaves toward or from each other is produced.

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

1. A hoisting apparatus comprising a cylinder and a piston movably engaged therewith, arms or levers pivotally engaged with stationary parts of the apparatus upon opposite sides of said cylinder and each carrying
 70 at its free end one or more pulleys or sheaves, and suitable links or arms pivotally connected with said pivoted arms or levers and operatively connected with said piston, substantially as described.

2. A hoisting-machine comprising a cylinder and a piston movably engaged therewith, a standard secured to said piston and carrying a head or table, arms or levers pivotally connected with stationary portions of the
 80 machine at opposite sides of the cylinder and each carrying one or more pulleys or sheaves at its free end, and links or arms pivotally connected with said levers and operatively engaged with said head or table, substantially
 85 as described.

3. A hoisting-machine comprising a cylinder, a piston movably engaged therewith and provided with a projecting standard, a head or table secured to said standard and movably
 90 engaged with guides upon said cylinder, arms or levers pivotally engaged with stationary portions of the machine at opposite sides of the cylinder and each carrying at its free end one or more pulleys or sheaves, and links or
 95 arms pivotally connected with said levers and with said head or table, substantially as described.

4. A hoisting-machine comprising a cylinder, a piston movably engaged therewith, levers or arms pivotally engaged with stationary portions of the machine at opposite sides of the cylinder and each carrying at its free end one or more pulleys, and diagonally-arranged links pivotally engaged with said levers and each operatively engaged with said
 105 piston at the side of the cylinder opposite to its connection with said levers, substantially as described.

In testimony that I claim the foregoing I
 110 have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

WILLIAM J. KAYSER.

Witnesses:

H. G. UNDERWOOD,
 JOHN E. WILES.