

F. BRIGGS.
AIR GOVERNOR OR BRAKE.

No. 437,280.

Patented Sept. 30, 1890.

Fig. 1.

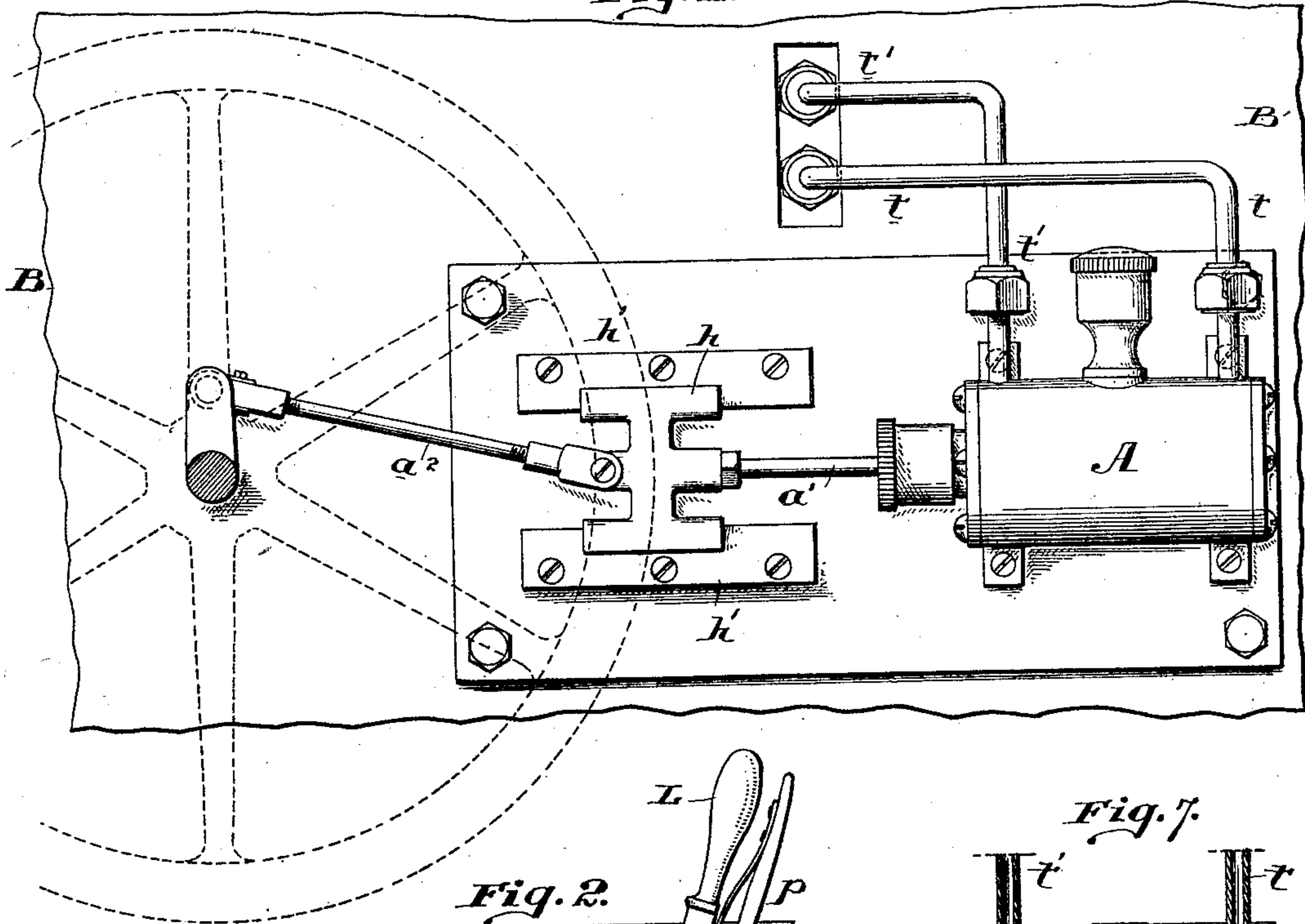


Fig. 2.

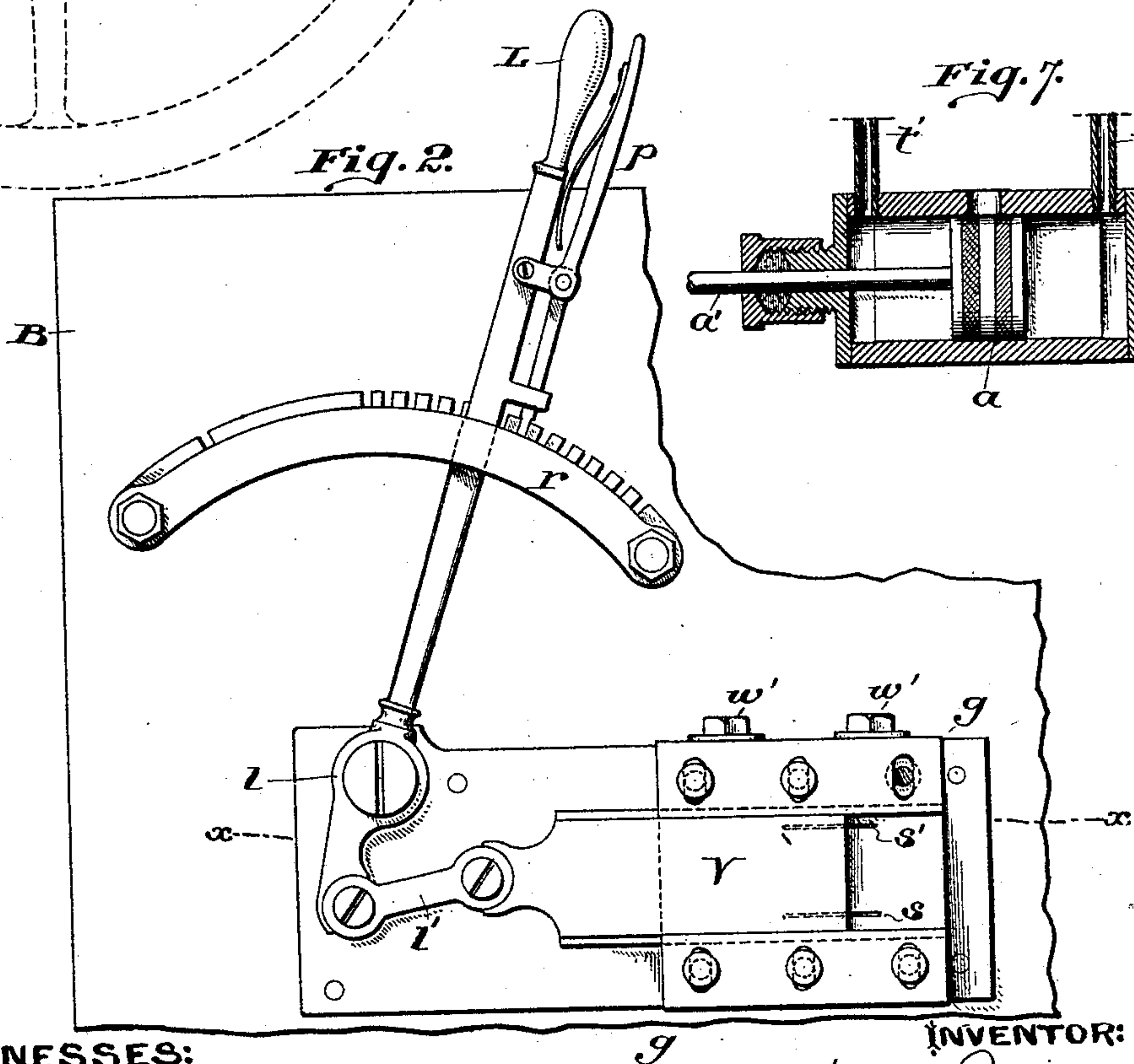
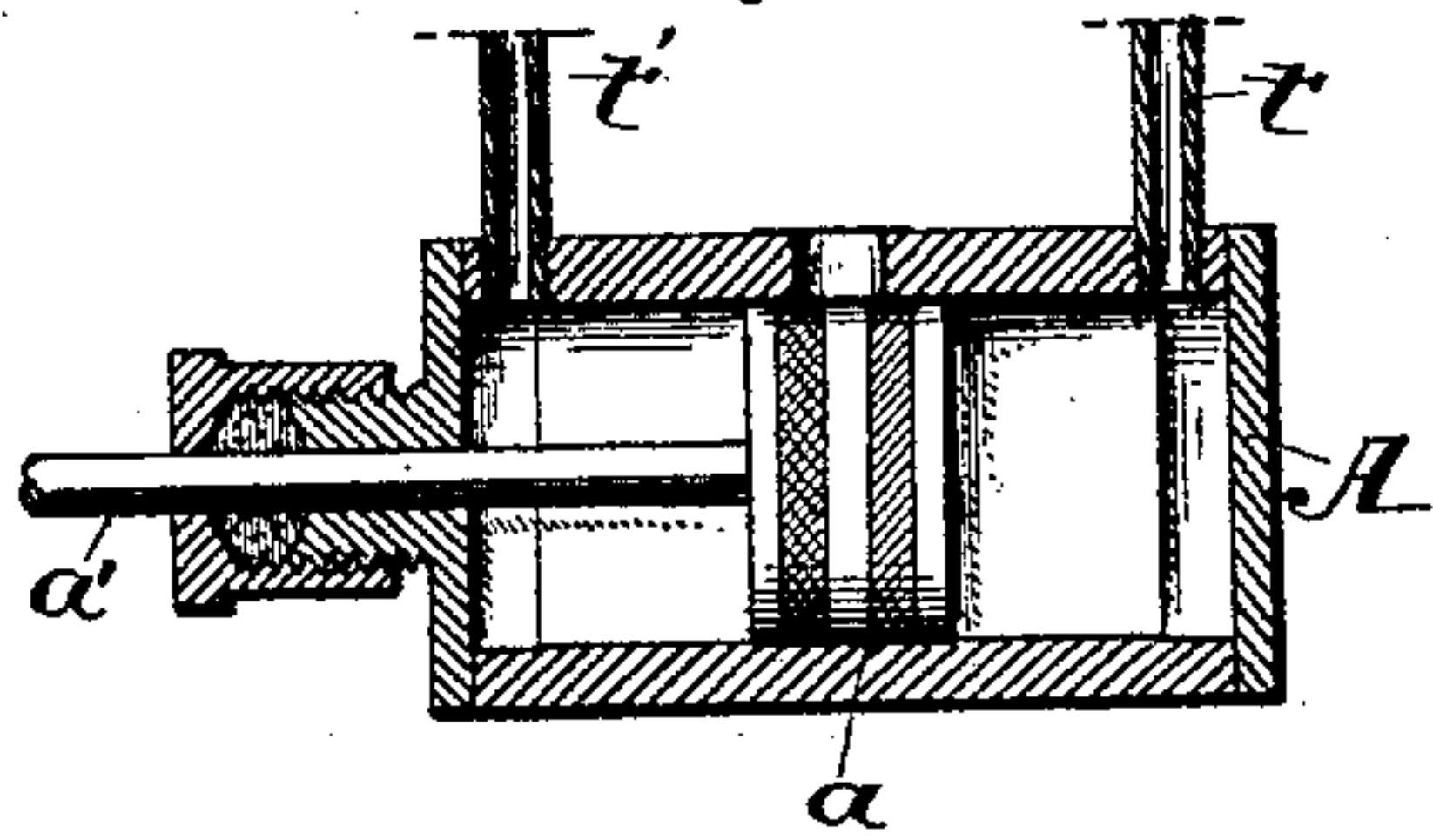


Fig. 7.



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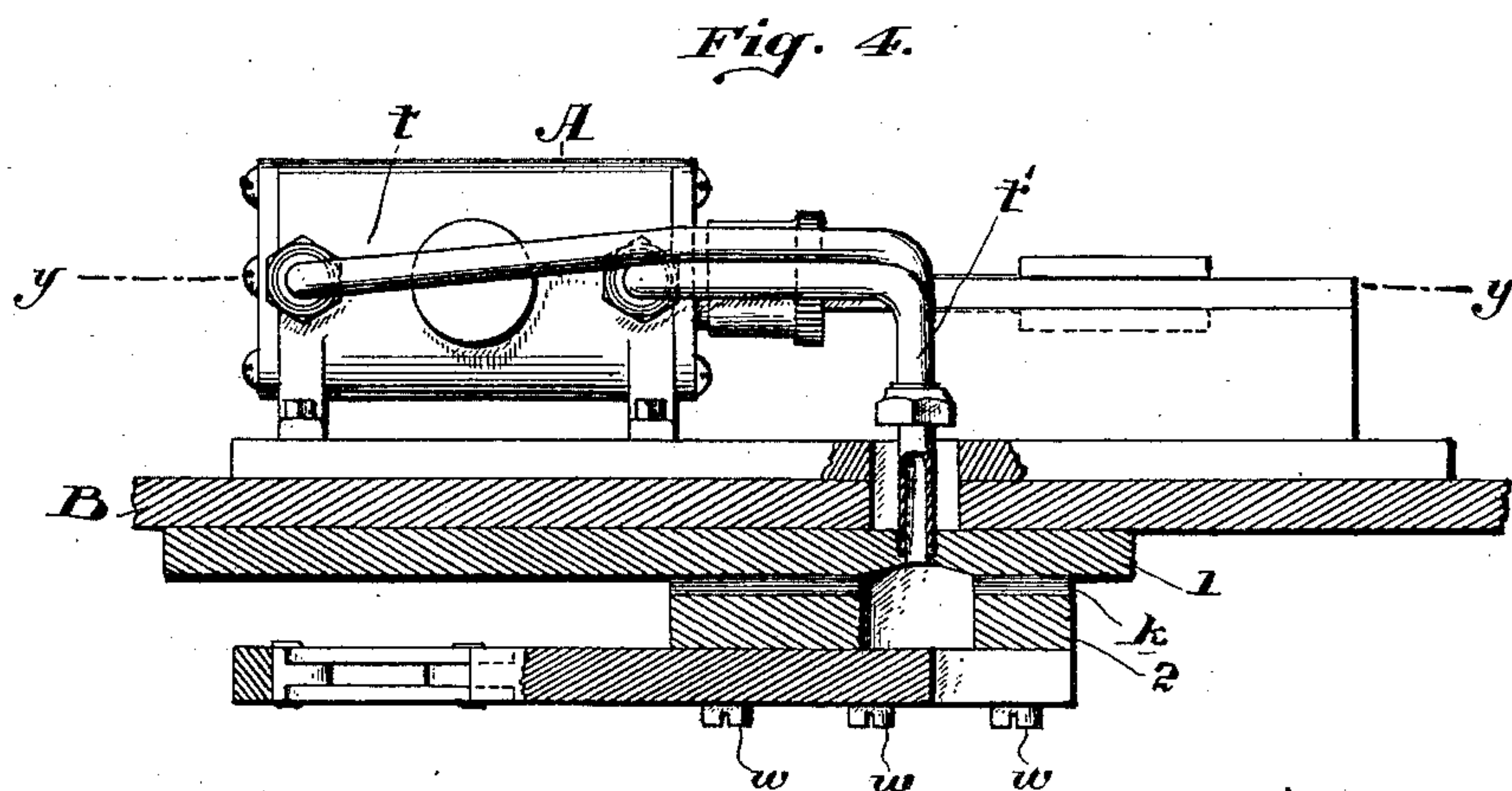
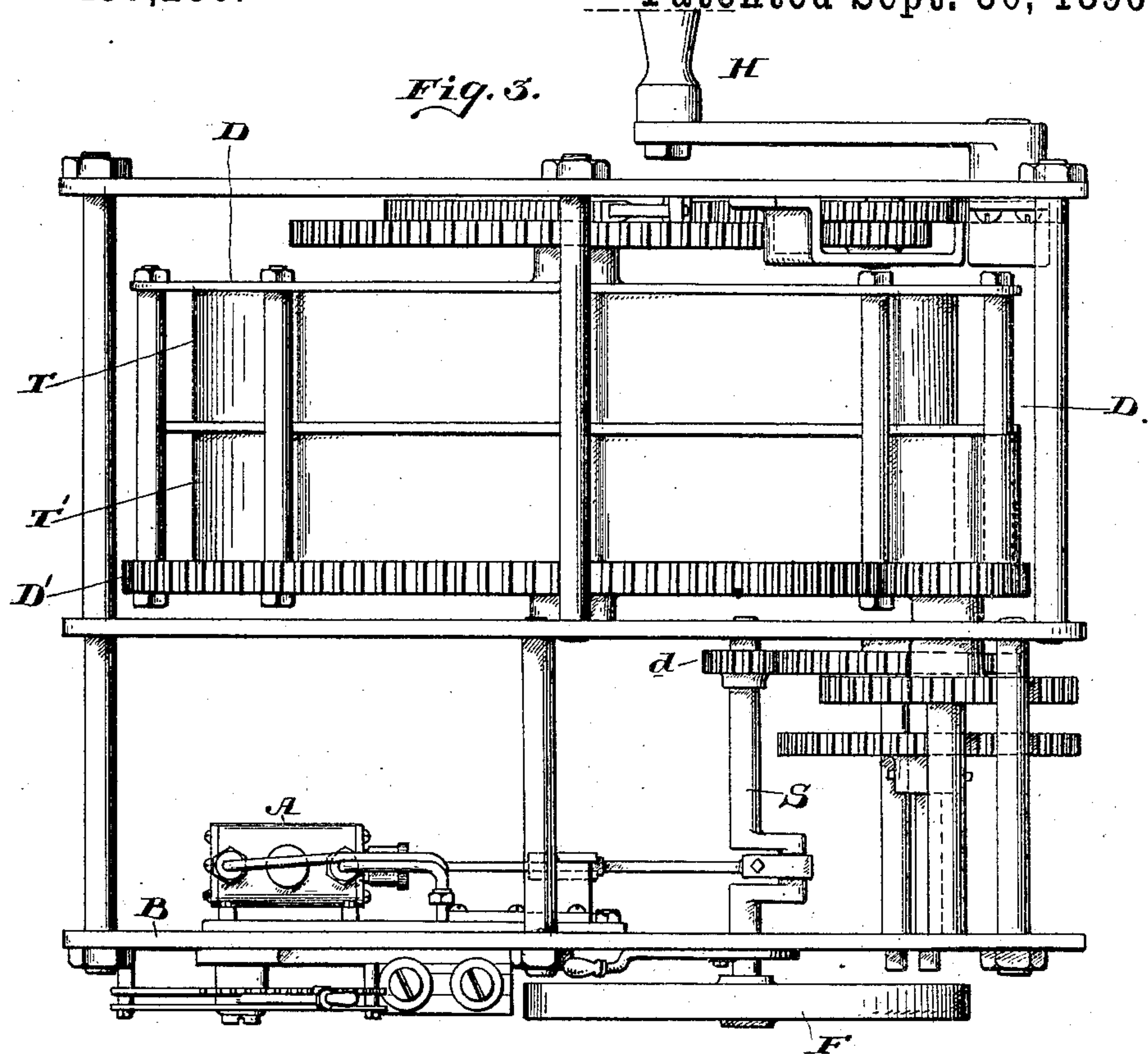
INVENTOR:

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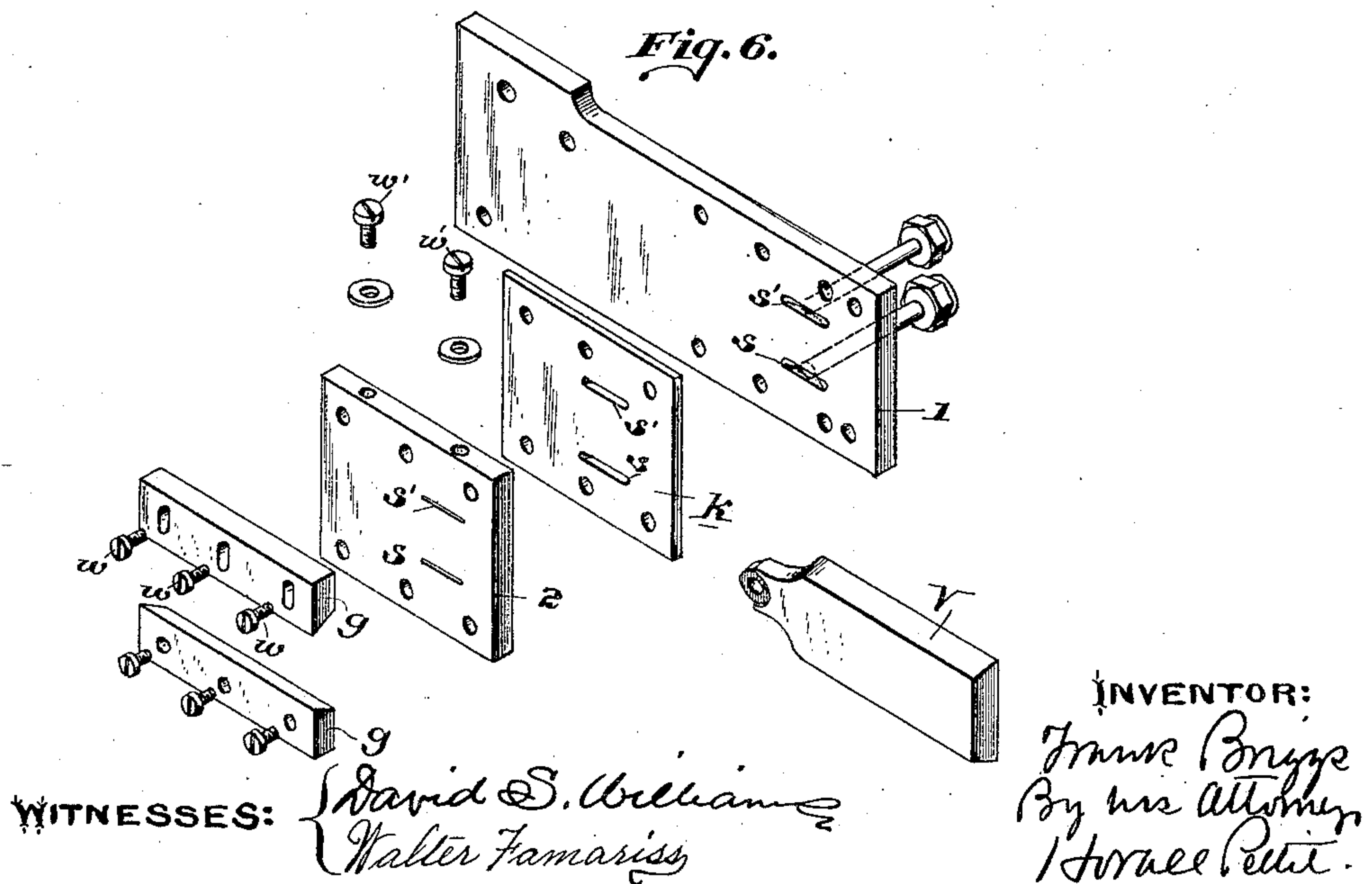
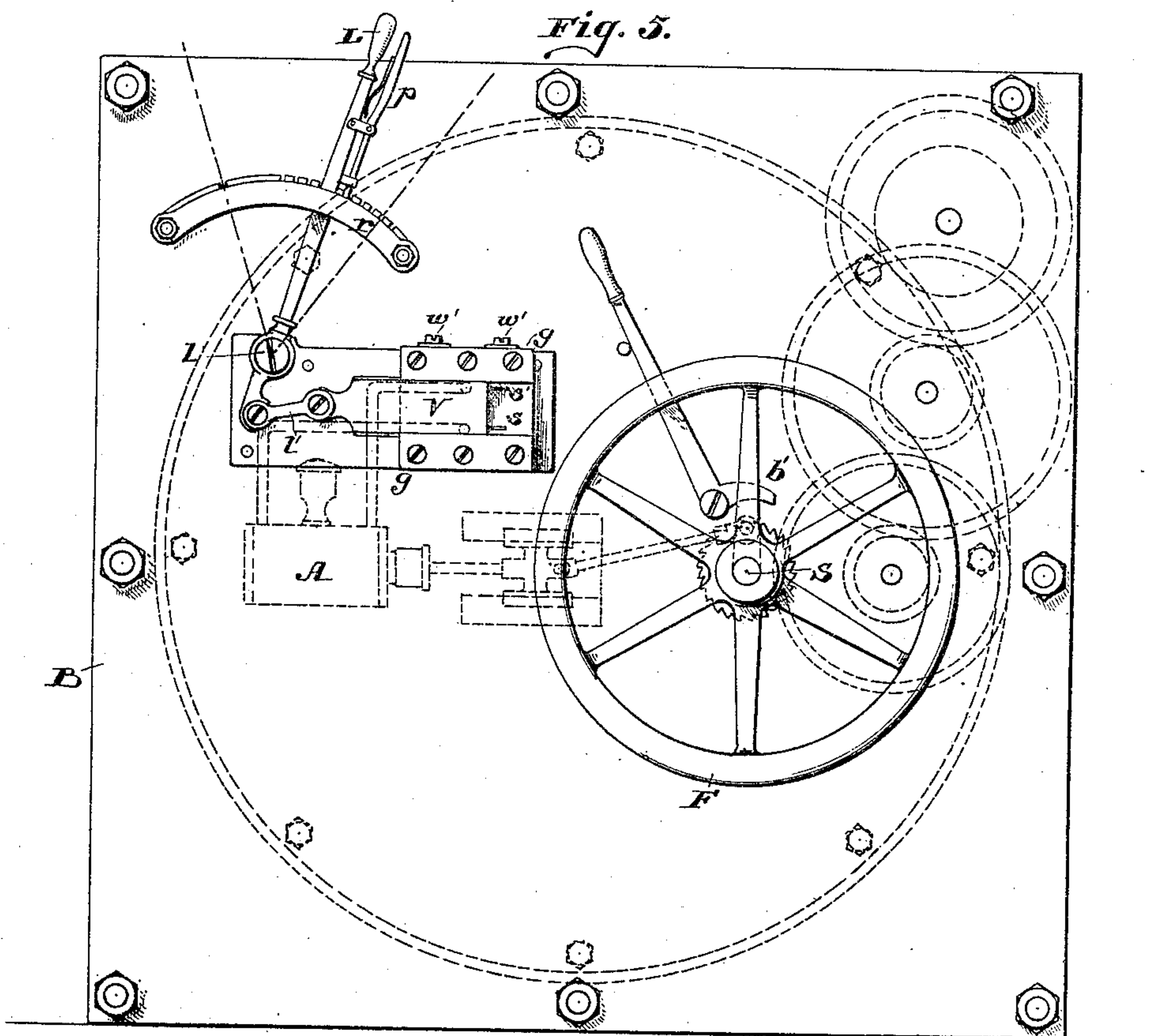
(No Model.)

3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

FRANK BRIGGS, OF PHILADELPHIA, PENNSYLVANIA.

AIR GOVERNOR OR BRAKE.

SPECIFICATION forming part of Letters Patent No. 437,280, dated September 30, 1890.

Application filed June 14, 1890. Serial No. 355,417. (No model.)

To all whom it may concern:

Be it known that I, FRANK BRIGGS, of the city of Philadelphia, and State of Pennsylvania, have invented certain new and useful
5 Improvements in Air Governors or Brakes; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification.

10 My invention has relation to air governors or brakes for regulating and stopping the movement of a motor and other machinery; and it consists in the improvement substantially as hereinafter described.

15 The object of my invention is to provide an air governor or brake by means of which the operation of the motor or machinery may be regulated, started, or stopped by a simple movement of a lever-operated valve, doing
20 away in my improvement with the employment of automatic spring-regulated valves, such as have been employed in certain construction of air-brakes.

25 Another object is to provide a double-acting air governor or brake in which the movement of the machinery or motor is controlled by both the compression and expansion of the air in the air-cylinder at the same time.

30 A further object is to provide the ingress and egress valves with mouths or ports so constructed that by a simple movement of the lever they may be opened to the full extent, or they may be closed entirely by a reverse movement, or partially closed to the
35 area of the breadth of a hair, thus allowing the motor to operate at full speed, or to be brought to a standstill, or to operate at any intermediate degree of velocity desirable, the motor or machinery responding immediately
40 to the movement of the valve-lever.

I will now describe my invention in connection with a spring-operated motor, to which class of motors my improvement is particularly applicable, though it can also be readily
45 applied to any class of motors or operating machinery.

In the accompanying drawings similar letters and figures of reference refer to similar parts throughout.

50 Figure 1 represents the air-cylinder secured to the inside walls of a spring-operated motor and connected with the crank-shaft, the

fly-wheel of which is shown in dotted lines. Fig. 2 shows the mouths of the ingress and egress ports, which are connected with the
55 air-cylinder, with the slide valve operated by a hand-lever. Fig. 3 is a plan view of a spring-motor operated by two springs, with the governor attachment, as shown in Figs. 1 and 2. Fig. 4 is a longitudinal sectional
60 view on the line xx of Fig. 2, showing the connections of the air-valves. Fig. 5 is a side elevation, as in Fig. 2, showing in dotted lines the connection of the air-cylinder with the
65 valved orifices and its connection with the wheels of the motor. Fig. 6 shows in detail the plates and fittings forming the valve detached. Fig. 7 is a longitudinal sectional
view of the air-cylinder on the line yy of Fig. 4.

70 A represents the air-cylinder secured to the inside wall B of the spring-motor by screw-fastenings or otherwise. The piston a is connected with the main crank-shaft S by means of the piston-rod a' and the connecting-rod
75 a^2 . The cross-head h , to which the end of the piston-rod a' is secured, gives an even motion to the piston-rod a' , said cross-head h working on guides h' , secured, directly or indirectly, to the wall B of the motor. The egress and in-
80 gress ports in the plates K, leading to the air-cylinder A, are secured to the outside wall B of the motor to be opened or closed simultaneously and to the same extent and are connected with the said cylinder A by the air
85 tubes or ports $t t'$ in the manner shown in Fig. 1, the said tubes being connected, respectively, with the said cylinder at or near the respective ends thereof, forming the only
90 air-connection with the interior of the cylinder, all other points of the chamber or cylinder being air-tight. The valved mouths of the respective ports or tubes $t t'$ are constructed in fine narrow slots $s s'$, the total area
95 of each of which is equal to or greater than the area of the respective tubes in cross-section. The object of reducing the area of the slots $s s'$ in cross-section from the point of connection with the tubes $t t'$ to the surface
100 of the ports $s s'$ is to obtain, when desired, while the valves may be still open, the least possible exposed area for the eduction and induction of the air to allow the machine to operate at the least possible speed and to

readily regulate its operation by such means to any desired speed. Over the mouths $s s'$ is provided an air-tight slide-valve V , secured in position by the guides g and operated to 5 and fro by the hand-lever L , which is pivoted at the point l and connected with the valve V by the arm l' . A pawl p is connected to the lever L in the manner shown in the drawings, adapted to work in the rack r , and connected to the plate B , which said rack holds 10 the lever in any desired position, thus regulating the admission and expulsion of air to the air-cylinder A .

In the construction shown the mouths of 15 the air tubes or ports $t t'$ are connected with the slotted mouths $s s'$ in plate K in the manner shown in detail in Fig. 4. The ends of the respective tubes are screwed into plate 1, which plate is secured to the outside of the 20 wall B of the motor. The outsides of the mouths of the respective orifices into which the tubes $t t'$ are fitted in plate 1 are provided with longitudinal grooves of a length about equal to the slotted mouths $s s'$. Next to plate 25 1 is preferably secured a rubber packing k , also grooved corresponding with the grooves in plate 1, and upon this is secured plate 2, also provided with the slotted openings, which on its face terminates in the fine slotted 30 mouths $s s'$, the area of the slots or grooves in cross-section gradually decreasing from point of connection with the tubes or ports $t t'$ in plates 1 to the surface of the mouths $s s'$. The said plates and ports, with the guiding-plate 35 g , are secured together to the wall B of the motor by means of the screws w . In order that the guide-plate g may be regulated in its fitting upon the valve V , the orifices through which the screws w pass are elongated vertically, as shown in Figs. 2 and 6. Screws w' 40 are vertically provided in plate 2 to insure a compact fitting of the guide-plates g to the slide-valve V .

In the construction of the spring-motor 45 shown in the drawings, $T T'$ represent two springs fitted in the usual manner on a drum D , which drum, by means of the large gear-wheel D' , connects with and imparts motion to the crank-shaft S through the medium of 50 the several respective gear-wheels secured on their respective shafts and connecting with the gear-wheel d , provided on the crank-shaft S . The springs $T T'$ are wound up in the drum D by means of the handle H , connected 55 through the medium of gear and ratchet wheels of the construction as shown in Fig. 3.

Supposing the slide-valve V to be fully opened and the lever L to be thrown fully forward, as shown in the dotted lines in Fig. 60 5, the machinery will be allowed to operate with full force and velocity. Reverse, however, the lever to the position shown in dotted lines in the same figure, and the valve V will be closed and the ingress and egress of air into 65 the cylinder A will be immediately checked. The piston-head a will immediately encounter

two resisting forces—a cushion of air in front and a suction or expansion from behind— 70 whichever way the piston may at that moment be operating. As the ports are closed by the valve and the cylinder A air-tight, the resistance of air coming in contact with the piston-head in front and the consequent expansive tendency from the rear, both of which forces 75 being greater than the propelling force of the motor, the piston is consequently brought instantly to a standstill. Should it be desired then to operate the machinery very slowly, the mouths $s s'$ are opened to the breadth of 80 a hair by means of the lever L and the slide-valve V . A small quantity of air being thus allowed ingress and egress, the machinery will commence to operate slowly. In this manner by opening and closing the valves to the de- 85 sired extent the machinery may be operated to any desired velocity. It will be seen that when the ports are opened the air is drawn in and forced out of the mouths $s s'$ alternately by the forward and backward motion 90 of the piston, which pumps and forces out air alternately.

A ratchet-wheel b is provided on the crank-shaft S , with a lever-operated pawl b' attached to the wall B of the motor, by which means 95 the machine may any time be stopped or prevented from moving independently of the governor when the governor is released.

I have shown a particular form of construction of my improved air governor and brake; but I do not limit myself to the particular 100 form of construction described.

My slide-valve connections I have shown as located apart from the air-cylinder, but connected therewith by elongated air tubes or 105 ports $t t'$. My slide-valve connections may be constructed upon or in close proximity to the air-chamber, or they may be at any distance therefrom. I have also minutely described and shown a particular construction of parts 110 of slide-valve as connected with the connecting tubes or ports $t t'$. The construction shown is merely one form of construction, as other connections with the elongated slots or mouths $s s'$ with the air-cylinder A may be made by mere mechanical change. 115

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

1. A revolving shaft, in combination with a cylinder having induction and eduction valved 120 ports constructed with separate mouths opening externally and adapted to open and close at the same time to the same extent, a piston working in said cylinder, and connections with said revolving shaft, substantially for the pur- 125 pose as described.

2. In combination with a motor or other machinery, a cylinder having induction and eduction valved ports constructed with ex- 130 ternally-opening mouths and adapted to open and close at the same time to the same extent and a piston working in said cylinder con-

5 nected with and actuated by said motor or machinery to compress and exhaust air within the cylinder at the same time for the purpose of regulating and controlling the operation of the motor or machinery, substantially as described.

10 3. In combination with a revolving shaft, an air-cylinder provided with inlet and outlet valved ports, the mouths of which said ports are constructed of narrow openings or slots adapted to be opened or closed, respectively, simultaneously to the same extent, and a piston working in said cylinder connected by piston-rods or other suitable connections to
15 the revolving shaft, substantially as described.

20 4. A revolving shaft, in combination with an air-cylinder, a piston working in said cylinder, connecting-rod connecting said piston with a crank on said shaft, and inlet and outlet ports connected, respectively, with the chamber of said cylinder at or near its respective ends, the mouths of said ports opening externally in fine longitudinal slits or
25 slots adapted to be opened or closed by slide-valves, substantially as described.

30 5. In combination with a revolving shaft, air compressing and expansion devices actuated by said revolving shaft, and valves or ports having external mouths constructed to be opened and closed simultaneously to the same extent and to expose, when desired, the least possible area in cross-section when par-

tially opened to allow the motor while yet in motion to run at the least possible speed. 35

6. The combination of a revolving shaft, means to rotate said shaft, air compressing and expansion devices actuated by said shaft, and a regulating slide-valve provided with induction and eduction ports having narrow
40 elongated mouths, whereby the orifices of said ports may be closed or opened or the area of the mouths of the ports reduced to a minimum to regulate the ingress and egress of air into the air-chamber, for the purpose substantially
45 as described.

7. The combination of the crank-shaft S, cylinder A, piston-head a , rod a' , connecting-rod a^2 , induction and eduction ports $t t'$, elongated mouths $s s'$ of said ports $t t'$, and
50 said valves V, constructed and operated in the manner and for the purpose substantially as described.

8. Cylinder A, in combination with crank-shaft S, piston a , piston-rod a' , connecting-rod a^2 , ingress and egress ports or tubes $t t'$, slide-valve V, and mouths $s s'$ of said ports or tubes $t t'$, said slide-valve V operated between
55 guide-plates $g g$ by lever L and connections, substantially as described. 60

In witness whereof I have hereunto set my hand.

FRANK BRIGGS.

Witnesses:

JOHN BRIGGS,
HORACE PETTIT.