

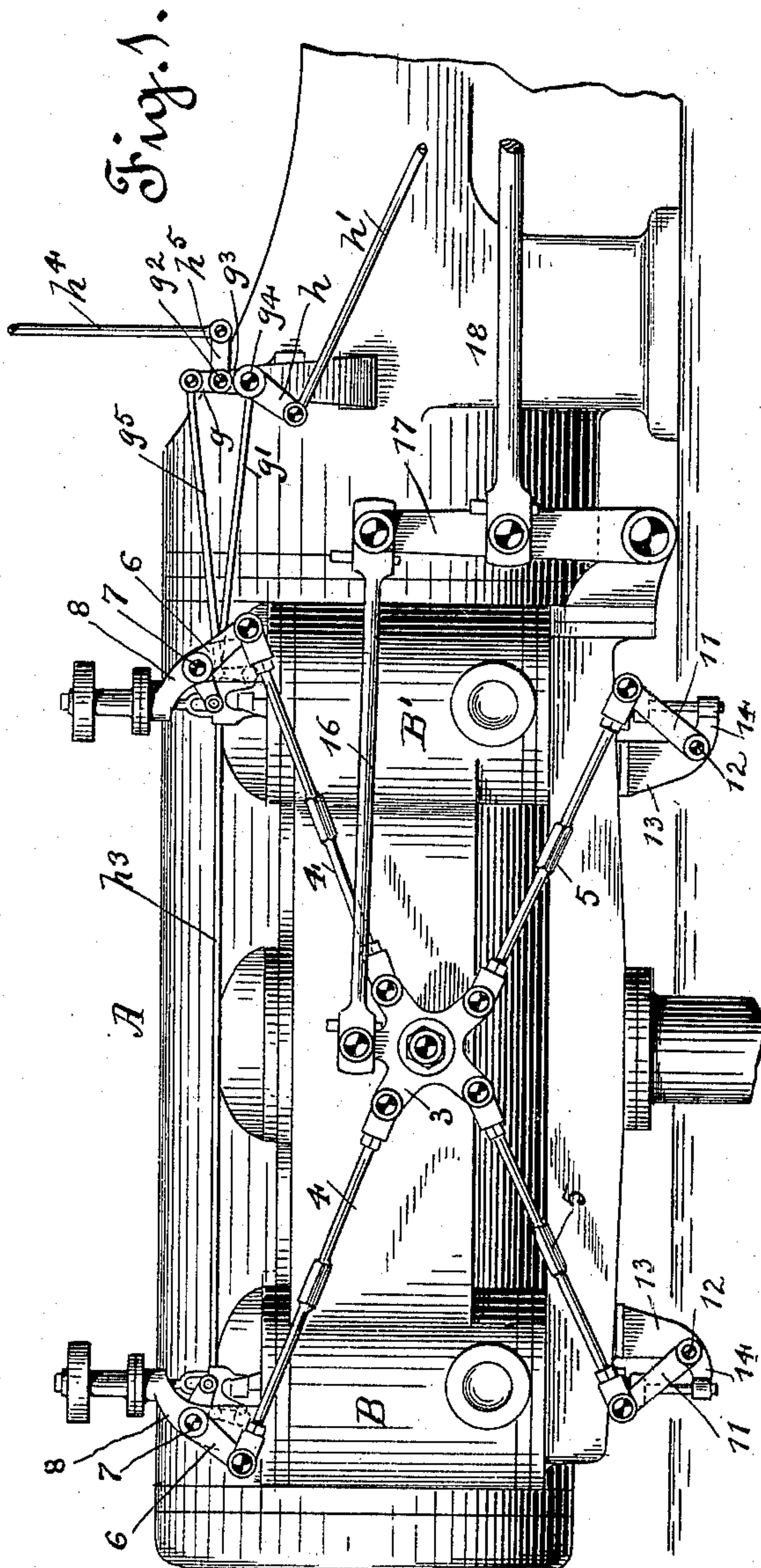
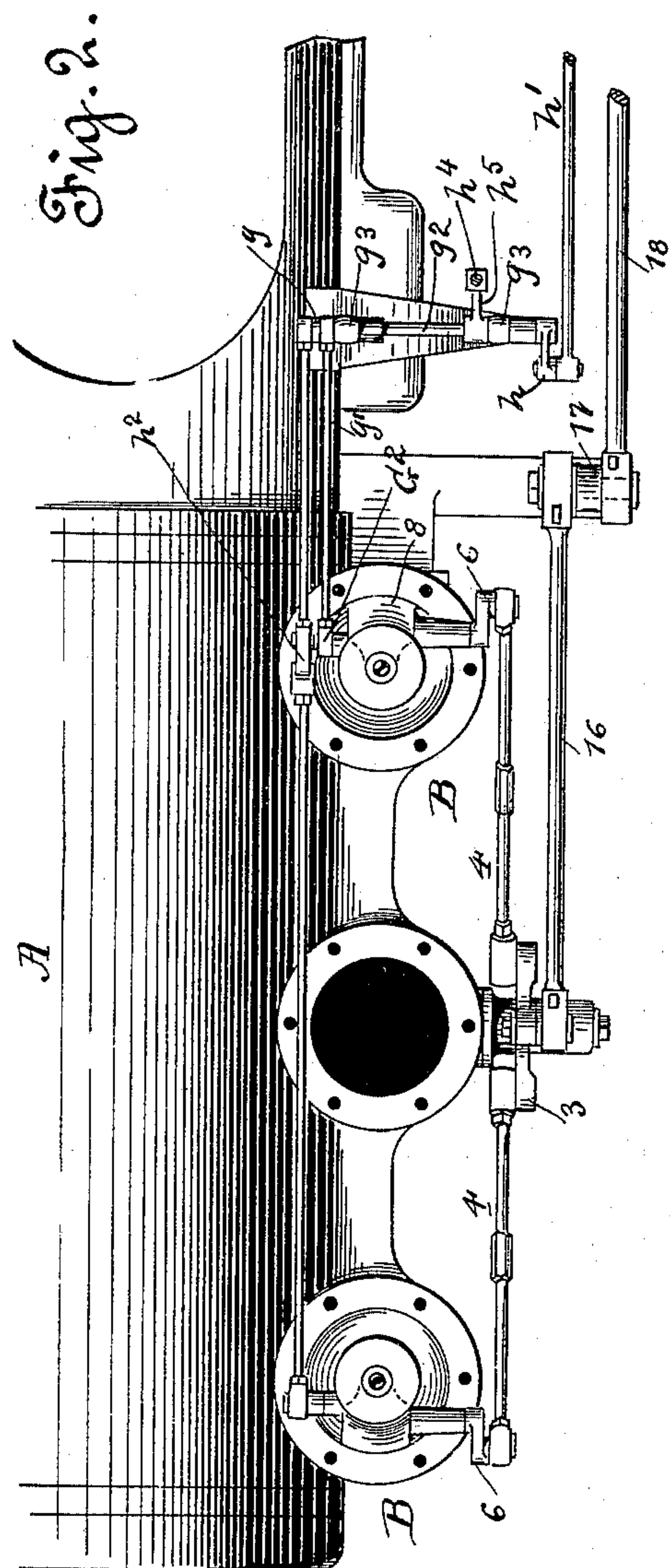
(No Model.)

2 Sheets—Sheet 1.

G. S. BINCKLEY.  
VALVE MECHANISM FOR ENGINES.

No. 591,070.

Patented Oct. 5, 1897.



Witnesses.

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Fig. 3.

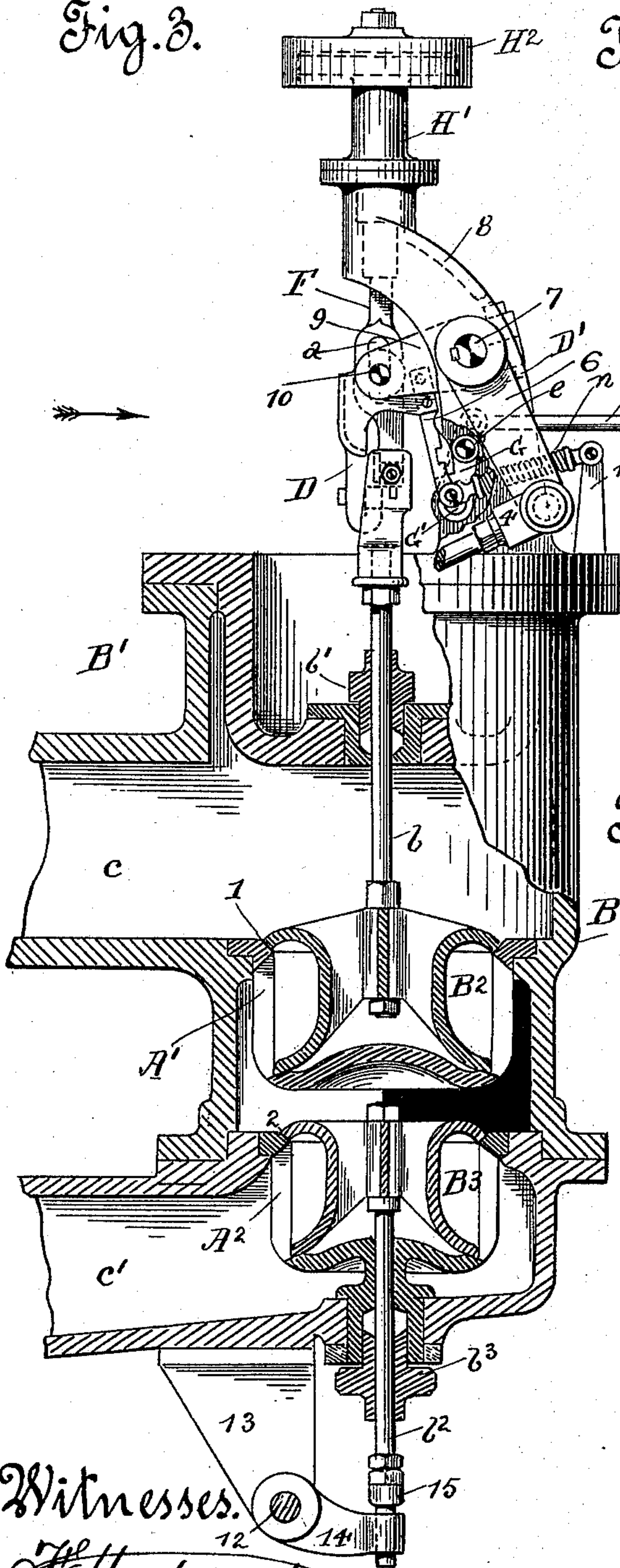


Fig. 4.

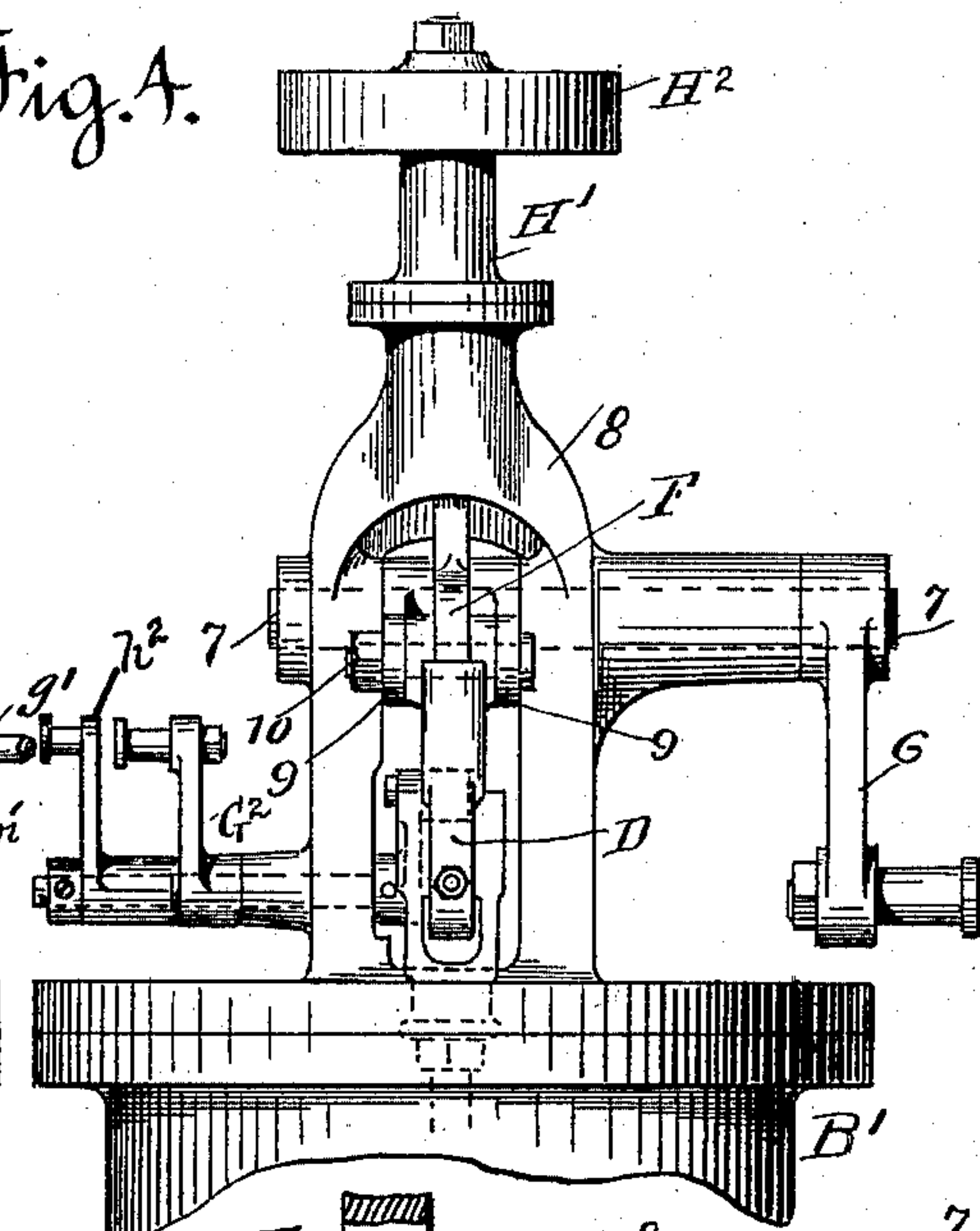
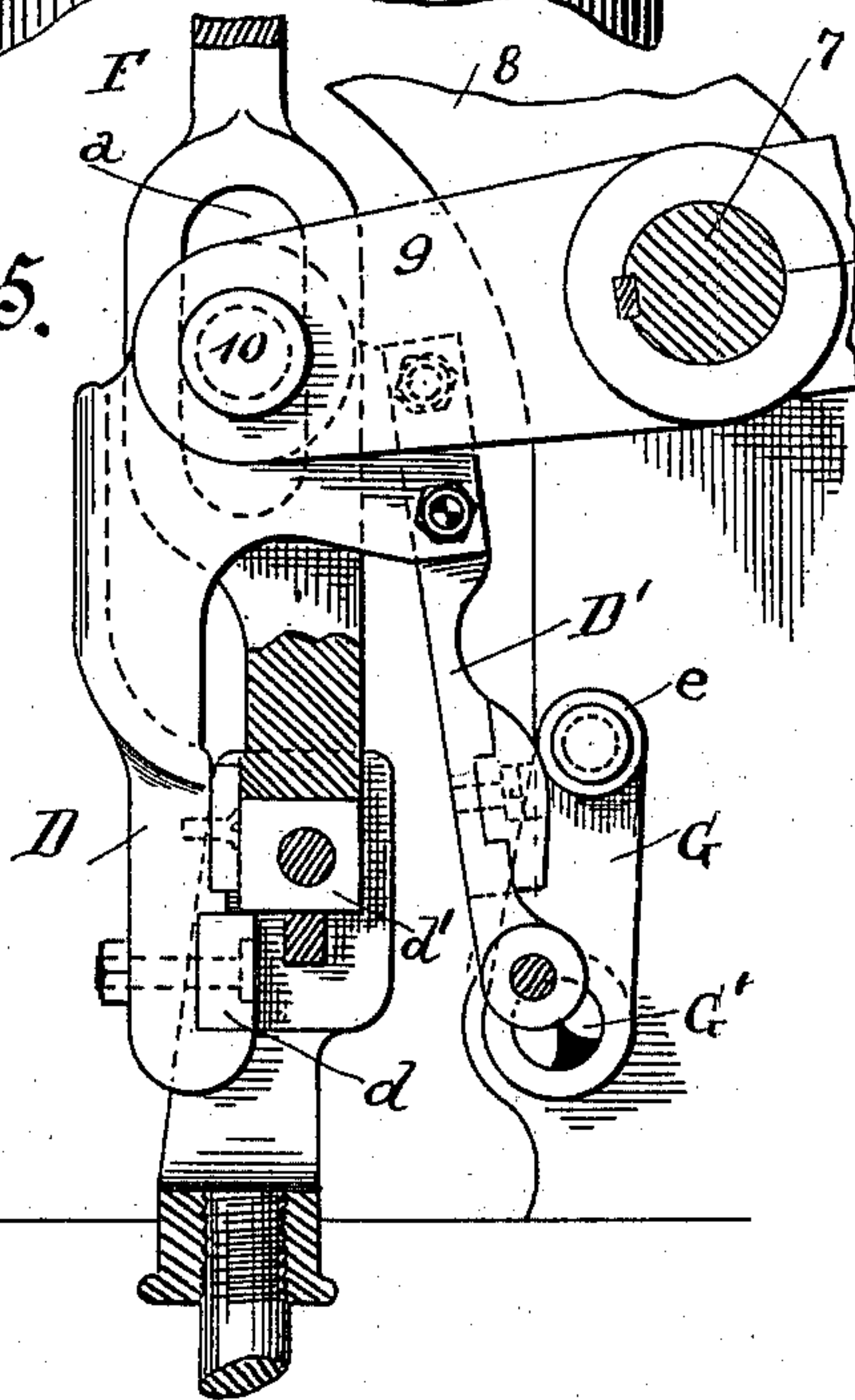


Fig. 5.



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# UNITED STATES PATENT OFFICE.

GEORGE S. BINCKLEY, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE  
UNION IRON WORKS, OF SAME PLACE.

## VALVE MECHANISM FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 591,070, dated October 5, 1897.

Application filed January 2, 1897. Serial No. 617,836. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE S. BINCKLEY, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Valve Mechanism for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof.

10 This invention relates to certain new and useful valve mechanism for use more especially in connection with that class or type of engines known as the "Corliss" engine; and it consists in the arrangement of parts and  
15 details of construction, as will be hereinafter fully set forth in the drawings and described and pointed out in the specification.

In order fully to understand this invention, reference must be had to the accompanying  
20 sheet of drawings, wherein—

Figure 1 is a side view in elevation showing the piston-cylinder, the position of the valves, and the connections for operating the said valves. Fig. 2 is a broken top plan view of  
25 the mechanism illustrated by Fig. 1. Fig. 3 is an enlarged detail sectional view, partly broken away, showing the valve mechanism located at the inner end portion of the cylinder. Fig. 4 is an enlarged detail front view  
30 in elevation, partly broken away, of the valve-operating mechanism disclosed by Fig. 3, viewed in the direction of the arrow; and Fig. 5 is an enlarged detail side view in elevation of the valve-operating mechanism set forth  
35 in Fig. 3.

In the drawings, the letter A is used to indicate the piston-cylinder of the engine, and the letters B B' are used to indicate the valve-chests located at each end thereof, within  
40 each of which valve-chests are arranged and work, respectively, the inlet-valve B<sup>2</sup> and the exhaust-valve B<sup>3</sup>, which valves are preferably of the puppet type. The valve B<sup>2</sup> works within a basket A', secured within the port-  
45 openings 1, formed through the lower wall and set at each end of the steam-inlet chamber c, and controls the admission of steam from said chamber through the port 1 into the piston-cylinder, while the outlet-valves B<sup>3</sup> work  
50 within the baskets A<sup>2</sup>, situated within the port-openings 2, formed through the upper

wall and at each end of the steam-exhaust chamber c', and said valve controls the flow of the exhaust from the piston-cylinder into the steam-exhaust chamber. The stem b of  
55 the inlet-valves extends upward through the stuffing-boxes b', while the stem b<sup>2</sup> of the exhaust-valves extends downward through the stuffing-box b<sup>3</sup>, Fig. 3. It must be remembered that an inlet-valve and an outlet-valve  
60 are located in each valve-chest and that each valve works in the same manner and is operated by the same mechanism. Consequently in the present application the description will be confined to the operation of the valve  
65 mechanism located at one end of the piston-cylinder, which description will suffice for the valve mechanism located at the opposite end of the cylinder.

To the cylinder A is attached the wrist-  
70 plate 3, from which plate upwardly and downwardly extend the connecting-rods 4 and 5, which rods, in accordance with the movement of the wrist-plate, operate the inlet and exhaust valves. The rods 4 are connected at  
75 their upper ends with the arm 6 of the rock-shafts 7, which work in bearings of the forked standard 8, secured to the top of each valve-chest. Each rock-shaft is provided with two  
80 projecting arms 9, through the outer end of which is carried the pin or bolt 10. This pin or bolt extends through a slot a, cut in the yoke F, and being of less diameter than the width of the slot has free play therein. This  
85 yoke is connected at its lower end to the upper end of the inlet-valve stem b', and it extends upward between the arms 9 and through the forked standard 8. Being thus connected it is obvious that as the arms of the rock-shaft 7 are thrown up or down by the move-  
90 ment of the wrist-plate 3 the yoke F, carrying the valve-stem b', will be raised or lowered, as hereinafter described, in order to open or close the inlet-valve. The rods 5 of the wrist-plate 3 connect at their lower ends  
95 to the arms 11, secured to the shaft 12, working in brackets 13, Figs. 1 and 3. This shaft carries the arm 14, which when raised engages the under face of the tappet 15, secured to the valve-stem b<sup>2</sup>, and lifts the valve-  
100 stem, so as to open the valve B<sup>3</sup>. The movement of the wrist-plate 3 is such as to cause



the connecting-rods 4 to raise the inlet-valves  $B^2$ , while the exhaust-valve  $B^3$  is seated. To the wrist-plate 3 is connected one end of the rod 16, the opposite end of which is connected to the vertical fulcrumed lever 17, which lever is connected to the drive mechanism of the engine through the medium of the connecting-rod 18.

The pin or bolt 10, connecting the arms 9 of the rock-shaft 7, carries the claw D, which claw has secured to its lower end the steel block  $d$ , which block when the lower end of the claw is moved inward moves beneath and engages with the steel block  $d'$ , secured to and carried by the vertical yoke F, secured to the upper end of the stem  $b'$  of the inlet-valves  $B^2$ . To the rear of the claw D is fastened the depending tailpiece  $D'$ . This tailpiece is connected by the spring  $n$  to a post  $n'$ , Fig. 3, secured to the top of the valve-chest, the resiliency of said spring being sufficient to hold the tailpiece  $D'$  toward the post  $n'$ , which maintains the lower end of the claw inward and holds the steel block  $d$  beneath the steel block  $d'$  of the yoke F.

The tailpiece  $D'$  is thrown inward, so as to release the claw D from engagement with the yoke F, by means of the roll  $e$ , which is carried by an arm G, attached to the rock-shaft  $G'$ , working through the forked bracket or standard 8. To the opposite end of the rock-shaft  $G'$  is secured the arm  $G^2$ , which is connected to the lower end of the lever  $g$  by means of the connecting-rod  $g'$ . The lever  $g$  is fastened to one end of the shaft  $g^2$ , which shaft is carried by the arms  $g^3$ , upwardly projecting from the rock-shaft  $g^4$ . To this rock-shaft is secured an arm  $h$ , and connection is made between this arm and the eccentric of the engine (not shown) by means of the eccentric-rod  $h'$ . Connection is also made between the upper end of the lever  $g$  and an idler  $h^2$ , loosely mounted upon the rock-shaft  $G'$  in advance of the arm  $G^2$ , by means of the rod  $g^5$ , and connection is made between said idler and the valve mechanism of the chest B by means of the connecting-rod  $h^3$ . This train of mechanism constitutes the cut-off mechanism for controlling the admission-valves. Connection is also made between the governor mechanism of the engine (not shown) by means of the vertical rod  $h^4$ , the lower end of which rod is attached to an arm  $h^5$ , secured to the shaft  $g^2$ . The vertical movement of the rod  $h^4$  throws or adjusts the mechanism just described in accordance with the load under which the engine is working.

By the foregoing it will be readily understood that as the claw is raised by the movement of the arms or levers 9 through the medium of the described mechanism, with its steel block in engagement with the block of the vertically-movable yoke, the said yoke will be carried therewith in order to lift the admission-valves. As the arm G is thrown

inward by the movement of the described cut-off mechanism the roll  $e$  is caused to bear against the tailpiece of the claw and move the same inward, thus forcing the claw to turn upon its fulcrumed point and throw its lower end or steel block carried thereby out of engagement with the yoke, so as to permit the said yoke to move downward in order to seat the admission-valve.

It will be understood that the connection between each valve mechanism is so arranged that as one valve is opened the opposite valve is closed or seated. Each yoke for raising the admission or inlet valves extends through the sleeve or guide  $H'$ , arranged on top of the forked bracket or standard 8, and to the upper end of the said yoke is secured the cap  $H^2$ , which fits upon the sleeve or guide  $H'$ , so as to form an air-cushion for seating the admission or inlet valves without serious impact or jar.

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

1. The combination with the inlet-valves, of the yoke connected to the stem of said valve, the claw carrying a block which engages with a block secured to the valve-yoke, mechanism for raising the claw in order to lift the yoke and inlet-valve, a tail connected to the yoke, and of mechanism for controlling the movement of the tail of the claw so as to move the same in or out of engagement with the valve-yoke.

2. The combination with the inlet-valve, of the yoke connected to the stem of said valve, the claw for engaging with said yoke in order to lift the same, mechanism for imparting vertical movement to the claw, spring-actuated tailpiece carried by said claw, a reciprocating arm for throwing the tailpiece inward to release the claw from engagement with the yoke, and of the eccentric cut-off mechanism for controlling the movement of the said arm.

3. The combination with the inlet-valves, of the yoke connected to the valve-stem thereof, a claw for engaging with said yoke, mechanism for imparting vertical movement to said claw, a spring-actuated tailpiece carried by the claw, a reciprocating arm for throwing the tailpiece to release the claw from engagement with the yoke, the eccentric cut-off mechanism for controlling the movement of the reciprocating arm, and of the connection between the governor and the reciprocating arm for throwing the claw.

In testimony whereof I affix my signature, in presence of two witnesses, this 26th day of December, 1896.

GEORGE S. BINCKLEY.

Witnesses:

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LEE D. CRAIG.