

W. Churchill,

Governor.

No 58,775.

Patented Oct. 16, 1866.

Fig. 1.

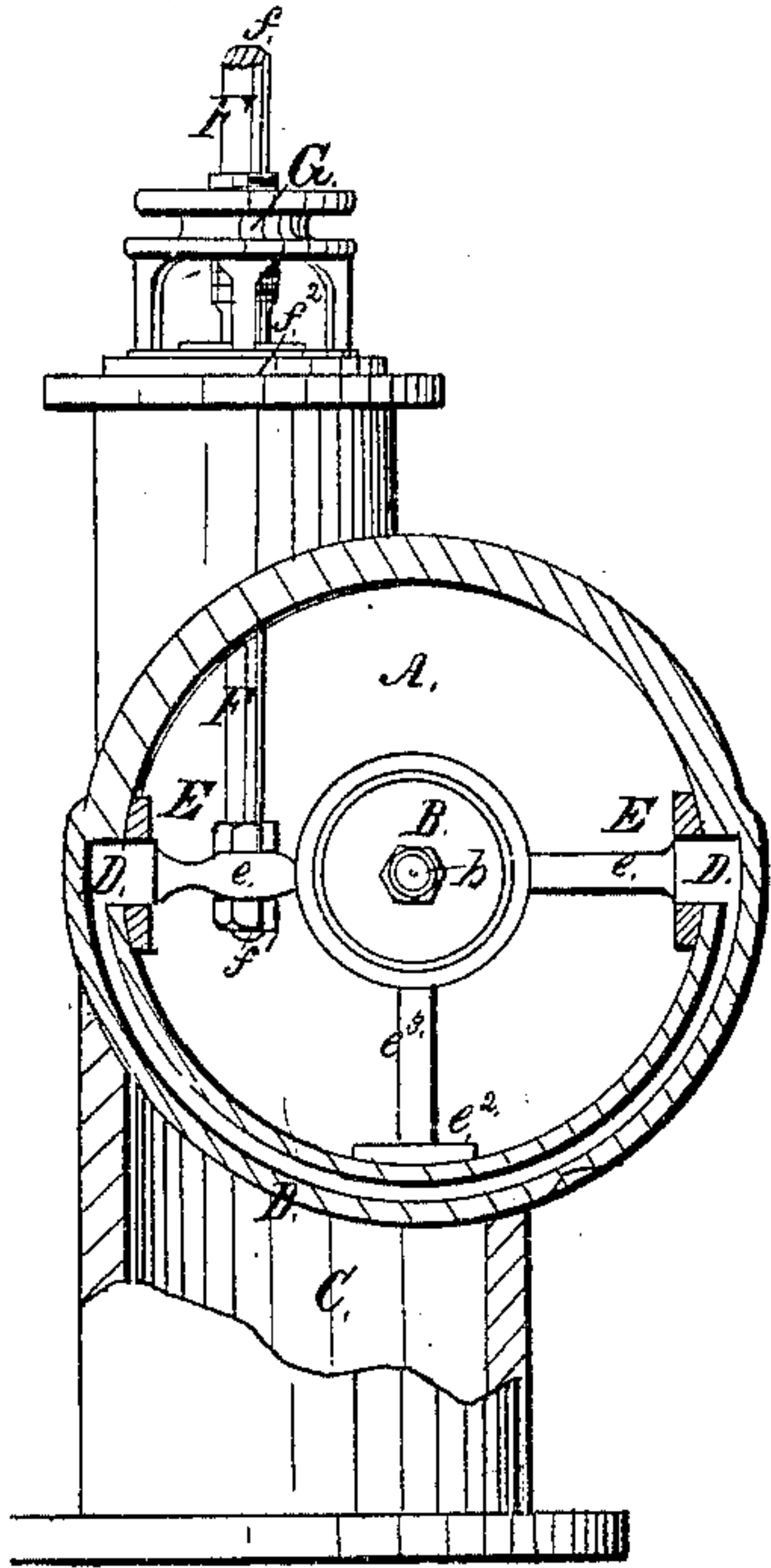
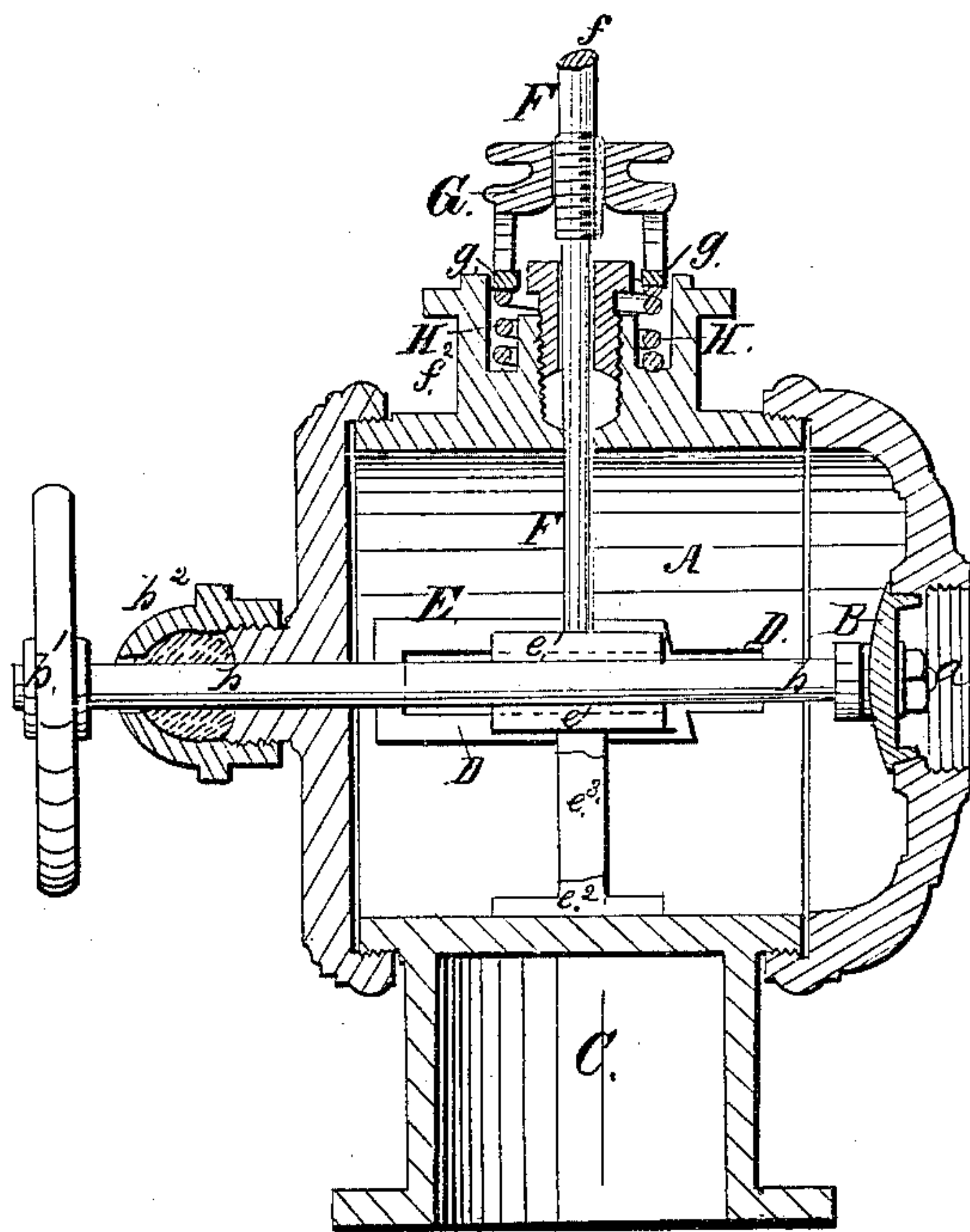


Fig. 2.

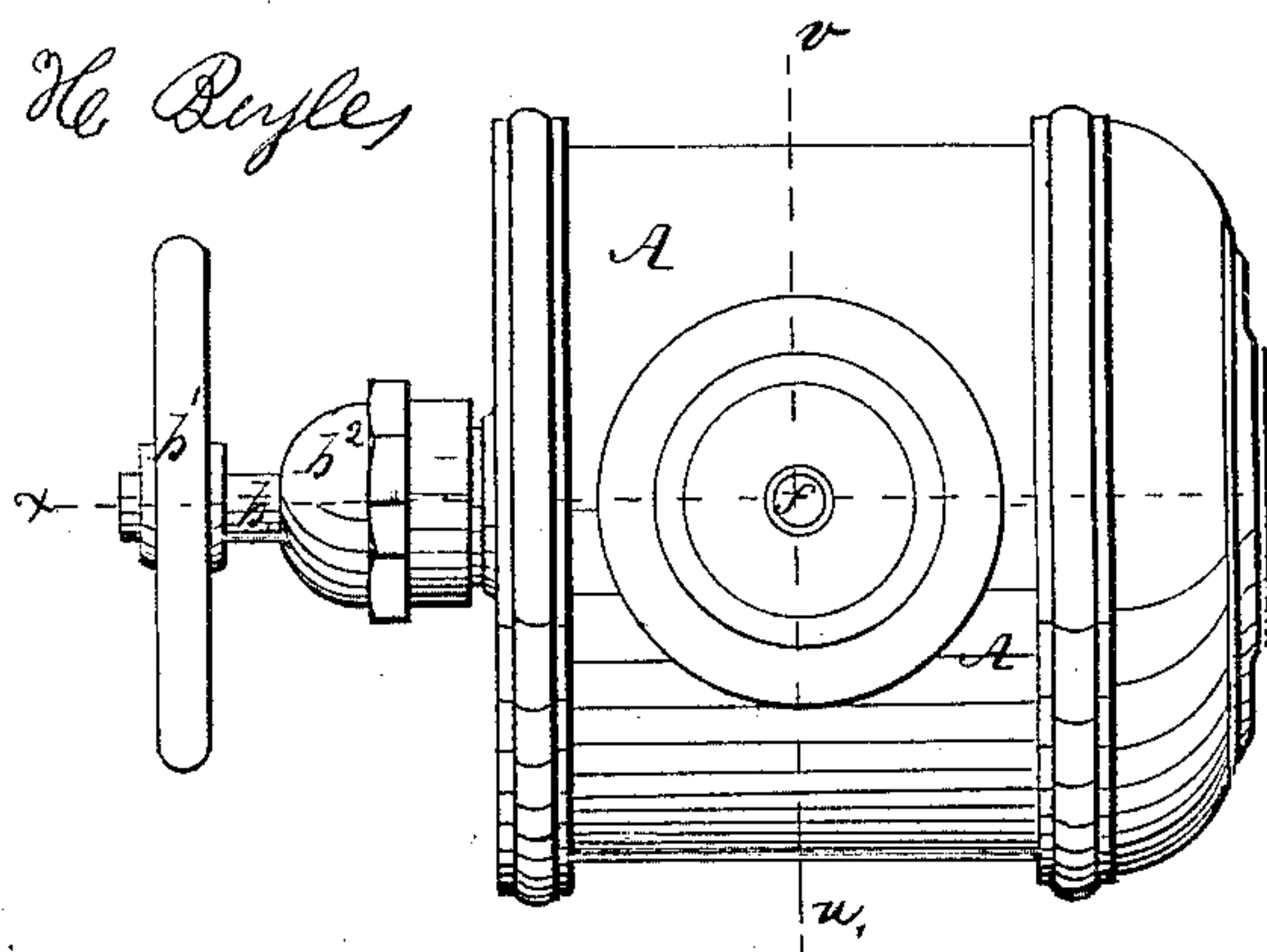


Inventor:

S M Randolph

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Fig. 3.



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W. Churchill by
a. y.
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UNITED STATES PATENT OFFICE.

WILLIAM CHURCHILL, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN GOVERNOR-VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 58,775, dated October 16, 1866.

To all whom it may concern:

Be it known that I, WILLIAM CHURCHILL, of the city and county of St. Louis, State of Missouri, have invented a new and useful Governor for Steam or other Engines; and I do hereby declare that the following is a full and exact description thereof.

The nature of my invention consists in the arrangement of the throttle-valve stem passing through a sleeve of the governor-valves, both valves being in one chamber, whereby the immediate and effective control of the quantity of steam or other motive power passing to the driving-cylinders of an engine is effected, and in certain detail features of construction, which will hereinafter more fully appear.

To enable those skilled in this art to make and use my said governor, I will proceed to describe its construction and application, referring herein to the accompanying drawings, whereof—

Figure 1 is a central sectional elevation along the line *uv*. Fig. 2 is a central sectional elevation along the line *xy*. Fig. 3 is a top plan of my said governor.

Similar letters of reference on said drawings, hereinafter referred to, designate similar parts.

I construct of the usual material, iron, brass, &c., the steam-chamber A, usually cylindrical in form, containing the throttle-valve B. The steam, air, or other power source passes into said chamber A at *a*, the inlet being here regulated by said throttle-valve B, said valve B being opened or closed by the valve-stem *b*, operated by the hand-wheel *b*¹ in the usual manner. As said chamber A must be made steam-tight, the stem *b* passes through *b*², a stuffing-box arranged in the usual manner. Out of said chamber A the steam, air, &c., pass through the pipe C to the cylinder of the engine, and, as it is necessary to regulate the amount of air or steam so passing in accordance with the power which the engine should furnish, I have constructed the parts now specially to be described.

I arrange in the metal circumference or walls of the chamber A the steam-passages D, the same connecting the interior of said chamber A with said steam-pipe C, above named. Said connection between the interior of A and the pipe C may be, however, arranged by connect-

ing-pipes, or in any other practical manner. In order to regulate the quantity of steam or air, &c., passing to said pipe C, it will then only be necessary to regulate the size of the openings of said passages D into said chamber A. This is done by the valves E, secured to the radial arms *e*, which connect with the sleeve *e*¹, through which the stem *b* of the throttle-valve B passes. Moreover, to further secure said valves E, I construct the bearing *e*², attaching to the arm *e*³ of said sleeve *e*¹. In this manner, the governor-valves being guided on the inner circumference or surface of the chamber A in three points, I secure a stable motion and a good fitting thereof. As the valve-stem *b* passes through said sleeve *e*¹ this acts as a guide thereof. By giving to said valves E a radial motion the passage to the steam-passages D may be increased in size or diminished. To thus move said valves E, I attach to one of the arms *e* a stem, F, the upper end whereof, *f*, I connect in such manner with the usual arrangement of rotating balls or globes that when the speed of the engine increases by the centrifugal force acquired the said balls or globes being drawn apart—i. e., their supporting-arms being brought more nearly horizontal—they press upon said shaft or stem F, to raise or lower the same.

As there are many devices for connecting centrifugal globes with the valve-stem F now in common use, and as I do not claim any special arrangement of such devices as my own, such arrangement is not specially shown, the same being foreign to the nature of my invention.

It is well known that in all arrangements of centrifugal governor-globes in common use, the motion of the globe in a vertical direction being dependent upon the action of centrifugal forces, and the action thereof being arranged to correspond to the speed of the engine, the motion imparted to the shaft F will vary in distance, as well as in the time or duration thereof, in accordance with the speed of the engine; but by attaching said stem F to the arm *e*, nearer the sleeve *e*¹ than is E, the motion of the valves E will be more sensitively correspondent to the speed of the engine than if a direct connection between the stem F and said valve were made. I would, however,

specially mention that it may be convenient to secure the motion of the valves E by connecting the stem F therewith in some other manner—for instance, by securing the sleeve e^1 so as to turn with the stem b , and then connecting F with b by a lever outside of the chamber A. Here the connection between e^1 and b would be so managed that in operating the throttle-valve the part connecting b and e^1 passed from the contact with e^1 when B is operated. Such and similar arrangements are included in the nature of this my invention. The connection between the stem F and the arm e can be effectively made by nuts on the lower extremity of F, said extremity f^1 at the same time passing through the arm e . When the stem F passes out of the chamber A, I make steam-tight by the usual stuffing-box f^2 .

It often becomes necessary to increase or diminish the speed of the engine for power purposes, and the delicacy of adjustment of the governor must be in accordance with the speed or power required. To effect this I secure to the stem F a nut, G. This presses upon a ring, g , resting upon a spiral spring, H. When it becomes necessary to lessen the delicacy of the governor action—in other words, to keep the steam-passages wide open notwithstanding high speed of engine—the nut G is screwed down hard, and this, causing an increased resistance of the spring H, will prevent an increased speed of the governor-balls or of the engine from affecting the valve. Again, by releasing the nut G, the action of

the spring H can be so decreased as to simply counterbalance the weight of the stem F and other not otherwise supported connections, when any change of speed of the governor-balls or engine will immediately and in a very sensitive manner react upon the valves E, thereby effecting a very perfect control of the quantity of steam or air, &c., passed to the driving-cylinders in very near accordance with the demand for power. Again, the arrangement of the opposite valves E is such that, the pressure of steam on their equal surfaces being equal, there is here a balance, so that by cause of the steam-pressure no additional power is requisite to move the valves, again insuring quick and free motion thereof, suited to the requirements of power and speed.

From the description of my said invention it, moreover, will appear that the action thereof is independent of the power—be the same steam, air, or gas—used.

Having thus fully described my said invention, what I claim is—

1. The arrangement of the throttle and governor valves in the manner substantially as set forth.

2. The combination of the nut G, stem F, and spring H, whereby to secure the action and regulation of the governor in accordance with the demands of power and speed.

WILLIAM CHURCHILL.

Witnesses:

M. RANDOLPH;

GEO. P. HERTHEL, Jr.