

E. REYNOLDS & N. G. HERRESHOFF.

Improvement in Governors for Steam Engines.

No. 125,084.

Patented March 26, 1872.

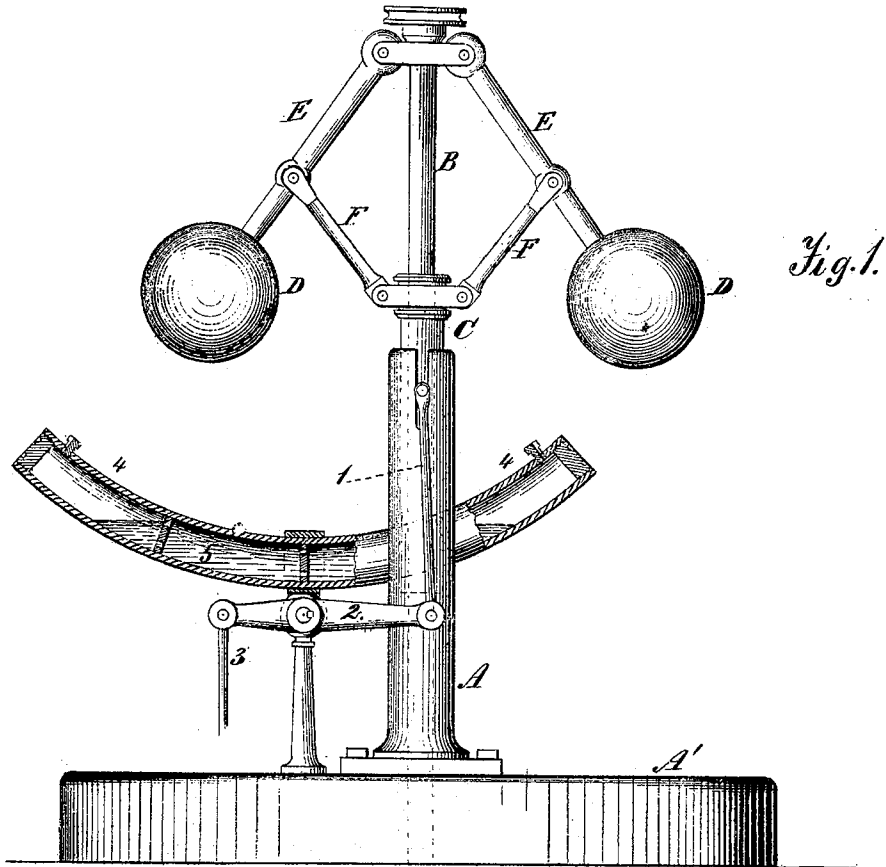


Fig. 1.

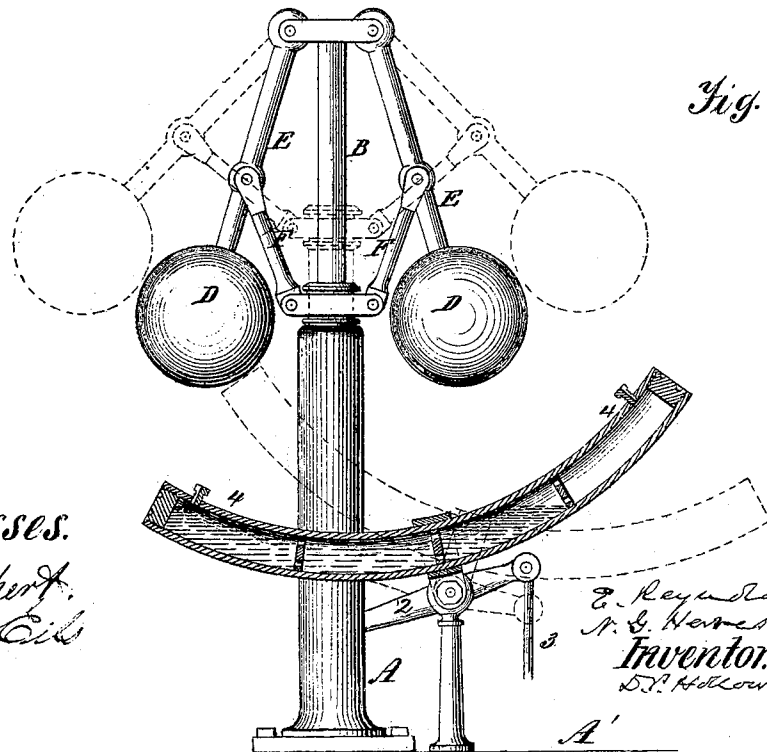


Fig. 2.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN GOVERNORS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 125,084, dated March 26, 1872.

Specification describing a certain Improvement in Governors for Steam and other Engines, invented by EDWIN REYNOLDS and NATHANIEL G. HERRESHOFF, residing at Providence, in the county of Providence and State of Rhode Island.

This invention relates to that class of instruments which are designed for regulating the flow of steam, gas, or water to the cylinder or other part of the engine to which they may be attached; and it consists in combining with such an instrument an oscillating tube or chamber, to be partially filled with mercury or some other semi-liquid or liquid substance, which shall aid in controlling the movements of the throttle or other valve or valves which control the admission or emission of the motive agent to or from the engine, as will be more fully explained hereinafter.

Figure 1 is an elevation, partly in section, showing our improvement as attached to a governor, the parts being in the proper position for giving the requisite amount of speed to the engine. Fig. 2 is a view of the opposite side of the governor, the mercury-tube being shown in section in full lines and in position to admit a full supply of steam to the cylinder, and in dotted lines in the position which it assumes when the valve is closed and the steam cut off from said cylinder, the different positions of the other parts of the governor being also shown in full and in dotted lines.

In constructing instruments of this character we use any approved form of mechanism for operating the valve or valves and the oscillating tube, the one shown in the example presented consisting of a tubular metallic column, A, placed upon any suitable base, A'. Passing through this column is a spindle, B, which is so fitted to the interior surface of the same as to cause it to form a support to the spindle and yet allow it to rotate freely therein. The aperture in the upper end of the column is bored out larger in that portion in which the spindle rotates, in order that it may be adapted to receive and guide a sleeve, C, which slides freely therein, the column being slotted to permit a pin which is inserted into the sleeve to move up and down in it, and thus prevent the sleeve from rotating. To the top of the spindle B a cross-head is attached,

to the outer ends of which the arms E E, which carry the balls D D, are pivoted, the arms being connected to a similar cross-head, which is placed upon the outer end of sleeve C, and made to revolve freely thereon by means of connecting-links F F, so that as the rotative movement of the balls is increased and they are caused to approach to or assume the positions shown in dotted lines in Fig. 2 the sleeve C shall be raised or caused to have an outward movement, which will give motion to the valve or valves through instrumentalities soon to be described.

The parts above referred to form no part of our present invention, except as they are combined therewith or arranged with reference thereto, and may be varied indefinitely without affecting our invention. In order that the parts which relate more nearly to our improvement may be properly combined with the parts already described, or others substantially like them, and designed to perform the same functions, a rod, 1, is attached to the pin already described as being placed in the sleeve C, and which works in a slot in the column A. This rod extends in the direction of the axis of the column for any desired distance, and to a point where it is pivoted to the end of a lever or to the arm of a tumbling-shaft, 2, which may be supported in any suitable bearings, so that to it may be attached a rod or rods for operating a throttle or other valve, or for operating a liberating mechanism of a detachable valve-gear. Upon the lever 2, or upon the end of the shaft to which it is fixed, there is secured a curved tube, 4, into the ends of which are screwed plugs, or they are otherwise closed, so as to effectually prevent the escape of any of the mercury or other substance with which said tube is partially filled. At proper intervals are inserted diaphragms into the tube, as shown in the drawing, they being for the purpose of preventing the too sudden rush of the mercury from one end of the tube to the other when it assumes either of the positions indicated in Fig. 2, these diaphragms being provided with small apertures through which the mercury has to flow in its passage from one portion of the tube into the other. Upon the upper surface of this tube apertures are formed for the escape of air from the tube, and

its introduction thereto, as the position of said tube is changed. It is apparent that the tube 4 is susceptible of being located and operated in a variety of positions; as, for instance, a tube may be attached to one or both balls of the governor or to any other part which has the requisite movement; but as it is not intended to limit this improvement to any particular location or arrangement of the tube it is not deemed necessary to describe all of the positions which it may occupy.

It will be understood that the object of this improvement is to enable the ordinary governor to give greater regularity to the movement of the engine to which it is attached by the attachment of the curved tube or chamber to it in such a manner that when the balls of said governor are in any given position and are rotating at any given rate of speed, and a greater amount of work is put upon the engine, or when it is relieved of a portion of what it was previously doing, and a temporary change of the movements of the balls is effected thereby, which change will cause said balls to assume a different position, thereby affecting the amount of force applied to the engine, the mercury in the tube will flow toward the end thereof which is depressed, and thus hold the balls in their new position, while still rotating at the same rate of speed that they did in their former position, which change of position will, of course, hold the throttle-valve or the valve-detachable mechanism in the position required by the different amount of labor which the engine is performing. The position which the parts are calculated to assume when the motor is running at the proper rate of

speed is shown in Fig. 1, where it will be seen that the mercury fills the lowest portion of the tube, from which position it will flow in either direction, according as the rate of speed of the motor is increased or diminished.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of a governor for regulating the speed of motors, a valve for regulating or controlling the influx to or efflux from the motor of the motive agent employed, and a curved tube or chamber containing mercury or other substance for aiding the governor or portions thereof in controlling the movements of said valve, substantially as and for the purpose set forth.

2. The combination of a governor having a sliding sleeve, a rod for connecting said sleeve to a lever or tumbling-shaft, with such a lever or shaft, a bent tube or chamber for containing mercury or other substance, and a valve-rod for actuating a valve for regulating or controlling the influx or efflux of steam to the cylinder of a steam-engine, substantially as and for the purpose set forth.

3. An oscillating tube or vessel of any suitable form containing mercury or other liquid, in combination with a governor for controlling the speed of motors, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EDWIN REYNOLDS.

NATHANIEL G. HERRESHOFF.

Witnesses:

B. B. HAMMOND,

H. H. WHITE.