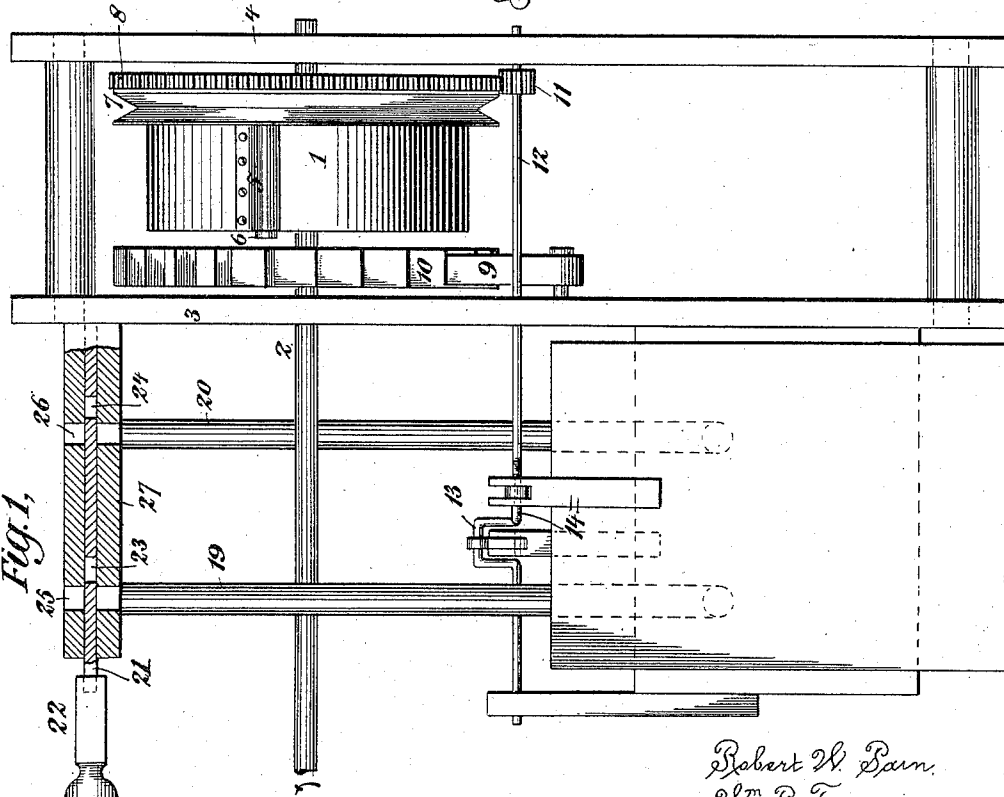
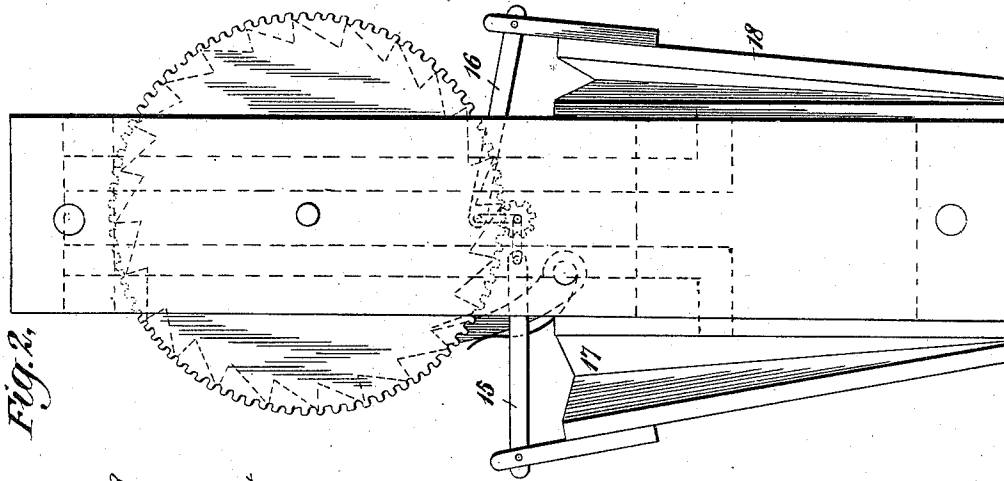


(No Model.)

R. W. PAIN & W. B. TREMAINE.
PNEUMATIC GOVERNOR.

No. 584,599.

Patented June 15, 1897.



WITNESSES:

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ROBERT W. PAIN AND WILLIAM B. TREMAINE, OF NEW YORK, N. Y.

PNEUMATIC GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 584,599, dated June 15, 1897.

Application filed October 16, 1896. Serial No. 609,066. (No model.)

To all whom it may concern:

Be it known that we, ROBERT W. PAIN and WILLIAM B. TREMAINE, citizens of the United States, residing at New York, in the county of New York and State of New York, have invented certain new, useful, and valuable Improvements in Pneumatic Governors, of which the following is a full, clear, and exact description.

This invention relates to pneumatic governors, particularly for spring and like motors, and has for its object to provide such a simple, practical, and effective device as to commend it for general use as a governor for all purposes to which it is adapted.

It is conceded that the form of spring-motor shown in the attached drawings is not new, and, further, that innumerable devices have been patented for governing such motors, but such devices are all more or less complicated, expensive, and inaccurate, particularly that class employing fans, and none of such devices are adapted to be adjusted to regulate the speed of the motor as simply as by the means provided in this invention, as will appear from a study of the annexed drawings, in which—

Figure 1 is a side-view of a spring-motor with the improved pneumatic governing device applied thereto, and Fig. 2 is a side view of the same.

Like numerals of reference placed on or near the several parts in the two drawings indicate the same constructions differently shown.

As before intimated, the spring-motor herein shown is of a well-known form, consisting of the coiled-tape spring 1, having its inner end rigidly secured to the main shaft 2, bearing in the upright 3 4 of the frame, the outer end 5 of said spring being secured by the stud 6 or other suitable means to the pulley 7 and gear 8, it being desirable in some cases to surround the spring 1 by a protecting-drum. (Not here shown.) The pawl 9 and ratchet 10 serve here, as of old, to prevent any back revolution of the shaft 2 and unwinding of the spring 1 from its interior and causing its outer end 5 to revolve the pulley 7, gear 8, pinion 11, and the auxiliary or governor shaft 12 at the highest rate of speed permitted by the resistance offered by the governing de-

vice connected to said auxiliary shaft 12, and to a description of the novel form of governor herein shown we will now proceed. The said auxiliary shaft 12 in this case has two crank-bends 13 14 formed therein which serve when in operation to give motion to their pitmen 15 16, connecting with their respective pneumatics or bellows 17 18, and cause the latter to be alternately opened and closed. Said bellows communicate with the exterior atmosphere only through their respective and independent tubes 19 20, which tubes are adapted to be partially or entirely throttled by the slide-valve 21, having the handle 22 at its outer end and in which are made two apertures 23 24, so located as to correspond with the two openings 25 26 through the valve-board 27, the bottom of said openings communicating with their respective connecting-tubes 19 20.

The operation of our device is substantially as follows: Supposing the slide-valve 22 to be entirely closed, as shown in the drawings, and the interior of the spring 1 to have been wound up by the forward revolution of the shaft 2 given it by hand or foot power or other manner, then owing to the inability of the bellows to either expel or suck in air through their closed tubes 19 20 they are prevented from moving and therefore hold the shaft 12 and the spring 1, through the intermediate gears, stationary—i. e., assuming that the bellows, tubes, valves, &c., are theoretically perfect—but in practice it is found that there is a slight leakage of air through the pores of the leather forming a part of the bellows or at the connections which is sufficient, under the conditions above assumed, to permit of a very slow revolution of said shaft 12, which allows only of a greatly slower movement of the driving-pulley 7. Assuming now that the slide-valve 22 is slightly drawn out, so as to permit a little air to be alternately expelled and sucked through the openings so made, then there is an immediate acceleration in the movement of the governing-bellows and a corresponding increase in the speed of the driving-pulley 7, and the farther the slide-valve is withdrawn the greater the speed of the driving-pulley, and vice versa.

It is obvious that this governing device may be applied to electric and other forms

of motors and that minor changes or modifications in the construction of the governor itself may be made without avoiding the spirit of this invention, as

5 What we claim is—

1. In a pneumatic governor for motors, the combination with a driven shaft, of a pair of bellows arranged upon either side of said shaft, and each having a movable board, independent connections between the said driven shaft and movable board of each bellows, said connections being arranged to operate the bellows alternately, and means for controlling the escape and admission of air through the said bellows, substantially as described.

2. In a pneumatic governor for motors, the combination with a driven shaft having a double crank-arm, of a pair of pneumatic bellows, an independent connection between each crank-arm and the movable board of each bellows, an air-port leading from each bellows and opening externally, and a valve for controlling the escape and admission of

air through the said air-ports and bellows, substantially as described.

3. In a pneumatic governor for motors, the combination with a driven shaft having two crank-arms arranged at substantially right angles to each other, of a pair of oppositely-disposed pneumatic bellows each having an air-port opening externally, the said bellows being arranged upon either side of the driven shaft opposite the crank-arms, an independent connection between each crank-arm and the movable member of each bellows, an air-port leading from each bellows and opening externally, and a valve for simultaneously opening or closing both of said air-ports, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

ROBERT W. PAIN.

WILLIAM B. TREMAINE.

Witnesses:

OWEN WARD,

W. A. BENJAMIN.