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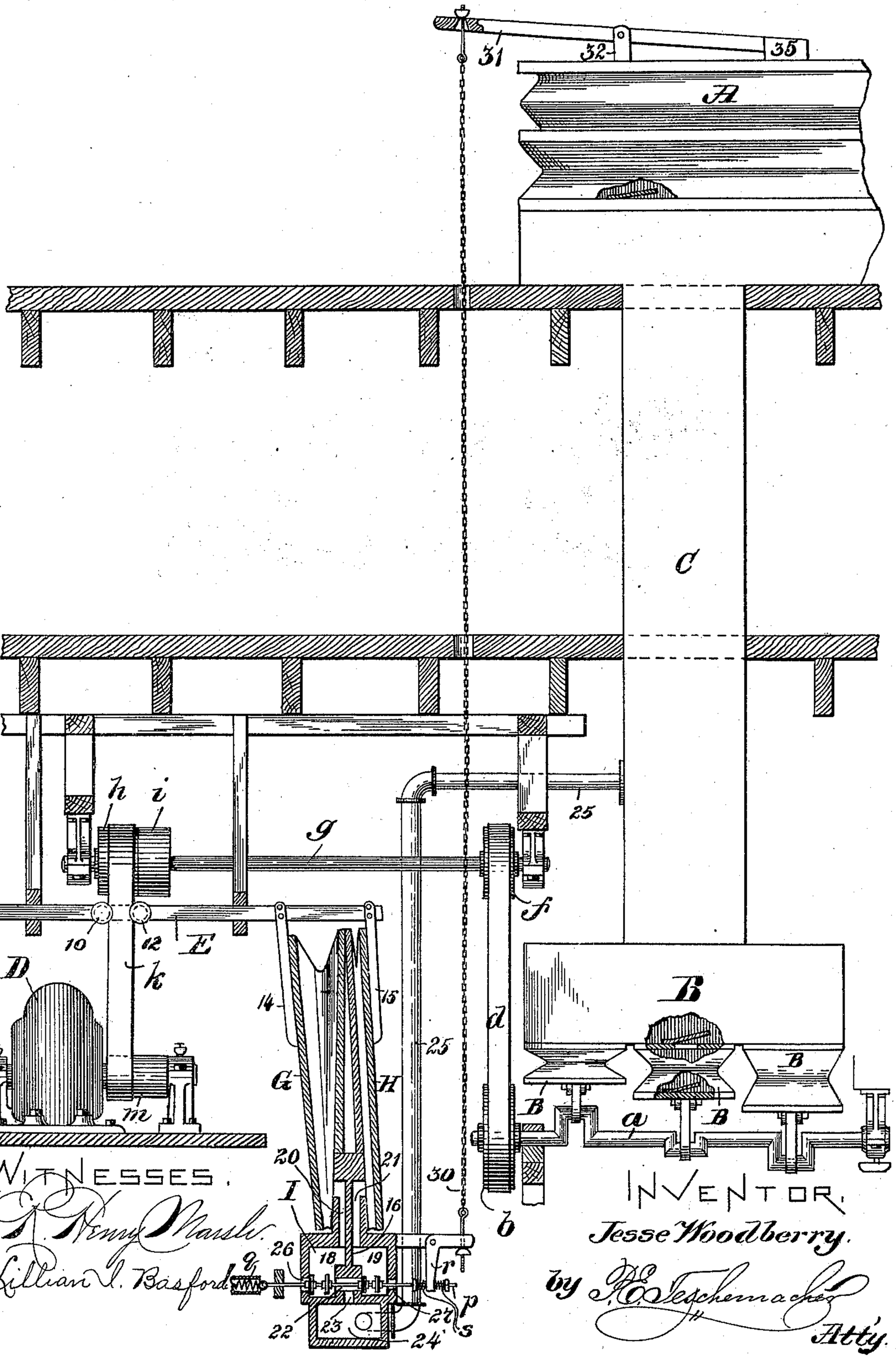
J. WOODBERRY.

PNEUMATIC BELT SHIFTING MECHANISM.

(Application filed Feb. 10, 1900.)

(No Model.)



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JESSE WOODBERRY, OF BOSTON, MASSACHUSETTS.

PNEUMATIC BELT-SHIFTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 646,892, dated April 3, 1900.

Application filed February 10, 1900. Serial No. 4,810. (No model.)

To all whom it may concern:

Be it known that I, JESSE WOODBERRY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a Pneumatic Belt-Shifting Mechanism for Church-Organ Motors, of which the following is a specification.

In operating church-organ motors much difficulty has been experienced in automatically regulating the action of the motor in such manner as to avoid irregularities or variations of the wind-pressure in the collapsible air-reservoir.

To overcome this difficulty is the object of my invention, which consists in automatically operating the belt-shifting mechanism of the organ-motor by means of a pair of bellows or pneumatics arranged intermediate between said belt-shifting mechanism and the collapsible air-reservoir and adapted to be operated by the latter as it expands and contracts, whereby the motor is automatically controlled with the greatest facility and without producing any variations in the wind-pressure, as will be hereinafter more fully set forth.

In the drawings, which represent in sectional elevation my pneumatic belt-shifting mechanism applied to an organ-motor, A represents the collapsible air-reservoir of a church-organ, which is supplied, as usual, with air from the feeding-bellows B through the wind-trunk C. The feeding-bellows B receive motion from the crank-shaft *a*, provided with a pulley *b*, driven by a belt *d* from a pulley *f* on a shaft *g*, provided with the usual fast and loose pulleys *h i*, adapted to be driven by a belt *k* from the pulley *m* of the organ-motor D.

E is the belt-shifter, composed, as usual, of a bar sliding in suitable guides and provided with antifriction-rolls 10 12, one on each side of the belt *k*, whereby as said bar is moved in the direction of its length the belt will be shifted from the fast to the loose pulley, or vice versa.

G H represent a pair of bellows or pneumatics arranged back to back, as shown, and 14 15 are two downwardly-extending arms secured to the belt-shifter bar E and bearing the one against the upper end of the outer side of the pneumatic G and the other against the upper end of the outer side of the pneumatic H, whereby as the pneumatic H is expanded the bar E will be moved to the right to shift the belt *k* onto the loose pulley *i*, and thus arrest the movement of the feeding-bellows, while when the pneumatic G is expanded the bar E will be moved to the left to shift the belt onto the fast pulley *h*, and thus set the feeding-bellows in motion.

At the base of the pneumatics G H and supporting the same is a box or casing I, divided by a partition 16 into two chambers 18 19, the former communicating through a passage 20 with the pneumatic G and the latter through a passage 21 with the pneumatic H. Through the partition 16 is formed a passage 22, which communicates through an opening 23 with a chamber 24, located beneath the chambers 18 19 and supplied with air through a pipe 25, extending therefrom to the wind-trunk C.

p is a sliding valve-spindle which passes through outlet-openings 26 27 in the opposite sides of the casing I and the central passage 22 and carries four valves, which respectively control the admission of air to the chambers 18 19, and thence to the two pneumatics G H and its discharge therefrom through the outlet-openings 26 27 of the casing I. These valves are so arranged that while the air is being admitted to the pneumatic G to expand the same it is being discharged from the pneumatic H, and vice versa, thereby causing the bar E to be moved to the right or left to stop or start the feeding-bellows, as desired.

q is a retracting-spring secured to one end of the valve-spindle *p* and acting to close the air-inlet valve of the pneumatic H, the opposite end of the spindle being connected with the vertical arm of a bell-crank *r*, pivoted to a bracket on the casing I. The spindle *p* slides through the end of the bell-crank, and springs *s* surround said spindle on opposite sides of the bell-crank and are held in place by nuts, as shown, thus forming a yielding connection between the spindle and the bell-crank to avoid any strain on the parts. To the horizontal arm of the bell-crank *r* is connected a chain 30, the upper end of which is connected to the outer end of a lever 31, fulcrumed to a support 32, rising from the top board of the air-reservoir A, said lever being

provided at its inner end with a weight 35, which normally rests on the top of said reservoir. This weight 35 acts on the lever 31 with sufficient force to enable it to overcome the resistance of the spring *q* of the valve-spindle, and thus as the reservoir A expands and when it has become nearly filled with air from the bellows B the lever 31 will, through the medium of the chain 30 and the bell-crank *r*, move the valve-spindle *p* to the right against the resistance of the spring *q*, thus admitting air to the pneumatic H, which will then act on the belt-shifter and arrest the movement of the feeding-bellows. When, however, the air-reservoir A begins to collapse, the descent of the lever 31 will slacken the chain 30, when the spring *q* will instantly retract the spindle *p*, thus admitting air to the pneumatic G and simultaneously cutting it off from the pneumatic H, the air being thus allowed to escape through the exhaust port or opening 27. The pneumatic G then shifts the belt onto the fast pulley *h*, when the feeding-bellows will again supply air to the reservoir A, which in this manner is kept fully supplied with air automatically without requiring care or attention on the part of any one, it being merely necessary to start the motor and stop the same when the performance on the organ has been terminated and its use is no longer required.

All liability of straining or breaking the valve mechanism is avoided by the employment of the springs *s* on either side of the bell-crank *r*, while any extra expansion of the air-reservoir A will cause the outer end of the lever 31 to be drawn down against the resistance of the weight 35, and thus avoid any danger of strain on the parts which might occur if the chain 30 were rigidly connected with the air-reservoir.

Heretofore when a belt-shifting device has been operated by mechanism connected directly with the collapsible air-reservoir the top of the latter was necessarily provided with a very heavy weight sufficient to operate the mechanism in one direction on the collapse of the reservoir. To raise this heavy weight as the reservoir was being again filled with air put much extra work upon the feeding-bellows, and, furthermore, this heavy weight on the top of the air-reservoir caused much irregularity in the supply of air to the organ, all of which difficulties are entirely overcome by my improvements, as the weight 35 is only required to be sufficiently heavy to overcome the resistance of the valve-spindle spring *q*, and therefore offers but slight resistance to the expansion of the reservoir A, and consequently puts hardly any extra work upon the feeding-bellows.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with the bellows or collapsible air-reservoir of an organ, of a motor belt-shifting device, a pair of bellows or pneumatics connected with and adapted to actuate the belt-shifting device in opposite directions and interposed between the latter and the air-reservoir, a valve mechanism for controlling the operation of said pneumatics, and suitable connections between the air-reservoir and the valve mechanism, whereby the latter is operated automatically by the expansion and collapse of the air-reservoir, substantially as described.

2. The combination with the bellows or collapsible air-reservoir of an organ, of a motor belt-shifting device, a pair of bellows or pneumatics connected with and adapted to actuate the belt-shifting device in opposite directions and interposed between the latter and the air-reservoir, valves mounted on a sliding valve-spindle and controlling the operation of said pneumatics, a spring for moving the valve-spindle in one direction, a bell-crank connected with said valve-spindle and adapted to move the same in the opposite direction against the resistance of its spring, a weighted lever fulcrumed to the top of the air-reservoir, and a connection between the said weighted lever and the bell-crank, whereby said valves are moved to produce an alternate operation of the pneumatics to actuate the belt-shifting mechanism, substantially as described.

3. The combination with the collapsible air-reservoir, of a belt-shifting device, a pair of pneumatics for operating the same, a valve mechanism for controlling the operation of said pneumatics, a spring connected with said valve mechanism, a lever mounted on said air-reservoir and having its outer end connected with said valve mechanism, said lever being provided at its inner end with a weight sufficiently heavy to overcome the resistance of the spring connected with the valve mechanism, whereby said valve mechanism is operated automatically in one direction by the lever as the air-reservoir is expanded, and in the opposite direction by the spring as the reservoir contracts, substantially as described.

Witness my hand this 7th day of February, A. D. 1900.

JESSE WOODBERRY.

In presence of—
P. E. TESCHEMACHER,
LILLIAN I. BASFORD.