

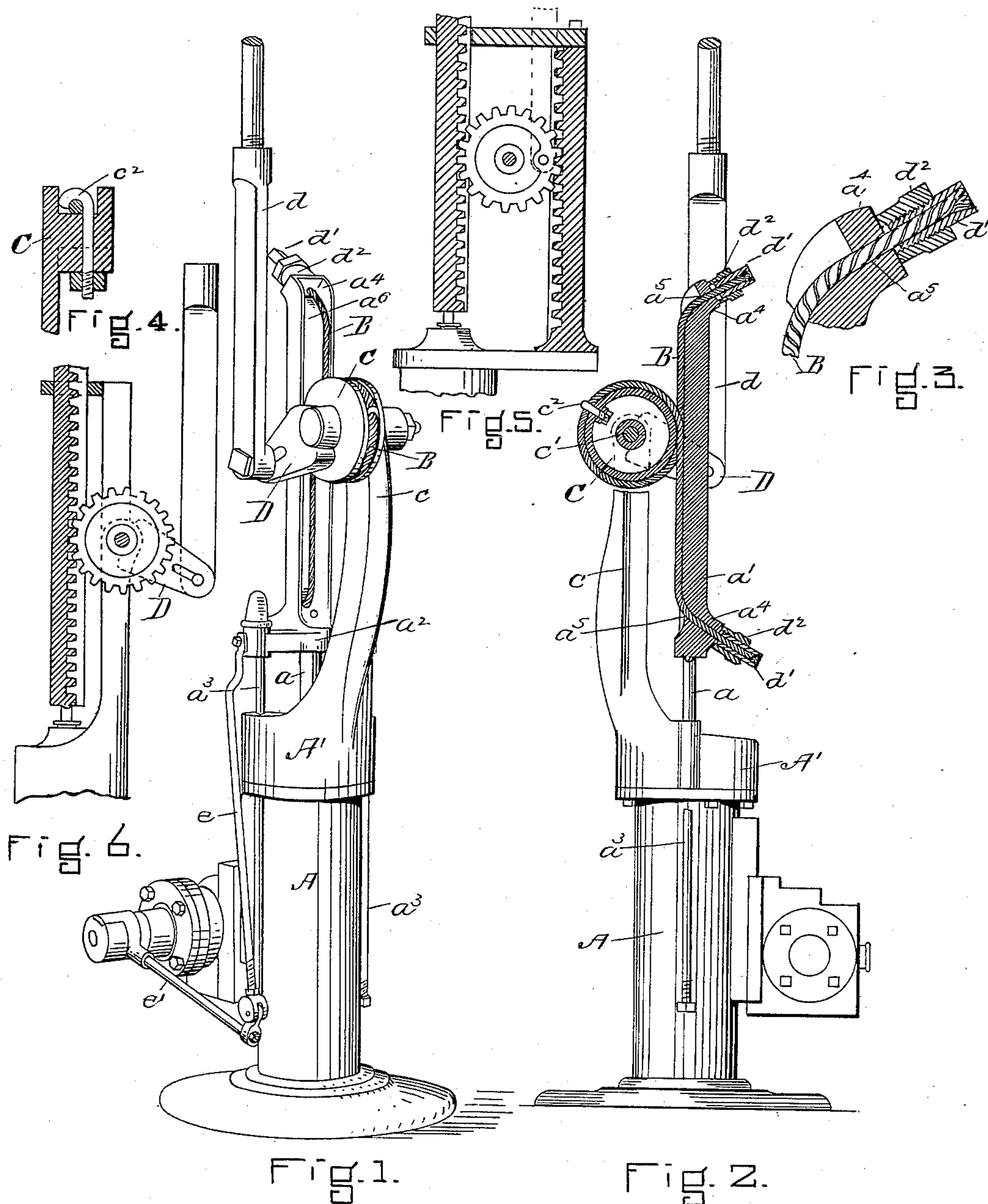
(No Model.)

F. E. WHITNEY.

DEVICE FOR CONNECTING MOTORS TO ORGANS.

No. 387,386.

Patented Aug. 7, 1888.



WTNESSES.

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UNITED STATES PATENT OFFICE.

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DEVICE FOR CONNECTING MOTORS TO ORGANS.

SPECIFICATION forming part of Letters Patent No. 387,386, dated August 7, 1888.

Application filed September 8, 1887. Serial No. 249,069. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. WHITNEY, of Melrose, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Devices for Connecting Motors to Organs, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

It is desirable that the air blown into the pipes of an organ should be forced from the bellows with as little irregularity in volume and speed as possible in order to prevent the pulsation of air in the organ. This is quite easily accomplished when the bellows are operated by hand, because it is easy to modulate or reduce the speed of the bellows-lever at the ends of its stroke; but where the bellows has been operated by a water-motor—the common way of operating such bellows by power heretofore—this result has not been accomplished, and for the reason that the movement given to the bellows by the motor is one that has the same rate of speed throughout, so that upon the reversal of the stroke of the bellows-lever a thump or blow has been given the air forced therefrom, which communicates pulsation or tremor to the air throughout the air-pipe passages in the organ. To overcome this difficulty and to permit a water-motor to be employed I have devised a connection between the piston of the motor and the bellows which communicates the power of the motor to the bellows with a varying degree of movement—that is, the movement of the bellows is reduced at each end of its throw, so that the effect of a hand operation of the bellows is provided, and the air is forced therefrom in a steady continuous flow with no thump or vibration. This result is obtained by introducing between the bellows arm or lever and the piston a crank adapted to be operated by the piston, and so adjusted or placed that the end of its upward movement and of its lower movement coincides with the end of the upward movement of the bellows-lever and of its lower movement. This gives to the bellows-lever a variable speed or movement which is slow at the beginning of its upward or downward movement, or at its start in either direction, and is faster between these points, gradually accel-

erating to the middle of the stroke and gradually slowing from the middle to the end. This crank may be connected with the piston in a number of ways, which I have illustrated. I prefer, however, the one employing a wire-rope connection.

In the drawings, Figure 1 is a view in perspective of a machine containing the features of my invention. Fig. 2 is a view thereof part in elevation and part in vertical section. Figs. 3 and 4 are detail views in section. Figs. 5 and 6 illustrate modified forms of construction, to which reference will hereinafter be made.

A represents the motor. It comprises, generally, a cylinder containing a piston and valves governing the inlet and exhaust of the water. Any form of water-motor may be used.

a is the piston-rod.

a' is a long head or bar, the lower end of which is in the form of a cross-head, *a*², secured to the upper end of the piston-rod. This cross-head has the guide-rods *a*³, which play in holes in the frame *A'*. The bar *a'* has the ends *a*⁴, which project from one side thereof, through which holes *a*⁵ are formed, and the recess *a*⁶ upon the opposite side; and there is secured to the ends of this bar a rope, *B*, preferably of wire, and in a manner to be adjustable as to length. This rope passes once about a drum, *C*, pivoted to a bracket, *c*, at *c'*, and is fastened thereto by a hook or clamp, *c*², one end of which bears upon the rope and the other end of which extends through a hole in the drum and receives a fastening-nut, by which its end *c*² is locked against the rope. (See Fig. 4.) The drum *C* has a crank, *D*, which is connected with the bellows-lever by a link or connecting-rod, *d*. Each end of the rope is secured in a screw-sleeve, *d'*, having a hole tapering outward by untwisting the ends of the wire and bending them back upon themselves in the enlarged portion of the hole to wedge the end of the rope in the hole. This sleeve has a screw-thread, which receives the nut *d*², that bears against the end of the bar, and by turning this nut the sleeve is moved in one direction or the other, according as the nut is rotated.

The head *a*² is provided with a rod, *e*, connecting it with a lever, *e'*, of the valve-operating mechanism.

In operation the upward movement of the

piston and bar causes the drum to be turned and the crank to be moved in an upward direction from a position slightly beyond its lower center to a position slightly past its upper center, and a reverse or downward movement of the piston and bar causes a reverse movement of the crank. Of course the crank communicates no movement to the connecting link or rod when its center is in a vertical line with the center of its operating-drum, and from said point it communicates a gradually-accelerating movement until its center has reached a horizontal line passing through the center of the drum, and from this line the movement is gradually retarded to the end of the stroke.

In Fig. 6 I represent in lieu of the connecting-rope the bar as formed with a rack and the drum as a pinion; but I prefer the rope because there is no jar or backlash.

In Fig. 5 I represent the employment of the bar as a rack in connection with a stationary rack, and with a pinion or gear having a crank and held between two racks. This pinion has a crank; but as it is moved vertically by the movable rack as well as turned the increase and decrease of the movement at the end of the stroke are not so gradual as when the crank only is caused to move.

I would state that I do not confine the invention to the operation of organ-bellows, and would also say that it can be used with any other motor than water-motors.

Having thus fully described my invention, I

claim and desire to secure by Letters Patent of the United States—

1. The combination, in an apparatus for operating organ-bellows, of a motor, a reciprocating head or bar operated by said motor, and a crank connected with said bar and operated thereby to travel from its lowest to its highest position and reverse coincidently with the upward and downward movements of the bar, and a rod or link connecting the crank to the device to be operated, substantially as described.

2. The combination, in devices for connecting motors to organs, of a water-motor, and a reciprocating bar attached to the water-motor to be reciprocated thereby, and having the rope or cord B, with the drum C, a support for the same, and the crank D, connected with said drum, and a link connecting said crank with the device to be operated, substantially as described.

3. The combination, in devices for connecting motors to organs, &c., of a bar, B, having a recess, a^6 , and ends a^4 , provided with holes a^5 , screw-threaded sleeves d' , to which the ends of the rope are secured, and the adjusting-nuts d^2 , the drum C, crank D, and connecting rod or link d , substantially as described.

FRANK E. WHITNEY.

In presence of—

F. F. RAYMOND, 2d,
FRED. B. DOLAN.