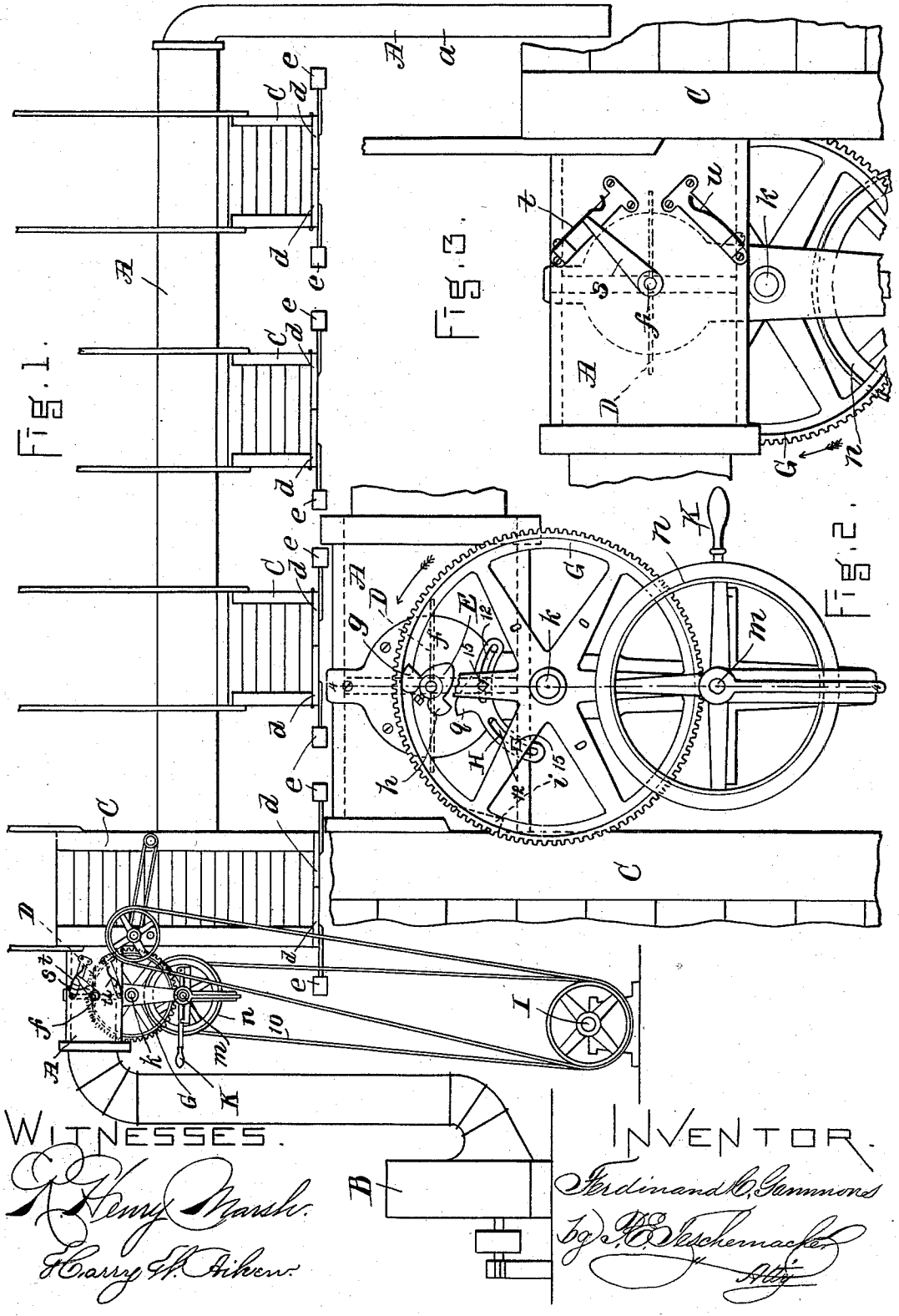
(No Model.) 2 Sheets—Sheet 1.

F. C. GAMMONS.

MECHANISM FOR AUTOMATICALLY OPERATING THE AIR OR CUT-OFF VALVES OF PNEUMATIC SEED COTTON CONVEYERS.

No. 500,804. Patented July 4, 1893.



WITNESSES.

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INVENTOR.

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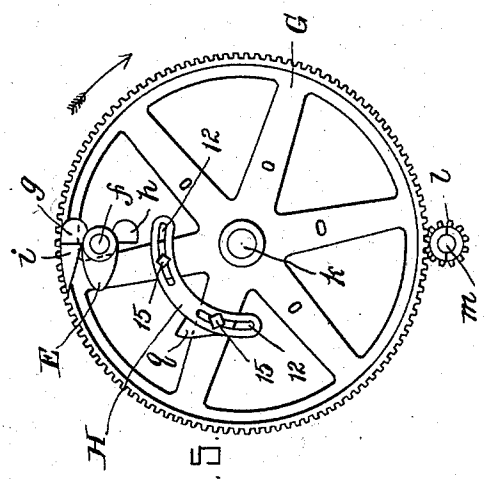

FIG. 5.

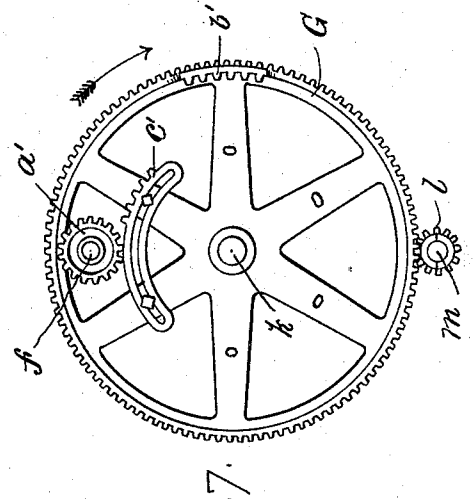

FIG. 7.

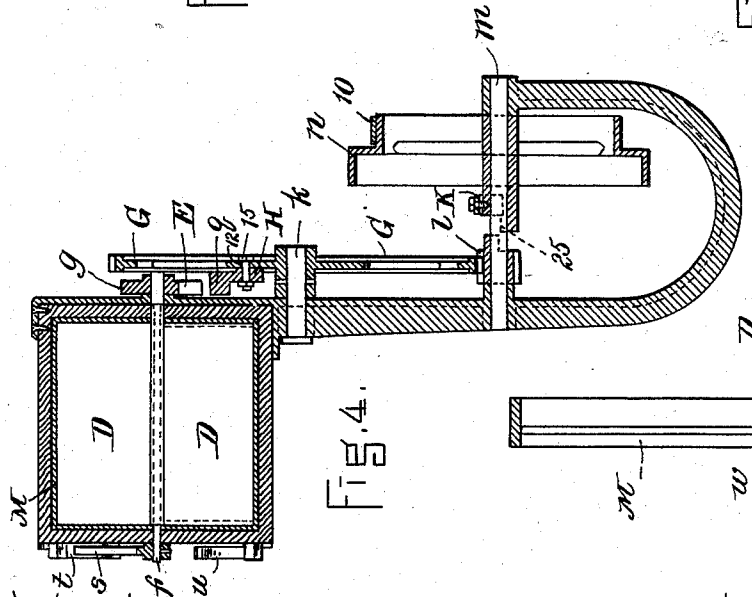

FIG. 4.

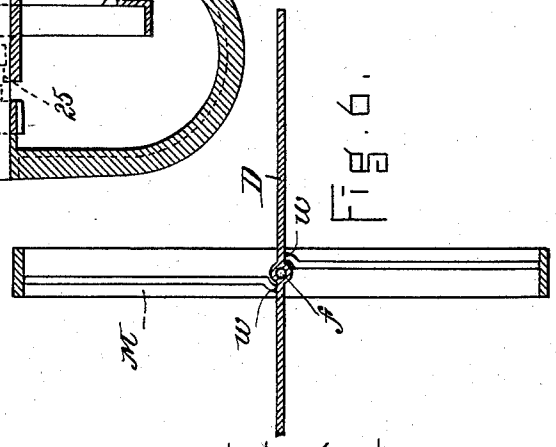

FIG. 6.

WITNESSES

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UNITED STATES PATENT OFFICE.

FERDINAND C. GAMMONS, OF BRIDGEWATER, MASSACHUSETTS, ASSIGNOR TO THE EAGLE COTTON GIN COMPANY, OF SAME PLACE.

MECHANISM FOR AUTOMATICALLY OPERATING THE AIR OR CUT-OFF VALVES OF PNEUMATIC SEED-COTTON CONVEYERS.

SPECIFICATION forming part of Letters Patent No. 500,804, dated July 4, 1893.

Application filed March 18, 1893. Serial No. 466,703. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND C. GAMMONS, a citizen of the United States, residing at Bridgewater, in the county of Plymouth and State of Massachusetts, have invented certain Improvements in Mechanism for Automatically Operating the Air or Cut-Off Valves of Pneumatic Seed-Cotton Conveyers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of a pneumatic seed-cotton conveyer provided with my improved air-valve-operating mechanism. Fig. 2 is an enlarged view of the air-valve-operating mechanism, showing the same on the side of the pneumatic tube opposite to that illustrated in Fig. 1. Fig. 3 is an enlarged view of a portion of the pneumatic conveyer-tube, showing the retaining device for holding the valve open or closed. Fig. 4 is a transverse vertical section on the line 4, 4, of Fig. 2. Fig. 5 is a view of a portion of the air-valve-operating mechanism showing the inner side of the same. Fig. 6 is a detail to be referred to. Fig. 7 represents a modification of the valve-operating mechanism to be referred to.

My invention relates to pneumatic apparatus for conveying seed-cotton from a wagon, store-house, or bin to the cotton-gin feeders or other desired location, and particularly to mechanism for automatically operating the air or cut-off valve which is located in the pneumatic tube between the exhaust-fan or blower and the cotton receiving box next adjacent thereto. These air-valves have hitherto been operated by hand or by mechanism arranged to close the valve at fixed intervals corresponding to the time required to fill the cotton receiving boxes connected with the pneumatic conveyer-tube. The said mechanism consisted essentially of a wheel driven by suitable connections from the motive power and provided with a toothed sector which engaged a gear secured to the shaft or spindle of the air-valve. With this construction the toothed sector passed out of contact with the gear on the valve spindle the instant the valve was closed, thus releasing the valve which was then again immediately opened by the force of the air assisted by a weighted lever secured to one end of the valve spindle. This sudden re-opening of the air-valve the moment after it is closed, is however found to be objectionable for the reason that the air in the conveyer tube is again set in motion before sufficient time has been allowed for the cotton to drop out of the receiving-boxes.

To avoid this difficulty is the object of my invention, which consists in certain novel mechanism for automatically closing and opening the air-valve at the exact times required, and varying the time which elapses between the said closing and re-opening of the air-valve, as hereinafter more particularly set forth.

In the said drawings, A represents the wooden pneumatic tube of a seed-cotton conveyer, one end *a*, of which is adapted to be placed over the wagon, bin, or other place or receptacle from which the cotton is to be drawn by suction and carried forward to the cotton-gin feeders or other desired location, the suction being produced by means of an exhaust-fan or blower B connected with the tube A at a point opposite to that where the cotton is received.

Connected with the tube A is a series of cotton-receiving boxes C placed over a corresponding number of cotton-gin feeders, not shown. Each of the boxes C is provided with a bottom composed of two leaves or portions *d*, *d*, hinged to the edges of the box and counterbalanced by means of weights *e*, arranged to keep the bottom closed when aided by the suction produced by the exhaust-fan B, but when the suction is interrupted or cut off, the weight of the cotton in the boxes will overbalance the weights *e*, and permit the cotton to fall into the feeders beneath, after which the weights *e*, will automatically return the leaves *d* to the position shown in Fig. 1, and close the bottoms of the boxes as required.

Beyond the last receiving box C and between it and the exhaust-fan B, the pneumatic tube A is provided with a cut-off valve D, which is operated as hereinafter described to shut off the suction or draft of air through the said tube A. This valve D consists of a

damper plate which is mounted upon a shaft or spindle *f* passing centrally through it, whereby said valve may be turned into a horizontal position to allow of the passage of the air, or into a vertical position to completely fill said tube and shut off the passage of the air to the exhaust-fan.

To one end of the spindle *f* is secured a collar E provided with two diametrically opposite teeth or projections *g*, *h*, the former (*g*) being adapted to be struck or engaged, to close the valve D, by a fixed tooth or projection *i* at or near the periphery of a gear G mounted on a stud *k* and meshing with a pinion *l* on a shaft *m* which is provided with a pulley *n* driven by a belt 10 from a pulley on the main driving shaft I, as shown in Fig. 1.

H is a curved plate or bar secured to the gear G about half way between the center and the periphery, and made adjustable on said gear in the arc of a circle by means of slots 12 and clamping screws 15; said plate H being provided with a tooth or projection *q* which is arranged to come into contact with the projection *h* of the collar E to open the valve D, the relative arrangement of the teeth or projections *i*, *q*, being such that the valve D, after being closed by the projection *i*, will not be again opened by the projection *q* until sufficient time has elapsed to permit all of the cotton to drop out of the cotton receiving boxes C. The pinion *l* is thrown into or out of engagement with the pulley *n* by means of a clutch 25 shown in Fig. 4, operated by a lever K when it is desired to start or stop the valve-operating mechanism.

By adjusting the plate H on the gear G, the time between the closing and re-opening of the valve may be varied to suit the requirements of the case.

The valve D is preferably operated once in sixty seconds more or less, according to the necessities of the case and the time required to fill the cotton receiving boxes; the speed of the driving shaft being regulated by cone pulleys or other suitable means; and as soon as the boxes C are filled, the valve D is closed, thus completely cutting off the suction, when the hinged bottoms *d* of the boxes C will instantly open downward by reason of the weight of the cotton thereon, which will then be discharged into the feeders beneath, said bottoms being again automatically closed by their counterbalance weights *e*, as soon as the boxes are emptied, when the valve D will be again opened by the contact of the projection *q* with the projection *h*, and the operation will be continued as before.

To the end of the valve spindle *f* opposite to that carrying the collar E, is secured an arm *s*, Figs. 1 and 3, which is adapted to engage with spring catches *t*, *u*, secured to the outside of the tube A, said catches forming friction devices which serve to retain the valve D securely in position when open or closed, but yielding readily to permit the valve to be moved from one position to the other by its actuating mechanism. The valve D is hung within a cast iron frame M closely fitting the interior of the tube A and provided with bearings for the spindle *f*, and stops *w* as shown in Fig. 6 to arrest the movement of the valve when brought into a horizontal position; said frame affording a convenient and reliable means for hanging the valve, and also serving to prevent the wooden tube A from warping and getting out of shape.

In Fig. 7 is represented a modification of my invention which I regard as the full mechanical equivalent of the mechanism above described for opening and closing the valve D. In the said modification the collar E on the valve spindle *f* is replaced by a gear *a'* which is periodically engaged on its upper side by teeth *b'* on the inner periphery of the gear G, which thus turns the spindle *f* in the proper direction to close the valve; said valve being again opened at the proper time by a curved toothed bar *c'* secured to the wheel G between its center and periphery, which bar *c'* engages with the under side of the gear *a'* and serves to turn the spindle *f* in the opposite direction to open the valve. The bar *c'* is made adjustable on the gear G in the arc of a circle in the same manner as the plate H shown in Figs. 2 and 5, in order to vary the time between the closing and re-opening of the valve, and the valve spindle is to be provided with spring catches or friction devices to hold it open or closed as previously described.

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

1. The combination, with a pneumatic conveyer-tube, of an air or cut-off valve placed therein and mounted on a shaft or spindle provided outside of said tube with teeth or projections, a wheel provided with projections or teeth arranged at different distances from its center and adapted to alternately contact with the teeth or projections of the valve spindle to close and re-open the said valve with a suitable interval between said closing and re-opening of the valve, substantially as set forth.

2. The combination, with a pneumatic conveyer tube; of an air or cut-off valve placed therein and mounted on a shaft or spindle provided outside of said tube with teeth or projections; a wheel provided with projections or teeth arranged at different distances from its center and adapted to alternately contact with the teeth or projections of the valve spindle to close and re-open the said valve with a suitable interval between said closing and re-opening of the valve, and a friction or retaining device for securely holding the valve in position when open or closed, substantially as set forth.

3. In a seed-cotton conveyer, the combination, with the pneumatic tube A, of an air or cut-off valve D placed therein and mounted on a shaft or spindle *f* provided outside of said tube with teeth or projections *g*, *h*, the

wheel G provided with a tooth or projection *i* at or near its periphery adapted to engage the projection *g* of the valve spindle to close the valve, and a tooth or projection *q* nearer the center adapted to engage the projection *h* of the valve spindle to re-open said valve, substantially as described.

4. In a seed-cotton conveyer, the combination, with the pneumatic conveyer tube A, of an air or cut-off valve D placed therein and mounted on a shaft or spindle *f* provided outside of said tube with teeth or projections *g*, *h*, the wheel G provided at or near its periphery with a tooth or projection *i* adapted to engage the projection *g* of the valve-spindle to close the valve, and an adjustable plate H secured to the wheel G and provided with a tooth or projection *q* adapted to engage the projection *h* of the valve-spindle to open said valve; said plate H being made adjustable in the arc of a circle, whereby the relative position of the projection *q* with respect to the projection *i* may be changed to vary the time between the closing and re-opening of the valve D, substantially as described.

5. In a seed-cotton conveyer, the combination, with the pneumatic tube A, of the air or cut-off valve D placed therein and mounted on a shaft or spindle *f* provided outside of said tube with teeth or projections *g*, *h*, the wheel G provided with a tooth or projection *i* adapted to engage the projection *g* of the valve-spindle to close the valve, an adjustable plate H secured to the wheel G and provided with a tooth or projection *q* adapted to engage the projection *h* of the valve-spindle to open said valve, and a friction or retaining device for securely holding the valve in position when open or closed, said device consisting of an arm *s* secured to the valve spindle, and spring catches *t*,*u*, all constructed and arranged to operate substantially in the manner and for the purpose set forth.

Witness my hand this 1st day of March, A. D. 1893.

FERDINAND C. GAMMONS.

In presence of—
P. E. TESCHEMACHER,
HARRY W. AIKEN.