

(No Model.)

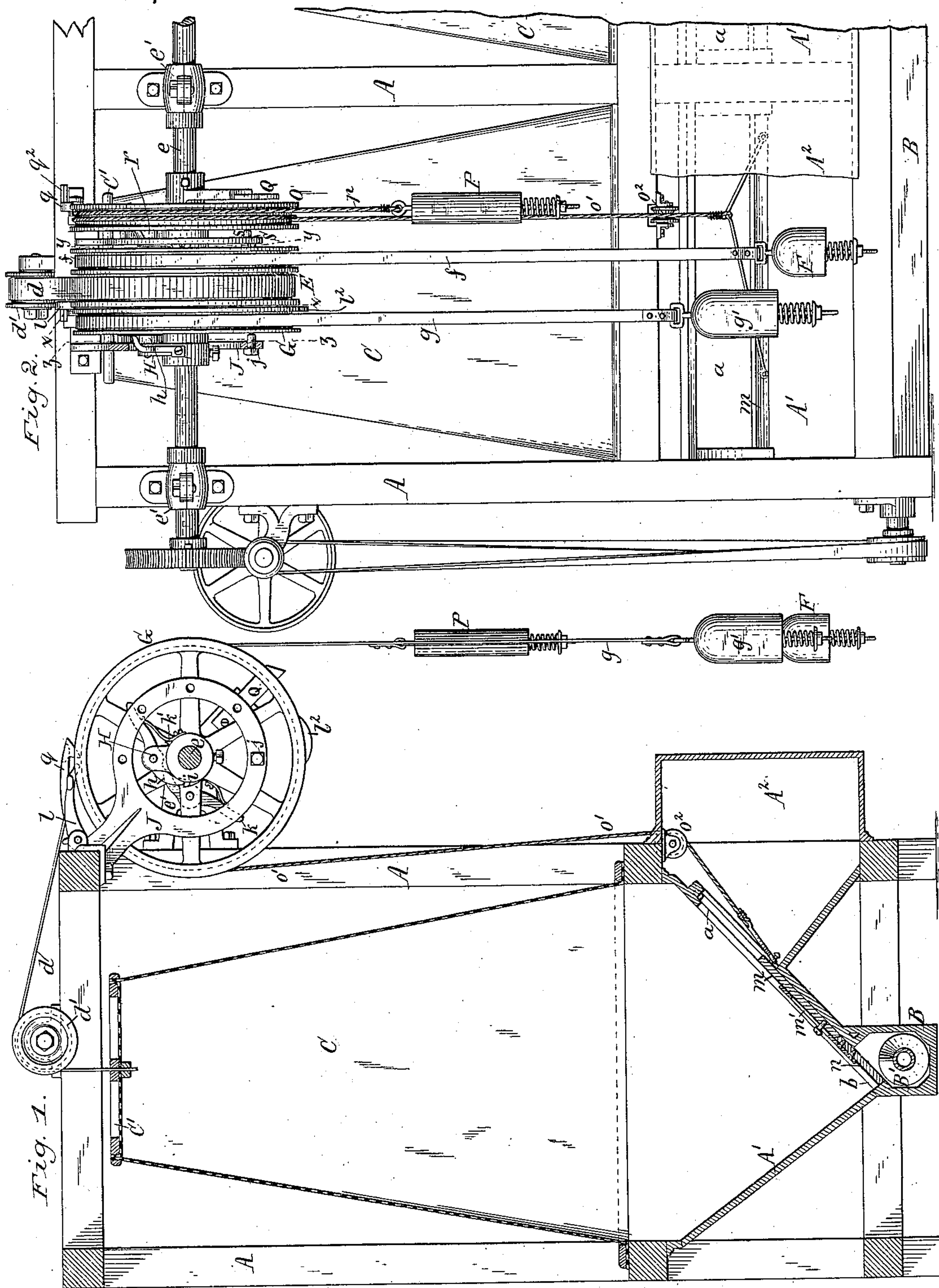
2 Sheets—Sheet 1.

C. H. MORGAN.

DUST COLLECTOR.

No. 333,021.

Patented Dec. 22, 1885.



Chas. J. Buchheit.  
Theodore L. Popp. Witnesses.

Chas. H. Morgan Inventor.  
By Wilhelm Honner  
Attorneys.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

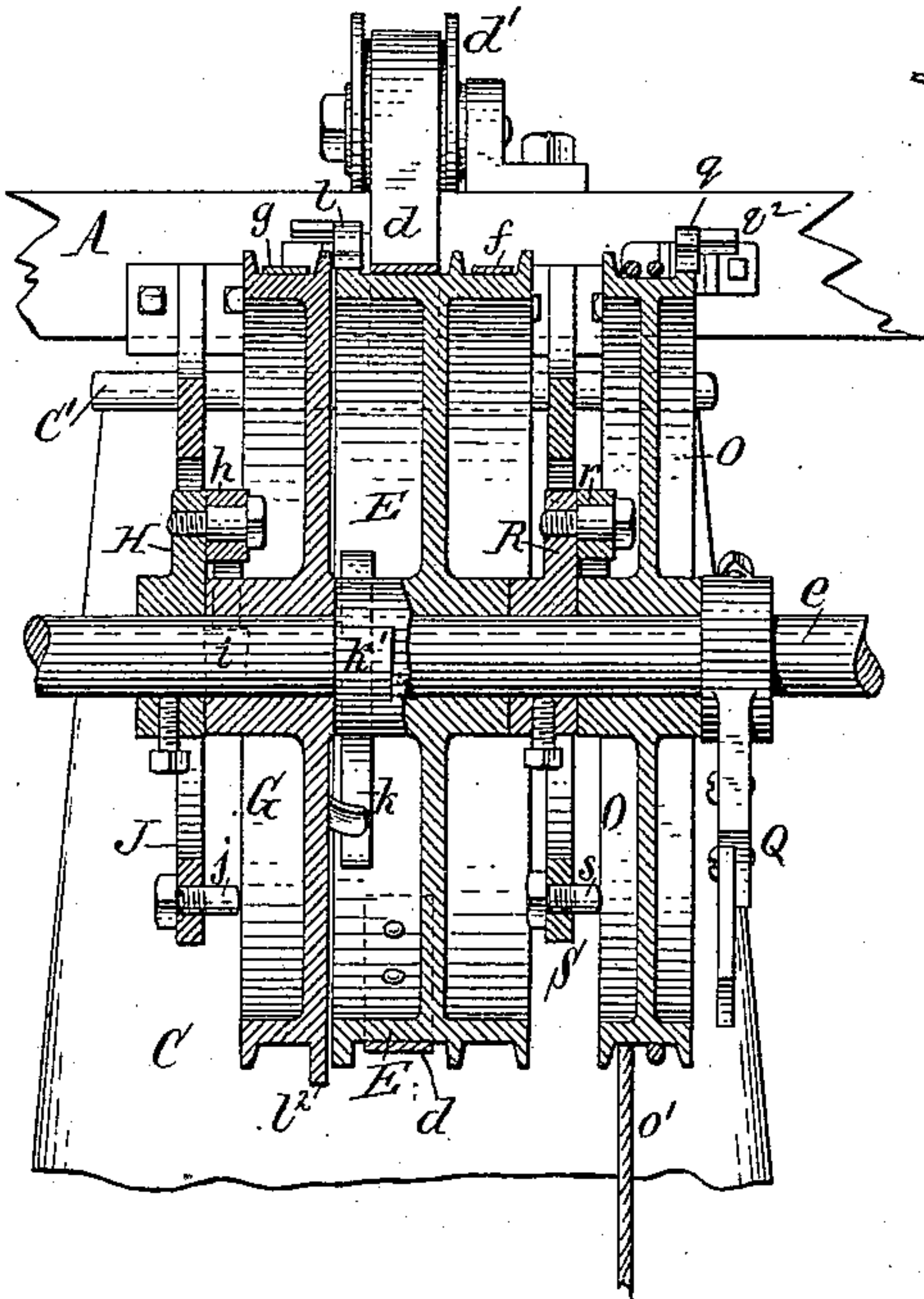


Fig. 4.

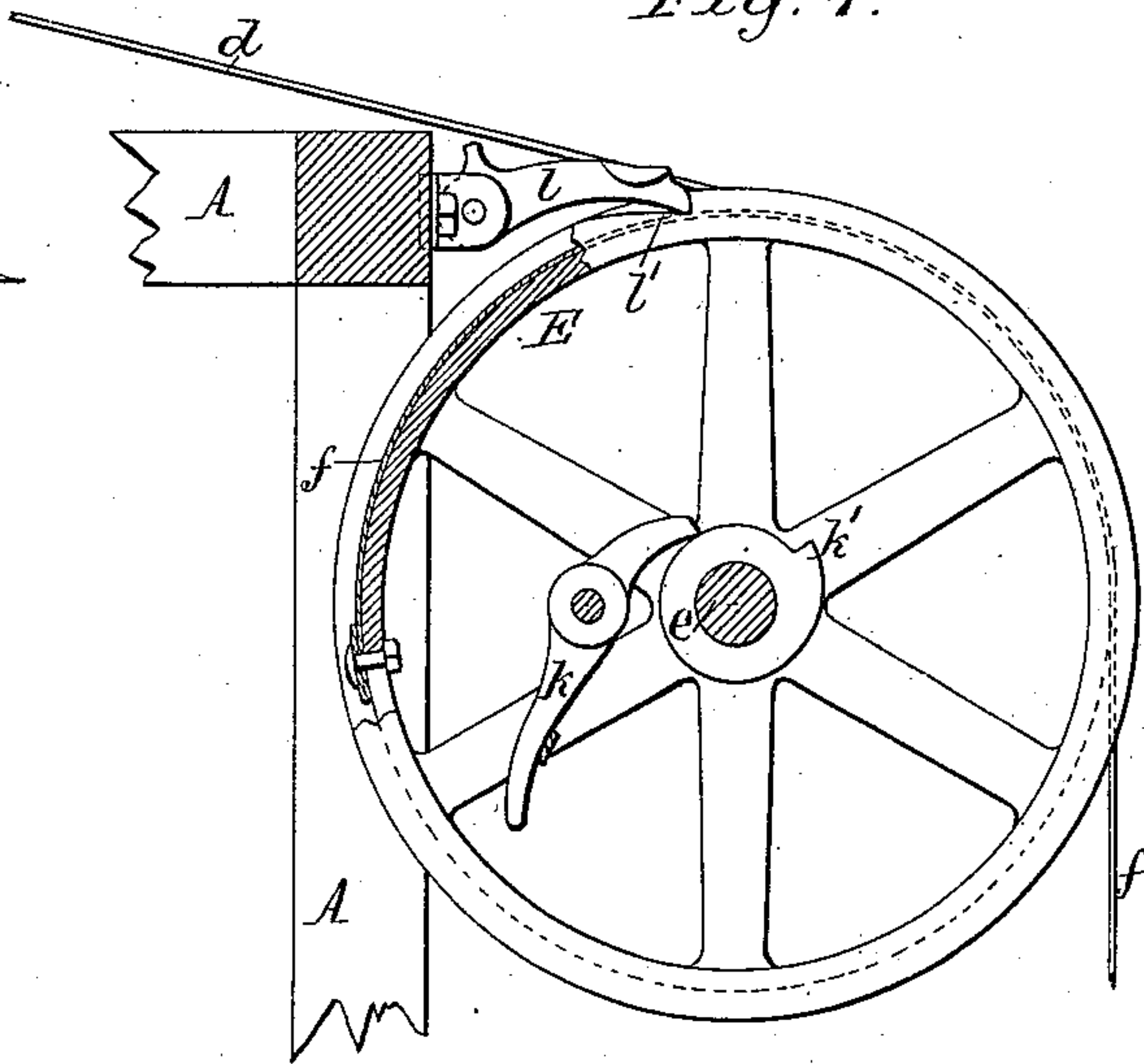


Fig. 5.

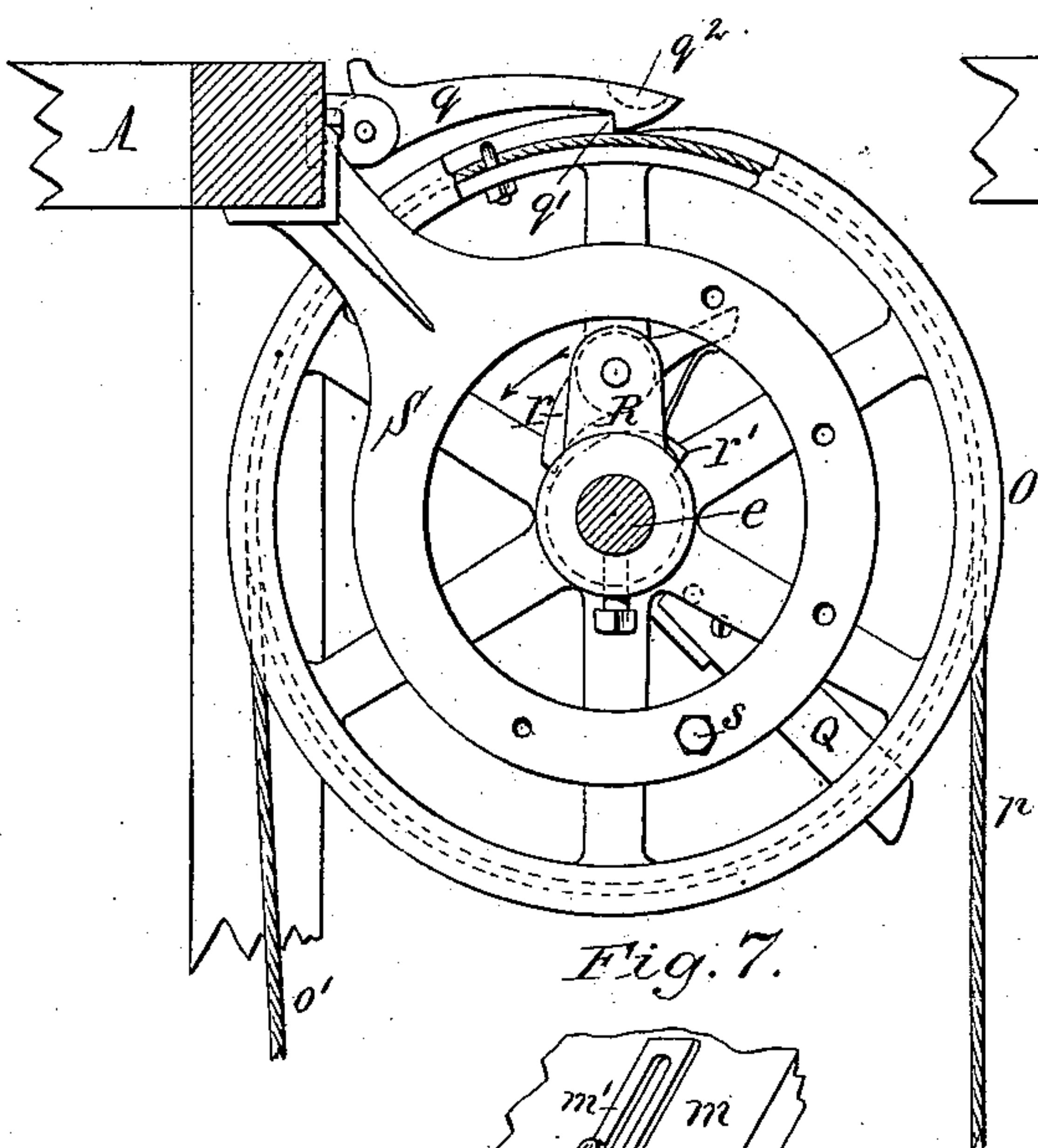


Fig. 6.

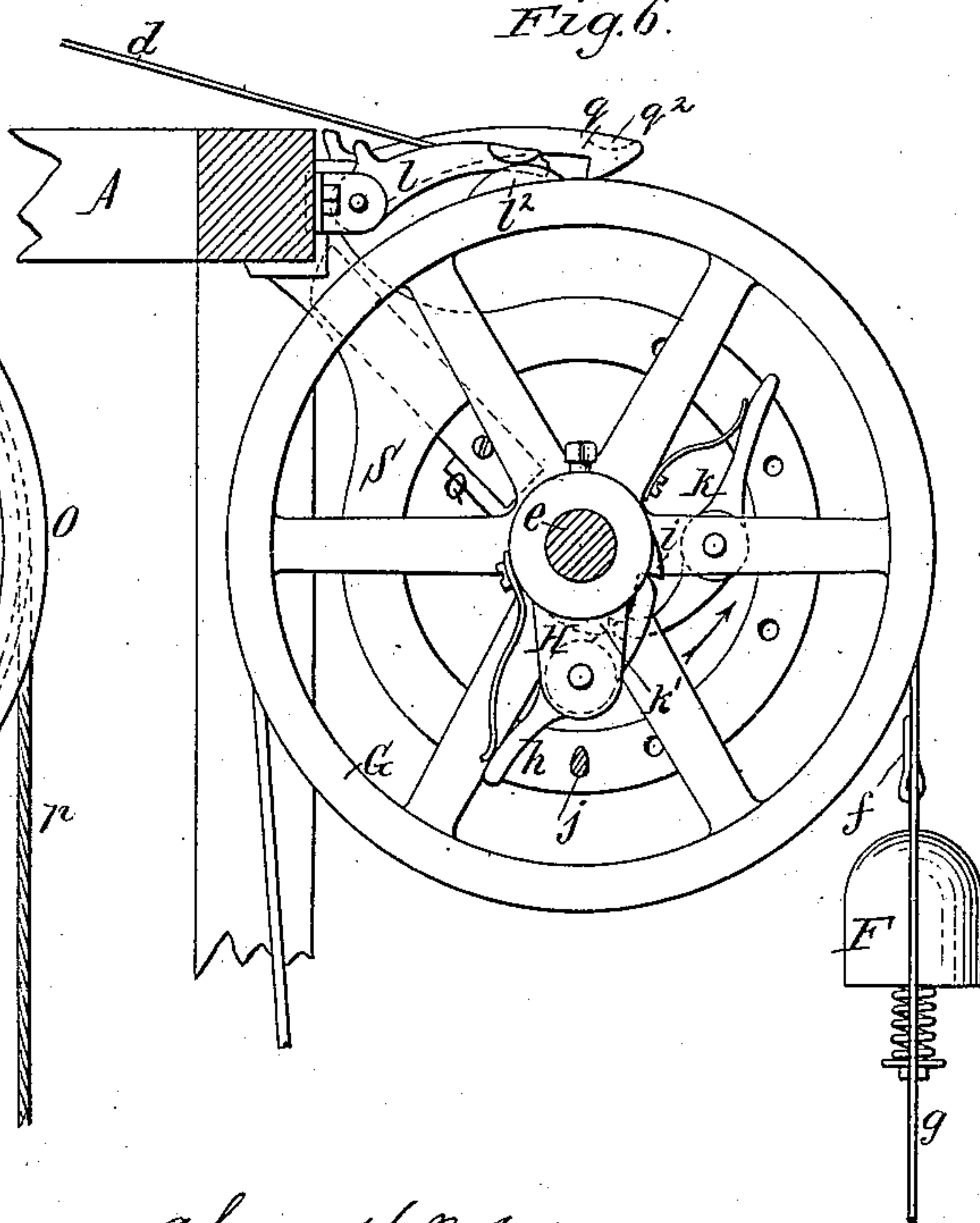
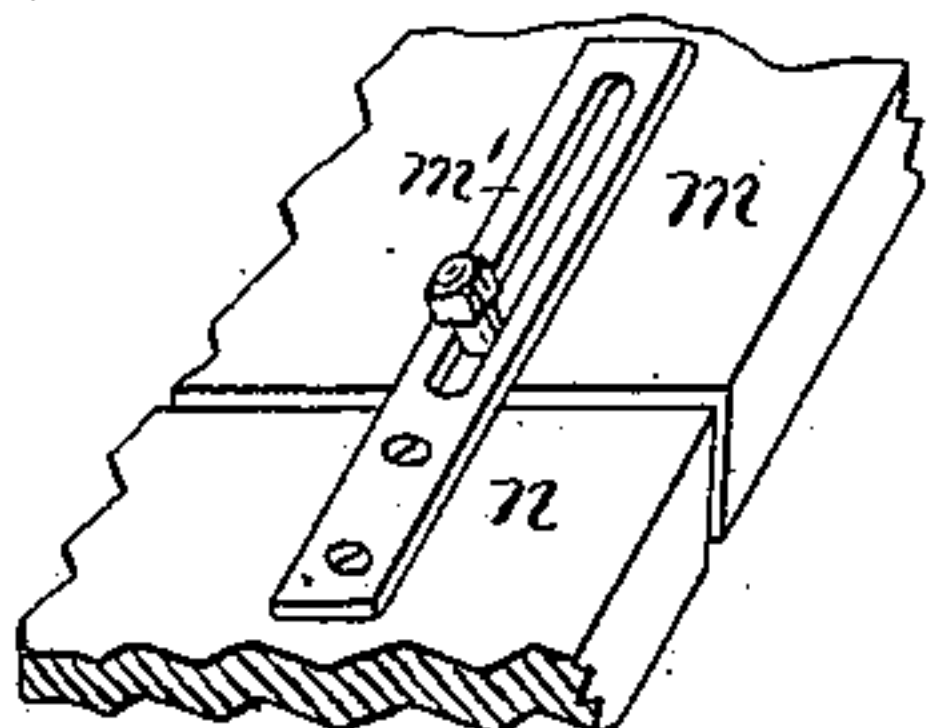


Fig. 7.



Chas. J. Buchheit.  
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Chas. H. Morgan Inventor.  
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# UNITED STATES PATENT OFFICE.

CHARLES H. MORGAN, OF BUFFALO, NEW YORK.

## DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 333,021, dated December 22, 1885.

Application filed September 5, 1885. Serial No. 176,228. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES H. MORGAN, of the city of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Dust-Collectors, of which the following is a specification.

This invention relates to an improvement in that class of machines which are employed in flouring-mills and factories for separating dust from air, and more particularly to an improvement in dust-collectors for which I have filed an application for Letters Patent of the United States on the 21st day of May, 1885, Serial No. 166,285. In this machine the dust is separated from the air by sifting the dust-laden air through filter-bags which are fastened with their lower ends to receptacles, while their movable upper ends are lowered from time to time for detaching the dust which adheres to the inner surface of the filter-bags.

The object of the present invention is to improve the mechanism whereby the free or movable upper end of the filter-bag is raised and lowered and to simplify the mechanism whereby the valves are operated which open and close the air-spout and the conveyer-trough inlet.

My invention consists to these ends of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of two sheets, Figure 1 is a vertical cross-section of one of the filter-bags and connecting parts. Fig. 2 is a fragmentary front elevation of the machine. Fig. 3 is a longitudinal sectional elevation of the pulleys and connecting parts of the mechanism whereby the bag and valves are moved. Fig. 4 is a cross-section in line *xx*, Fig. 2. Fig. 5 is a cross-section in line *yy*, Fig. 2. Fig. 6 is a cross-section in line *zz*, Fig. 2, but showing the parts in the position which they assume when the bag is lowered. Fig. 7 is a perspective view of the connection of the valves.

Like letters of reference refer to like parts in the several figures.

A represents the stationary frame of the machine; A', the hopper-shaped dust-receptacles, arranged in the lower part of the frame A side by side; A<sup>2</sup>, the air-trunk through which the dust-laden-air is conducted to the

machine, and *a* the openings leading from the air-trunk A<sup>2</sup> into the dust-receptacle A'.

B represents the conveyer-trough, arranged lengthwise underneath the dust-receptacles A'; B', the conveyer-screw arranged in the trough B, and *b* the openings leading from the dust-receptacles A' into the trough B.

C represents the filter-bags, secured with their lower ends to the dust-receptacles A' so as to communicate therewith, and having free upper ends, which can be lowered for reversing the bags and dislodging the dust which adheres to the inner sides of the same.

C' represents open frames to which the upper ends of the bags are secured, and which are covered with filter-cloth to increase the separating-area.

*d* represents a band, cord, or chain attached to each frame C', and running over a guide-pulley, *d'*, for raising and lowering the bags.

*e* represents a horizontal driving-shaft arranged lengthwise in the front side of the machine and supported in bearings *e'*, which are secured to the frame A.

E represents a band-pulley mounted loosely on the shaft *e*, and having one end of the band *d* attached to its face, so that by turning the pulley in one or the other direction the band *d* is wound upon the pulley or unwound therefrom, thereby raising or lowering the bag.

*f* represents a band, cord, or chain attached to the face of the pulley E on one side of the band *d*, and running around the pulley in an opposite direction to that of the band *d*.

F is a weight attached to the lower end of the band *f*, and adapted to counterbalance the larger portion of the weight of the bag. When the pulley E is released, the bag descends by gravity, and the weight F is raised and retards the downward movement of the bag. The face of the pulley E is preferably provided with projecting rims, as shown, whereby the bands *d* and *f* are separately guided on the pulley.

G represents a band-pulley mounted loosely on the shaft *e* on one side of the pulley E and adjacent to the band *d*.

*g* is a band secured with one end to the face of the pulley G, and provided at its opposite end with a weight, *g'*, which is sufficiently heavy to raise the bag quickly. The band *g*



runs around the pulley G in the same direction in which the band *f* runs around the pulley E.

H represents an arm or carrier secured to the shaft *e*, to rotate therewith in the direction of the arrow in Fig. 6, and provided with a pivoted pawl, *h*, which engages with a nose, *i*, on the hub of the pulley G in such manner as to cause the pulley to rotate with the shaft *e*, thereby winding the band *g* upon the pulley G and raising the weight *g'*.

J represents a stationary ring or circular frame adjacent to the outer side of the pulley G, and provided with an arm, whereby it is secured to the frame A, concentric with the shaft *e*.

*j* represents a stop secured to the ring J, and adapted to trip the pawl *h* and disengage it from the nose *i* of the pulley G, thereby disconnecting this pulley from the shaft *e*, and permitting the weight *g'* to run down and rotate the pulley in a direction opposite to that in which the shaft *e* rotates.

*k* represents a pawl pivoted to the inner side of the pulley G, and engaging with a nose, *k'*, on the hub of the pulley E in such manner as to cause the pulley E to rotate with the pulley G, when the latter is rotated by the weight *g'*, thereby causing the bag to be elevated by the heavy weight attached to the pulley G, together with the light weight attached to the pulley E, both running down simultaneously on the same side of the pulleys E and G.

*l* represents a detent-pawl pivoted to the frame A, and engaging in a notch, *l'*, in the rim of the pulley E in such manner as to prevent the pulley from being rotated by the weight of the bag.

*l'* is a projection or cam formed on the rim of the pulley G in such a position as to elevate the pawl *l* and disengage it from the pulley E when the bag is required to be lowered.

*m* represents a sliding valve, which opens and closes the aperture *a*, through which the dust-laden air passes from the air-spout A<sup>2</sup> into the dust-receptacle A', and *n* is a similar sliding valve, whereby the aperture *b*, leading to the conveyer-trough, is opened and closed. The valves *m* and *n* move in inclined ways and are made sufficiently heavy to descend by gravity when released. The conveyer-valve *n* is arranged in the ways below the air-spout valve *m*, and is attached to the latter by a slotted connection, *m'*, which permits the valve *n* to close before the valve *m* has fully opened the opening *a* of the air-spout. The closing movement of the valve *m* is very quick, as it is produced by the descent of a weight, P, while its opening movement, which is produced by the rotation of a pulley, O, in raising the weight P, is comparatively slow, in order to prevent a violent reaction on the air-currents in the purifiers with which the dust-collector is connected. On the downward movement of the valves the conveyer-valve *n* descends with the air-spout valve *m*, thereby fully closing the conveyer-aperture *b* first and

before the air-spout opening *a* is fully opened, as the movement of the air-spout valve *m* continues after the valve *n* is closed as far as the slotted connection *m'* permits.

The pulley O, whereby the valves are operated, is connected with the upper valve, *m*, by a cord, *o'*, running over a guide-pulley, *o*<sup>2</sup>. The pulley O is mounted loosely on the shaft *e* on one side of the pulley E, and the cord *o'* is so connected with the pulley O that upon rotating the latter in the direction to wind the band *o'* upon the pulley the valves *m* and *n* are raised. The pulley O is rotated in this direction by the weight P, which is attached to the pulley by a cord, *p*, in such manner that the weight P in running down will unwind the cord *p* from the pulley O and wind the cord *o'* upon the same.

*q* is a detent-pawl pivoted to the frame A and engaging against a recessed shoulder, *q'*, on the pulley O in such manner as to prevent the pulley from being rotated by the weight P.

Q is an arm secured to the shaft *e* on one side of the pulley O, and adapted to lift the pawl *q* out of engagement with the pulley when the weight P is required to run down. The detent *q* is provided on its side with a nose, *q*<sup>2</sup>, which is lifted by the arm Q in rotating with the shaft *e*.

R represents an arm or carrier secured to the shaft *e* on one side of the pulley O and provided with a pivoted pawl, *r*, which engages with a nose, *r'*, formed on the hub of the pulley O, so as to rotate the pulley in the direction in which the weight P is raised.

S is a ring or circular frame arranged on one side of the pulley O concentric with the shaft *e* and provided with an arm, by which it is secured to the frame A.

*s* is a stop secured to the ring S in such a position as to trip the pawl *r* and disengage it from the pulley O when the weight P has been elevated and the detent *q* has engaged with the pulley.

The shaft *e* is rotated slowly by any suitable means, a speed of about one revolution every two minutes being suitable for the devices represented in the drawings.

When the bag has been in its elevated position the predetermined length of time, the arm Q lifts the detent *q* out of engagement with the pulley O, whereby the weight P is permitted to run down and caused to rotate the pulley O, so as to wind up the cord *o'* and close the air-spout valve *m* and open the conveyer-valve *n*. The blast is thus shut off from the bag preparatory to clearing the same, and the opening of the conveyer-trough is opened to receive the accumulated dust. The cam *l'* on the pulley G now lifts the detent-pawl *l*, and disengages the latter from the pulley E, whereby the upper end of the bag C is permitted to descend and the bag is reversed. The small weight F is at the same time raised and retards the downward movement of the upper end of the bag, which movement continues until the nose *k'* of the pulley E strikes



the pawl *k* of the pulley *G*. The pawl *h* of the carrier *H* is now tripped by the stop *j*, and disconnected from the nose *i* of the pulley *G*, thereby disconnecting the latter from the shaft *e* and permitting the pulley to be rotated by the weight *g'*. The pulley *G* turns the pulley *E* by means of the pawl *k* and nose *k'*, and the weight *F* descends at the same time and assists in turning the pulley *E* in such manner as to elevate the upper end of the bag *C* by the band *d*. This movement of the pulley *E* continues until the upper end of the bag *C* has reached its highest position and the bag has been fully distended. While the bag is being distended the outer air flows into the bag and supplies the partial vacuum created in the same, and in so doing assists in dislodging the dust particles which may adhere to the inner side of the bag. The pawl *r* of the carrier *R* next engages with the pulley *O*, and rotates the latter in such direction as to raise the weight *P* and unwind the cord *o'*, thereby permitting the valves *m* and *n* to descend, thus closing the conveyer-valve *n* and opening the air-spout valve *m*, whereby the blast is again admitted to the bag *C*. This movement of the pulley *O* continues until the pawl *r* is tripped by the stop *s*. The bag remains elevated until the predetermined period of time has passed, when the operations of raising the valves, lowering the bag, raising it, and lowering the valves are repeated in the above-described manner.

Several bags are connected with the same blast-spout *A*<sup>2</sup>, side by side, and each is provided with separate mechanism for actuating the valves and the bag, but all are driven by the same shaft *e*, and the actuating mechanism of the several bags is so timed that the air-current is shut off from only one bag at a time.

By duplicating the actuating devices on diametrically-opposite sides of the shaft *e* the bag can be dropped twice and through half the distance for every revolution of the shaft. The band *d* is made of about half the ordinary length in this case.

I claim as my invention—

1. The combination, with the dust-receptacle, of an air-spout leading to the same, a valve whereby the connection between the dust-receptacle and air-spout is automatically opened and closed, a filter-bag having its lower end rigidly secured and its upper end movable, and an automatic lifting mechanism constructed substantially as described and attached directly to the movable end of the filter bag, whereby said end is automatically raised and lowered, substantially as set forth.

2. The combination, with the air-spout and dust-receptacle, of a filter-bag having its lower end rigidly secured and its upper end made movable, a driving-shaft, *e*, provided with a pulley, *E*, having a notch, *l'*, a band, *d*, connecting said pulley with the movable end of the bag, and a detent, *l*, whereby the bag is held in an elevated position, substantially as set forth.

3. The combination, with the air-spout and dust-receptacle, of a filter-bag having its lower end rigidly secured and its upper end made movable, a driving-shaft, *e*, provided with a loose pulley, *E*, a band, *d*, attached directly to the movable end of the bag and connecting the same with the pulley, and a counterbalancing-weight, *F*, connected with the pulley *E*, substantially as set forth.

4. The combination, with the filter-bag having its lower end rigidly secured and its upper end made movable, of a driving-shaft, *e*, provided with a loose pulley, *E*, a band, *d*, connecting said pulley with the movable end of the bag, and a pulley, *G*, provided with a weight, *g'*, and which causes the pulley *E* to be rotated and the bag to be raised by the descent of the weight, substantially as set forth.

5. The combination, with the filter-bag having its lower end rigidly secured and its upper end made movable, of a driving shaft, *e*, provided with a loose pulley, *E*, a band, *d*, connecting said pulley with the movable end of the bag, a pulley, *G*, provided with a weight, *g'*, whereby the pulley *E* is rotated and the bag is raised, a carrier, *H*, secured to the shaft *e* and engaging with the pulley *G* for raising the weight *g'*, and suitable connecting devices whereby the pulley *E* is driven from the pulley *G*, substantially as set forth.

6. The combination, with the filter-bag and driving-shaft *e*, of the loose pulley *E*, having a notch, *l'*, and connected with the bag by a band, *d*, a detent, *l*, whereby the bag is supported, a pulley, *G*, provided with a weight, *g'*, and having a cam, *l*<sup>2</sup>, whereby the detent is disengaged for releasing the bag, substantially as set forth.

7. The combination, with the filter-bag and the driving-shaft *e*, of the loose pulley *E*, connected with the bag by a band, *d*, a loose pulley, *G*, provided with a weight, *g'*, and with a pawl, *k*, engaging with the pulley *E*, a carrier, *H*, secured to the shaft *e*, and provided with a pawl, *h*, engaging with the pulley *G*, and a stop, *j*, whereby the pawl *h* is disengaged from the pulley *G*, substantially as set forth.

8. The combination, with the filter-bag, dust-receptacle, air-spout, and conveyer, of the air-spout valve *m* and conveyer-valve *n*, attached together by a sliding connection, substantially as set forth.

9. The combination, with the filter-bag and air-spout valve, of the driving-shaft *e*, a loose pulley, *O*, provided with a weight, *P*, a carrier, *R*, secured to the shaft *e*, and provided with a pawl, *r*, engaging with the pulley *O*, and a stop, *s*, whereby the pawl *r* is disengaged from the pulley, substantially as set forth.

10. The combination, with the filter-bag and air-spout valve, of the driving-shaft *e*, a loose pulley, *O*, provided with a weight, *P*, a de-

tent, *q*, and an arm, *Q*, secured to the shaft, whereby the detent is released, substantially as set forth.

- 5 11. The combination, with the filter-bag, air-spout, and dust-receptacle provided with a discharge-opening, of an air-inlet valve and a dust-discharge valve capable of independent movement with reference to each other, whereby the dust-discharge valve is closed before

the air-inlet valve is opened, substantially as is set forth.

Witness my hand this 1st day of September, 1885.

CHARLES H. MORGAN.

Witnesses:

JNO. J. BONNER,  
OSCAR SCHAULE.