

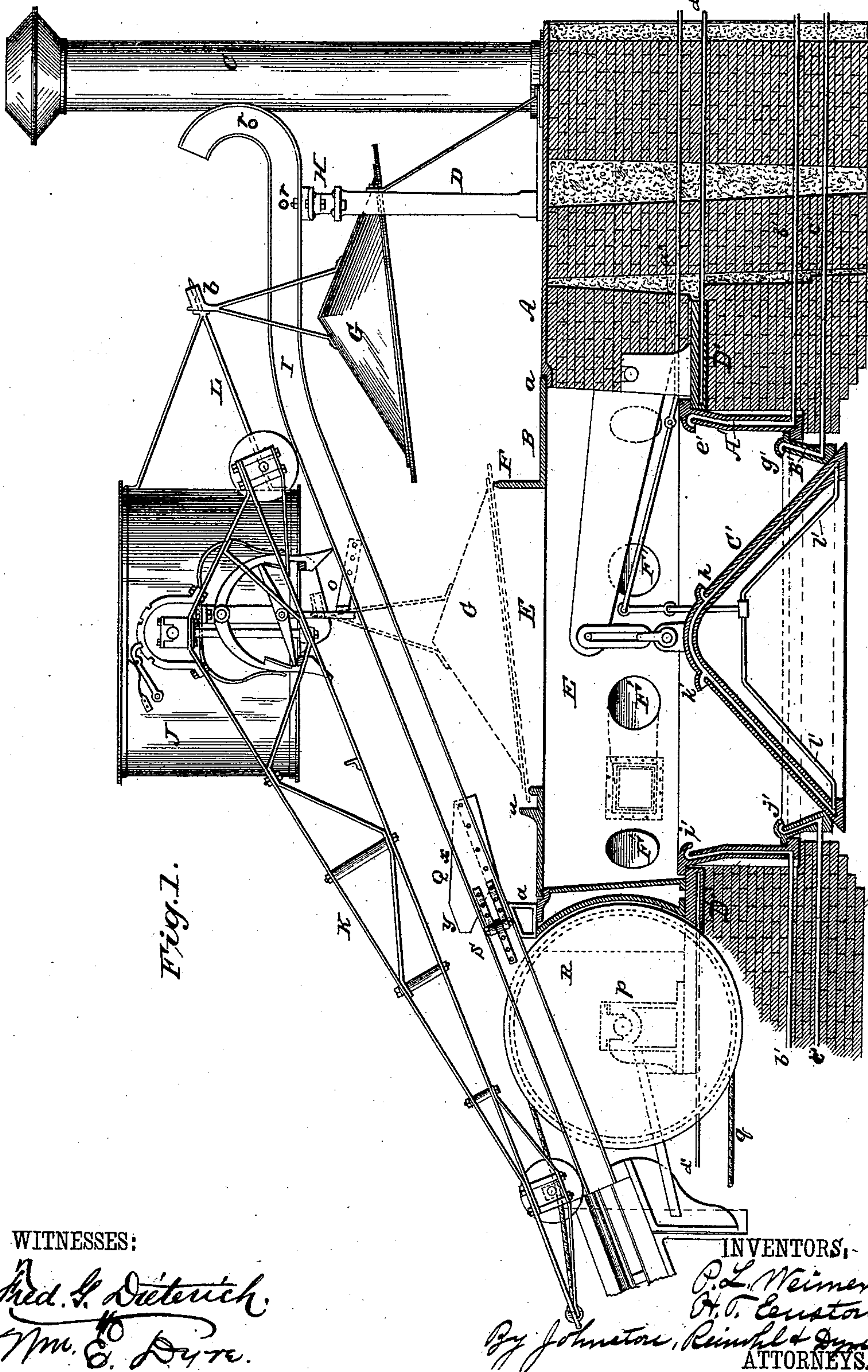
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4 Sheets—Sheet 1.

P. L. WEIMER & H. T. EUSTON.
MEANS FOR FILLING FURNACES.

No. 326,181.

Patented Sept. 15, 1885.



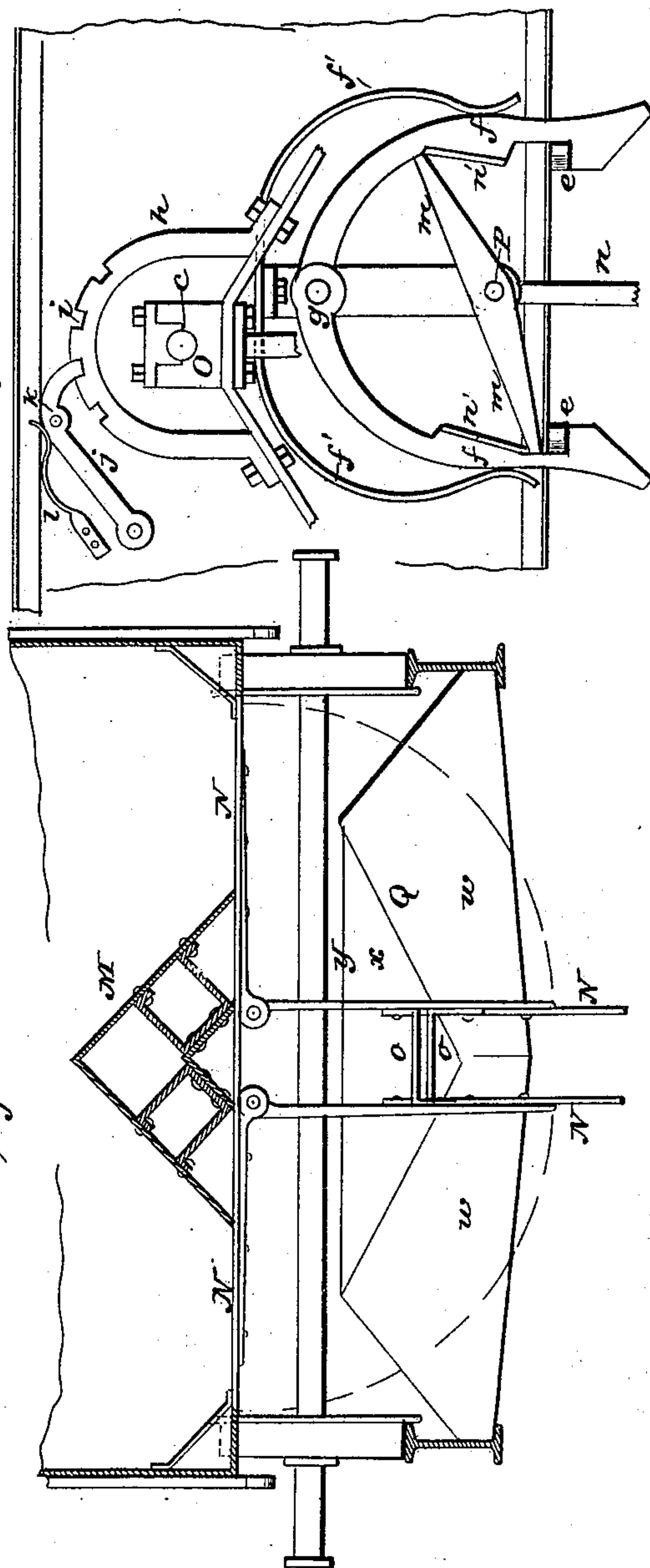
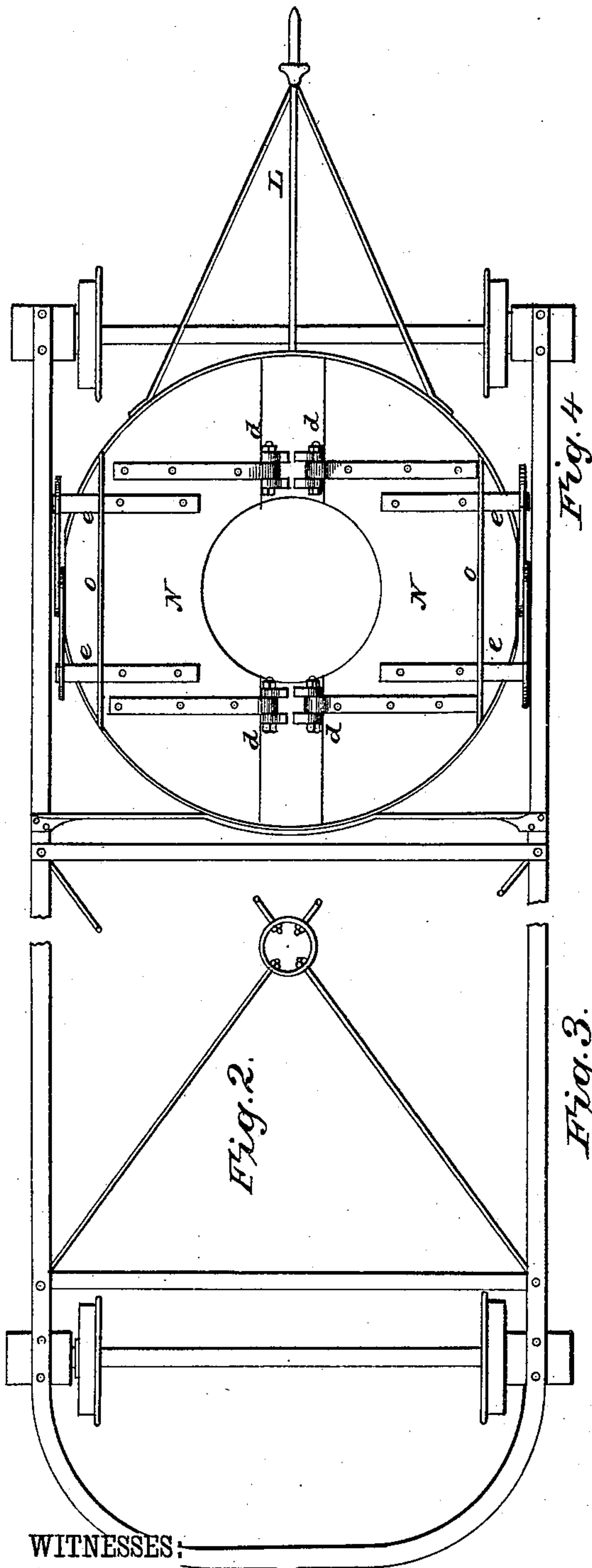
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WITNESSES:
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Wm. E. Dyer

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ATTORNEYS.

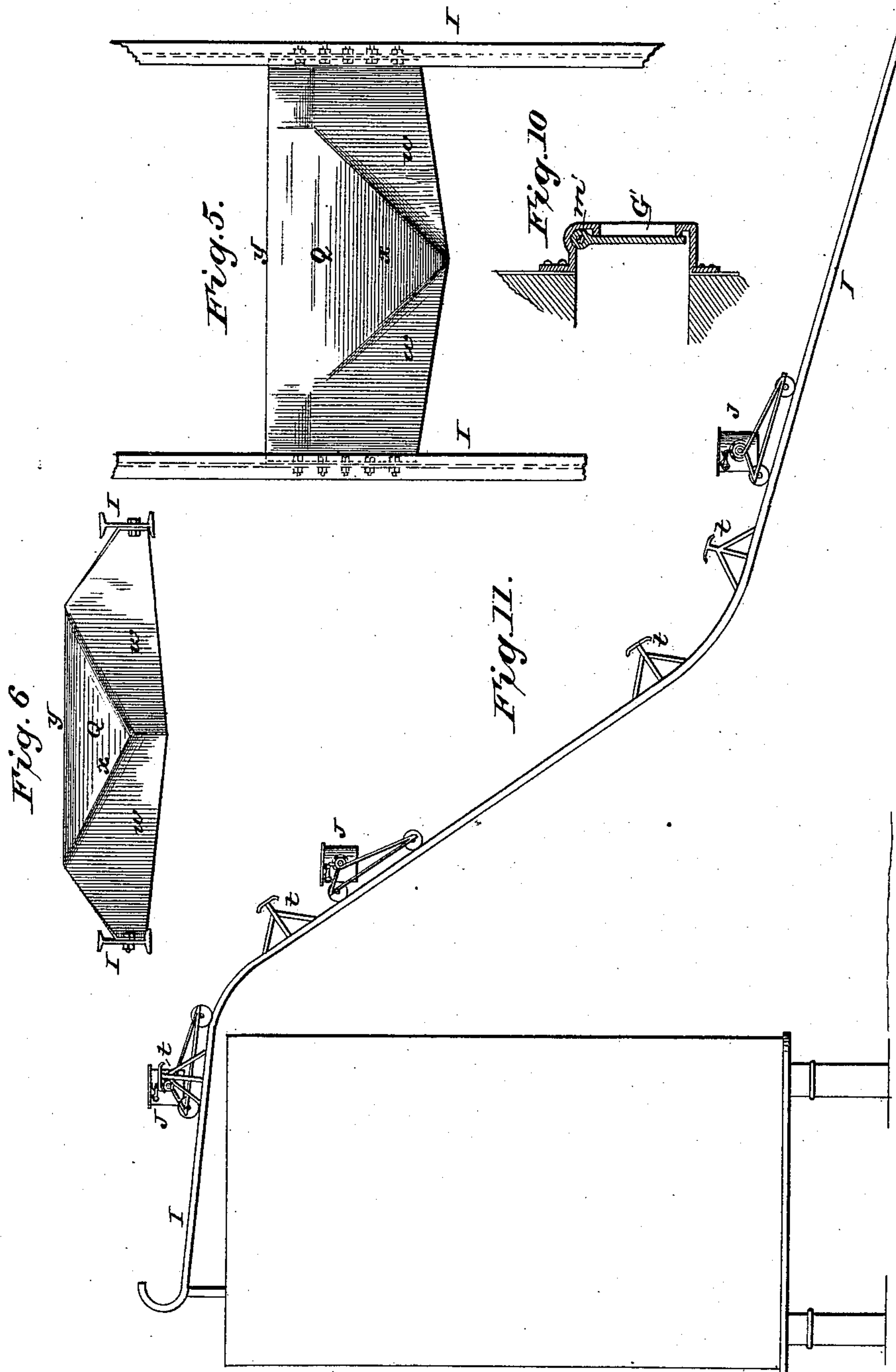
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Fig. 8.

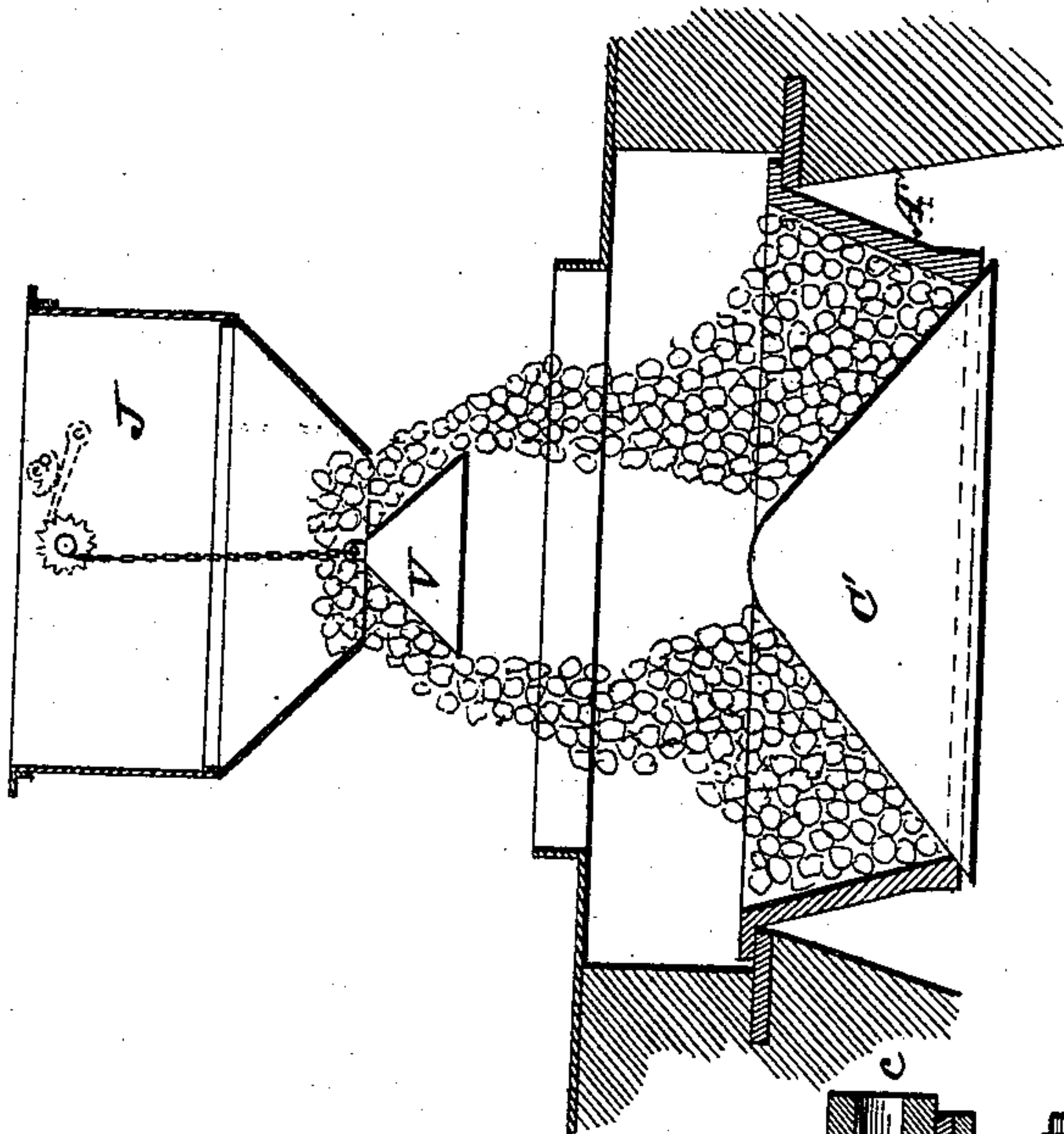
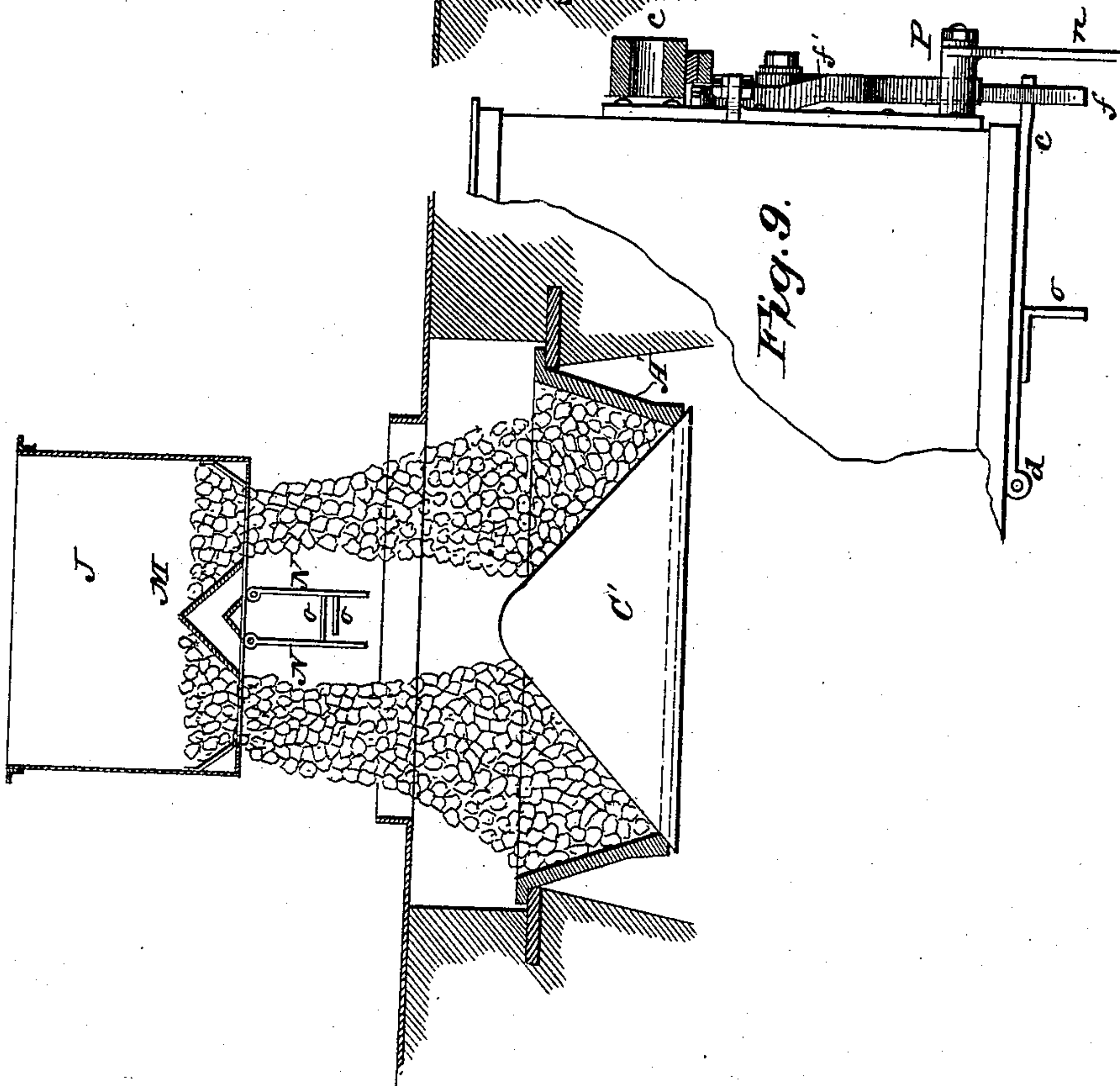


Fig. 7.



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UNITED STATES PATENT OFFICE.

PETER L. WEIMER AND HENRY T. EUSTON, OF LEBANON, PENNSYLVANIA.

MEANS FOR FILLING FURNACES.

SPECIFICATION forming part of Letters Patent No. 326,181, dated September 15, 1885.

Application filed June 8, 1885. (No model.)

To all whom it may concern:

Be it known that we, PETER L. WEIMER and HENRY T. EUSTON, citizens of the United States, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Means for Filling Furnaces; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the working of blast-furnaces under the present system, whereby the yield of the furnace is greatly increased above that which has heretofore been produced, a corresponding increase in the quantity of the material constituting the stock from which the iron is made is necessarily required.

The object of our invention is to provide means for conveying stock to the tunnel-head of a furnace and distributing it evenly around the charging-bell in the hopper. With this object in view, our invention consists in the construction of a filling-car, as will be hereinafter described, and specifically pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 represents a vertical section of the upper end of a furnace-stack, and a side elevation of a track, car, and its attachments above the stack. Fig. 2 is a bottom view of the car-truck and filling car or tub. Fig. 3 is a sectional view of a portion of the car, the track, and the shoe for closing the hinged doors in the bottom of the car. Fig. 4 is a side view of the filling-car. Fig. 5 is a top view of the shoe for closing the doors. Fig. 6 is an end view of the same. Fig. 7 is a sectional view of the filling-car and the hopper. Fig. 8 is a similar view of a modified construction of the tub. Fig. 9 is a broken section of an end view of the car. Fig. 10 is a sectional view of the automatic air-valve. Fig. 11 is a side elevation of a furnace-stack and an irregular inclined track.

Reference being had to the drawings, and to the letters of reference marked thereon, A represents a platform, which supports the top plate, B, in an annular rabbet, *a*, the stack C, and the columns D, as shown in Fig. 1. The top plate, B, is provided with an opening, E, surrounded by a vertical flange, F, inclined

on the upper end, and provided with knife-edges, forming a bearing surface for the cover G. Upon the columns D rests a horizontal beam, H, which supports the outer ends of the rails I of the inclined track. To the upper side of the cover G is attached a strut having formed in the end thereof an eye or socket, *b*.

J represents a filling car or tub, mounted upon a truck provided with a rearwardly-projecting frame, K, of sufficient length to admit of the car being moved over the tunnel-head without exposing the cable to the injurious effects of the heat of the furnace. The tub is suspended upon trunnions *c*, arranged above the vertical center of the car, as clearly shown in Figs. 1 and 4, for the purpose hereinafter described.

From the forward end of the car projects a prow, L, the end of which is adapted to enter the eye or socket *b*, formed on the end of the strut attached to the cover G.

The tub is provided with a cone, M, in the center of its bottom, which, with the walls of the tub, forms an annular discharge-opening, as shown in Fig. 7, the purpose of which is to distribute the stock or charge evenly in the hopper around the bell. The doors N of the car are provided with hinges *d*, and with arms *e* projecting laterally on both sides of the car, adapted to be engaged by latches *f*, which are pivoted at *g* to the side of the car.

Upon the frame of the truck which supports the car are secured pillow-blocks O, which support the trunnions *c*, upon which the filling-car is pivoted. Arched racks *h*, provided with notches *i*, are also secured to the frame of the truck upon both sides of the car. A pawl, *j*, provided with a projecting pin, *k*, and a retaining-spring, *l*, is adapted to engage with the notches in the arched rack and hold the car in its desired position.

A pivoted T-shaped bar or lever, P, the lateral arms *m* of which engage with the latches *f*, and the vertical arm *n* with a projection, *o*, secured to the rails I of the track, disengages the latches from the bars *e* projecting from the doors of the car when the latter has reached its position to deposit its contents into the hopper of the furnace.

Between the rails of the track is secured a shoe-piece, Q, having double inclined walls *w* and *x*, and a flat surface, *y*, as shown in Figs.

5 and 6. Upon the under side of the car-doors are secured projecting pieces *o*, which ride upon the shoe-piece *Q* when the car crosses it in descending the inclined plane.

5 A sheave or pulley, *R*, over which the cable *g* passes, is supported upon pillow-blocks *p*, resting on the seat-ring, as shown in dotted lines in Fig. 1.

10 The car may be elevated by the usual means employed for such purposes—such as the ordinary hoisting-engine.

The rails *I* are secured together at their outer ends by bolts (not shown) passed through the holes *r* in the web of the rails. To provide for the removal of any of the parts of the hopper or its adjuncts, the rails *I* are supplied with hinges (only one being shown in the drawings) which permits of their being separated laterally when desired.

20 When it is desirable to use an inclined plane of varying angles—such, for example, as is shown in Fig. 11—projections *t* are secured to each side of the frame-work. The upper surface or horizontal bar of said projections has its ends bent, as shown, and is adapted to strike the pawls on the sides of the car or tub as it passes, disengage it from the rack, and permit the tub to swing into position to bring the top of the tub on a horizontal line, thus preventing the spilling of any of the contents of the tub as it passes over the changing angles of the inclined plane.

The operation of our invention is substantially as follows: The car or tub having been filled with coal, ore, &c., in the stock-house, is drawn up the inclined plane, and as it passes over the tunnel-head the prow *L* on the front end of the car engages with the socket *b* in the strut on the cover *G*, lifts it from its seat, and carries it to the position shown in full lines in Fig. 1. When the car has reached a point directly over the opening *E*, the vertical arm *n* of the T-bar *P* strikes the projection *o*, which moves the lateral arm *m* of the bar against the inclined surfaces *n' n'* of the latches *f*, and disengages them from the bars *e*, which permits the doors *N* to swing open, when the contents of the car or tub are discharged through the annular opening in the bottom of the car and distributed evenly in the hopper around the charging-bell. By the use of the long rearward extension of the car frame or truck, the car is projected beyond the sheave and the cable prevented from coming in contact with the hot gases escaping from the tunnel-head when the cover has been removed. The car having deposited its contents in the hopper, it is started down the inclined plane with its doors swinging in their open position. The cover *G* is replaced automatically upon its bearing over the opening *E*, and to prevent its momentum from carrying it beyond its proper seat, a stop, *u*, is provided on the plate *B*. When the car reaches the shoe-piece *Q*, bolted between the rails of the track, the pointed end of the shoe enters between

the doors, separates and partly closes them, the car still moving down the plane. The projections *o* on the bottom of the doors are brought in contact with the inclined surfaces *w w* and *x* of the shoe-piece, and when they reach the horizontal or flat portion of the shoe they press the doors into their closed position, at which point in the operation the latches *f* engage with the bars *e* on the doors and are held by the bow spring *f'*, when the car will be in condition for refilling upon reaching the stock-house.

The advantages of swinging the car or tub upon trunnions secured to it above the vertical center of the car will be apparent from the fact that the major portion of the load will be below the trunnions and cause the car to swing into position, bringing the upper or open end of the car on a horizontal line, which is of importance to prevent the spilling of its contents.

In Fig. 7 we have illustrated our car or tub with swinging doors above and discharging its contents into a hopper of ordinary construction, and in Fig. 8 we have shown a modification of the car or tub in which the bottom is formed by a conical valve, *V*, adapted to be lowered to discharge the contents of the car. It will be observed that either construction provides for an even distribution of the stock around the bell in the hopper.

To provide against the destructive effects of the heat of the furnace upon the hopper and its appurtenances, we have constructed them hollow, as shown in Fig. 1.

The hopper *A'*, lip-ring *B'*, the charging-bell *C'*, and the seat-ring *D'* are provided with air-chambers formed in the castings, and are supplied with air through pipes *a'* leading to the bell *b' b'*, to the hopper *c' c'*, to the lip-ring, *d' d'* and to the seat-ring. The air passing through the chambers of said parts is discharged through openings *e' g' h'*, which are protected from the falling stock by hoods *i' j' k'*, and passes over the inner surface of the castings. The pipe *a*, which supplies air to the bell, is provided with suitable joints, such as are common to steam and gas pipe fittings, to accommodate the raising and lowering movements of the bell. To protect said pipe from injury from the stock being dumped into the hopper, it is conducted along beneath the beam to which the bell is attached, and passing down through the bell it is connected to the chamber therein by the branches *l' l'*. The air-supply may be induced by the natural draft of the chimney *C*, or it may be supplied from a suitable pump under pressure.

Instead of conducting air through the hollow casting the discharge-openings may be omitted and water supplied through one of the pipes and conducted outside of the furnace through the other pipe.

Above the hopper *A'* we construct a ventilating-chamber, *E*, which is supplied with a series of air-flues, *F'*, passing through the ma-

sonry, are provided with inwardly-opening valves, G', as shown in Fig. 10, the valves being swung from the top on hinge-joints m'. By this means we secure a copious supply of atmospheric air to the hopper induced by the draft of the chimney C, which communicates with the ventilating-chamber, the air circulating over the surfaces of the castings and maintaining them at a reduced degree of temperature.

In another application, filed August 3, Serial No. 173,387, which constitutes a division of this application, as required by the office, we have claimed the several devices herein shown and described for cooling the hopper and the parts immediately related thereto.

Having thus fully described our invention, we claim—

1. A stock or filling car for furnaces provided with a projecting prow, in combination with a removable sealing-cover of a furnace, substantially as described.

2. A stock or filling car for furnaces, provided with a forward-projecting prow and a rearward extension of the frame of the truck, in combination with a track extending across the tunnel-head, a sheath, and a cable, substantially as and for the purpose set forth.

3. The combination of a furnace-stack, provided with a sealing-cover, and a filling-car having a projecting prow adapted to seat and unseat the cover, substantially as described.

4. The combination of a furnace-stack, a sheave or pulley arranged on one side of the stack, and a filling-car provided with a rearwardly-projecting frame of sufficient length to permit the car to be moved over the furnace without exposing the cable to the heat thereof, substantially as described.

5. A stock or filling car for furnaces, provided with a cone and swinging doors in its bottom, in combination with a shoe-piece secured between the rails of the track and adapted to close the doors, substantially as described.

6. A shoe-piece provided with double incline sides and a flat surface, substantially as shown, secured between the rails of the track, in combination with a car provided with swinging doors in its bottom, as and for the purpose described.

7. A stock or filling car for furnaces, provided with swinging doors in its bottom, means, substantially as shown, for opening the doors automatically, in combination with a shoe-piece provided with double inclined surfaces, and a flat surface adapted to close the doors of the car when passing over it.

8. A stock or filling car for furnaces, suspended upon trunnions secured thereto above the vertical center of the car and provided with a notched rack, a pawl, and a retaining-spring, in combination with a furnace-stack and a track crossing the same, substantially as described.

9. A stock or filling car for furnaces suspended upon trunnions secured thereto above the vertical center of the car, a notched rack, a pawl and retaining-spring, in combination with projections secured to the roadway or track and adapted to release the pawl and permit the car to swing, substantially as and for the purpose set forth.

10. The combination of the filling-car, provided with a projecting prow and having an annular opening in the bottom, a furnace having a sealed charging-chamber or hopper, a removable cover, and a charging-bell, substantially as described.

11. A stock or filling car for furnaces, provided with swinging doors in its bottom, spring-actuated latches secured to the sides of the car for supporting and retaining the doors, a T-lever pivoted between the latches in combination with a stop secured to the track, and a furnace stack, substantially as described.

12. The combination of a furnace-stack, a track crossing the same above the tunnel-head and provided with hinged rails and a horizontal support for said rails whereby they are adapted to be moved laterally, substantially as and for the purpose set forth.

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

PETER L. WEIMER.
HENRY T. EUSTON.

Witnesses:

J. WEIDMAN MURRAY,
TOBIAS REINVEHL.

Correction in Letters Patent No. 326,181

It is hereby certified that Letters Patent No. 326,181, granted September 15, 1885, upon the application of Peter L. Weimer and Henry T. Euston, of Lebanon, Pennsylvania, for an improvement in "Means for filling Furnaces," an error appears in the printed specification requiring the following correction: In line 28, page 3, the word "sheath" should be stricken out and the word *sheave* inserted instead; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 22d day of September, A. D. 1885.

[SEAL.]

H. L. MULDROW,
Acting Secretary of the Interior.

Countersigned:

M. V. MONTGOMERY,
Commissioner of Patents.