T. F. ROWLAND.

GAS-RETORT CHARGER.

No. 192,289. Patented June 19, 1877.

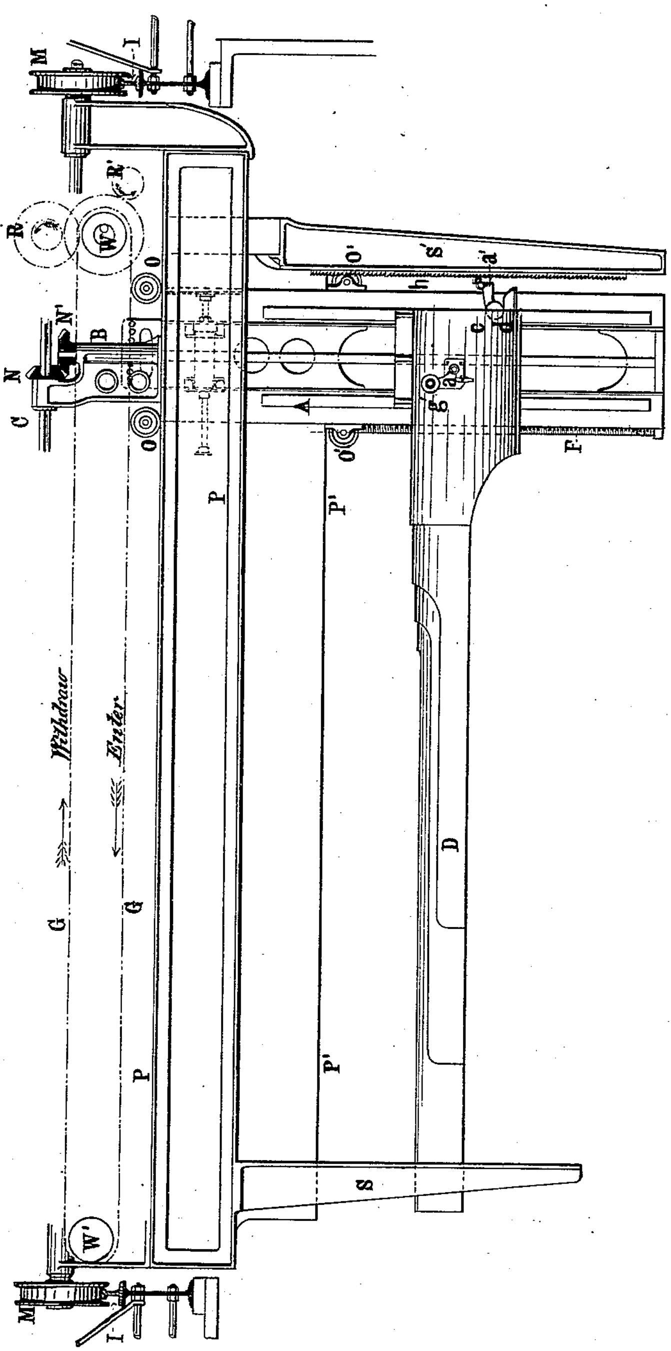

Fig. 1.

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4 Sheets—Sheet 2.

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Fig. 5.

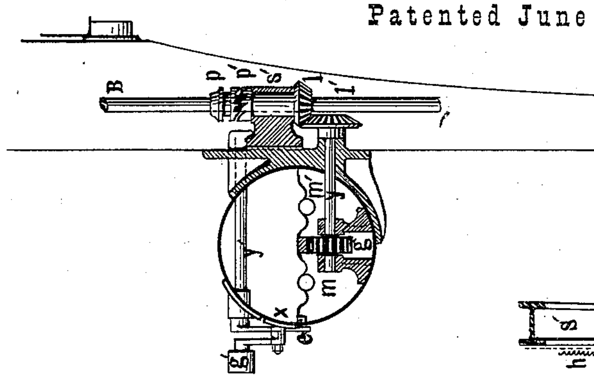


Fig. 2.

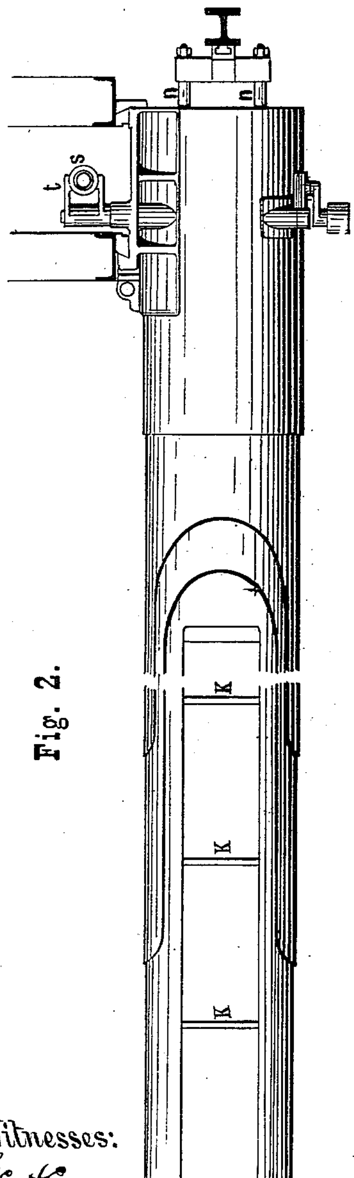


Fig. 3.

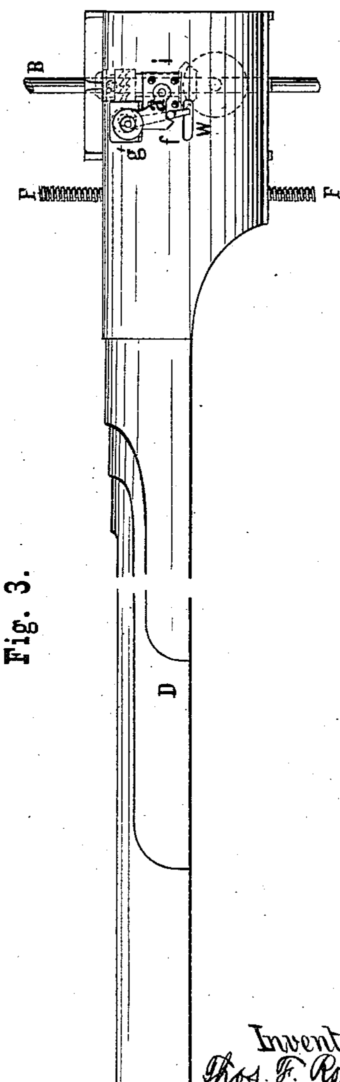
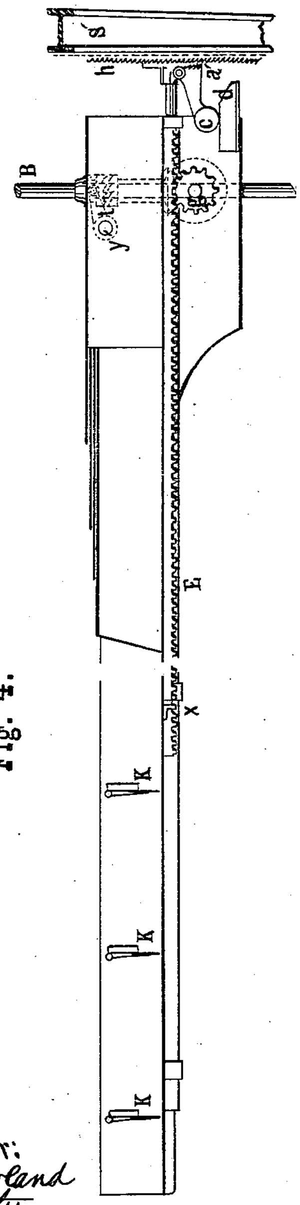


Fig. 4.



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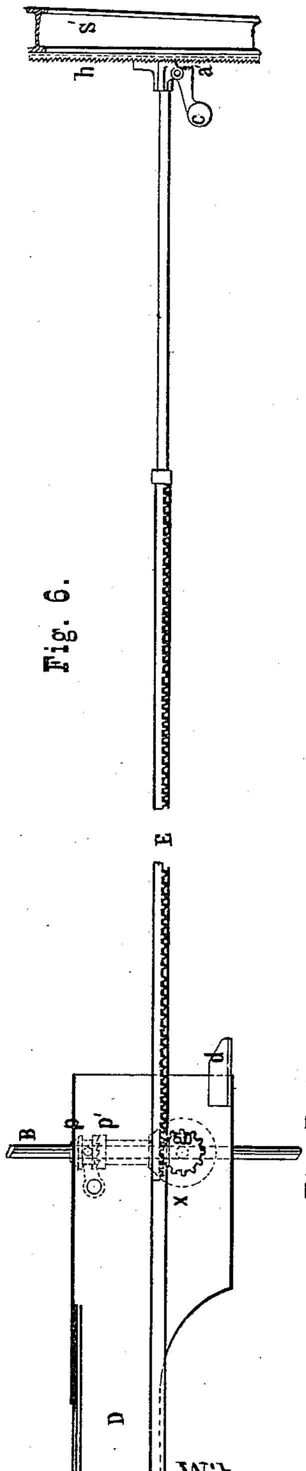

Fig. 6.

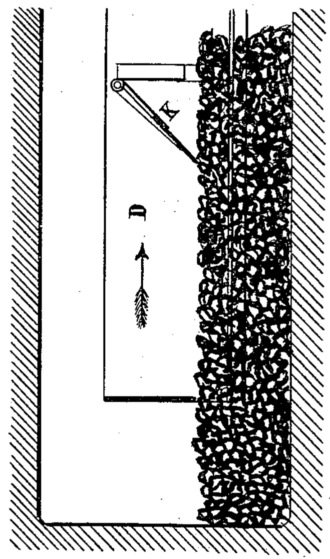

Fig. 8.

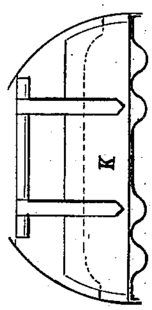

Fig. 9.

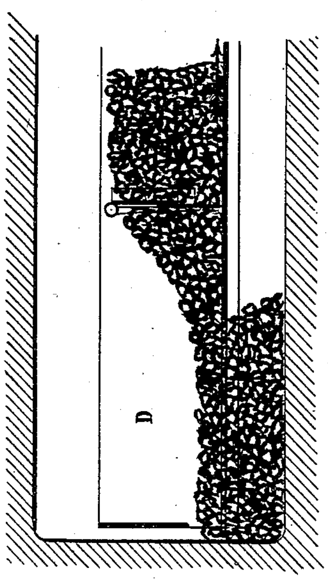

Fig. 7.

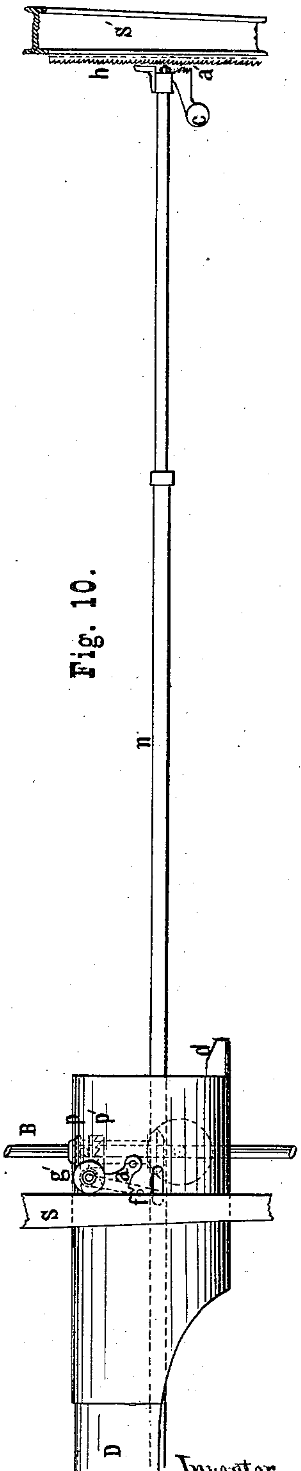

Fig. 10.

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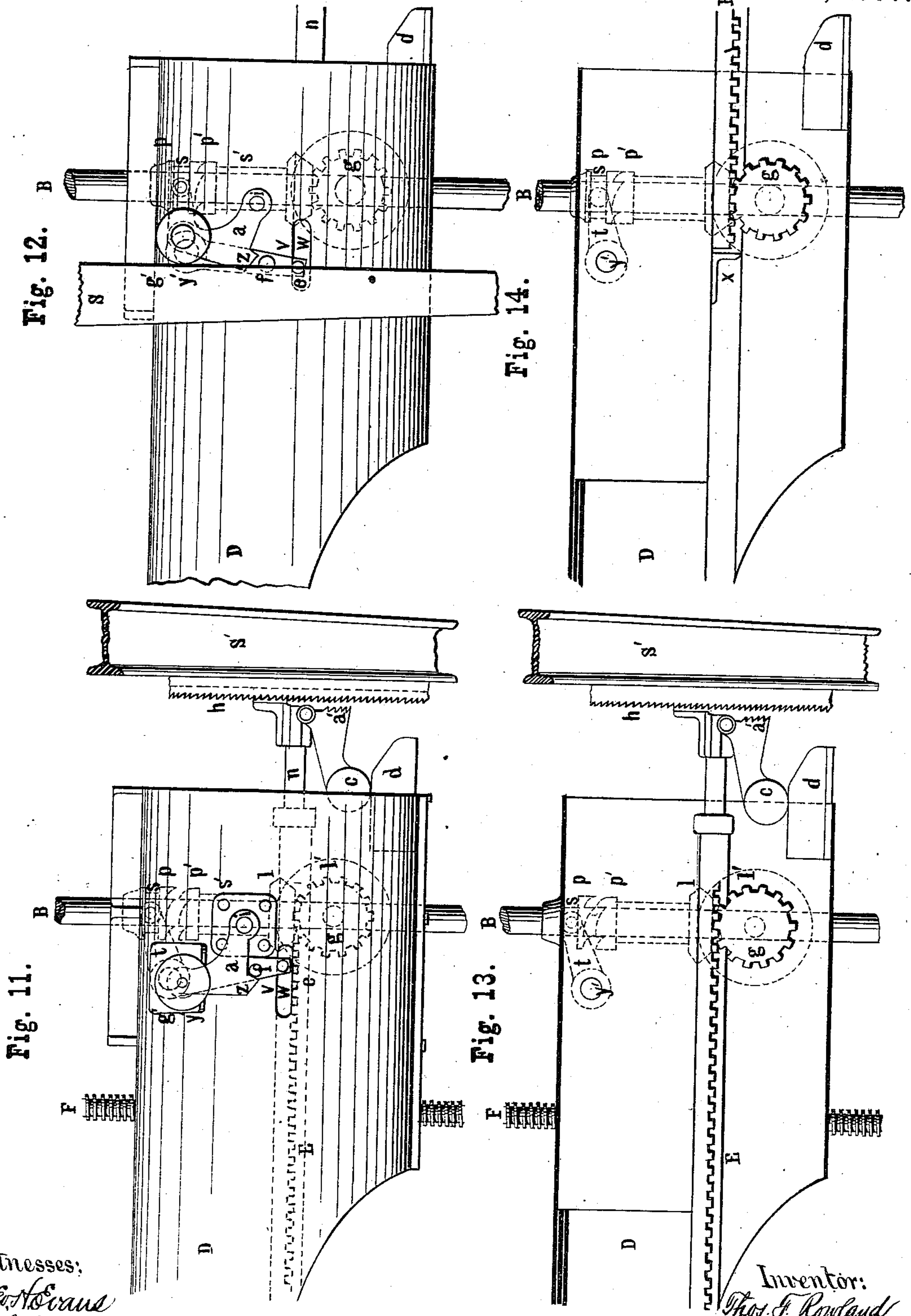

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UNITED STATES PATENT OFFICE.

THOMAS F. ROWLAND, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN GAS-RETORT CHARGERS.

Specification forming part of Letters Patent No. **192,289**, dated June 19, 1877; application filed January 29, 1877.

To all whom it may concern:

Be it known that I, THOMAS F. ROWLAND, of the city of Brooklyn, county of Kings and State of New York, have invented a new and useful Improvement in Gas-Retort Chargers, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to improvement in apparatus for charging gas-retorts.

I have invented certain other apparatus for accomplishing this same object, and patented the same in the United States Patent Office on September 24, 1872.

My present machine is an improved form of that apparatus.

In my former machine I used three chargers or scoops, acting simultaneously so as to charge at the same time three retorts. This I have found to be inexpedient for several reasons. That machine was necessarily cumbrous and expensive, and involved the necessity of a great cooling of the bench of retorts by the simultaneous opening of three doors.

In the present apparatus, therefore, I employ but one scoop, which is adjustable to the different height of the retorts.

This invention also has an improved automatic method of withdrawing the bottom of the scoop, and an improved method of moving the same into and out of the retorts.

I will now describe my drawings.

Figure 1 represents a general view of my apparatus. Fig. 2 represents a top view or plan of my scoop; Fig. 3, a side view of the same; Fig. 4, a longitudinal cross-section of the same, showing the bottom-withdrawing apparatus; Fig. 5, a lateral cross-section through the shaft *y* and pinion *g*. Fig. 6 shows the bottom withdrawn and the apparatus for guiding the same in its withdrawn position. Figs. 7 and 8 represent two views of the scoop and of the swinging plates K. Fig. 9 shows a view of one of the swinging plates. Fig. 10 shows a detailed view of part of the automatic withdrawing apparatus, and the bottom-supporting mechanism. Figs. 11, 12, 13, and 14 represent detailed views, on a larger scale, of the automatic apparatus for withdrawing the bottom.

Similar letters of reference indicate similar parts in all the drawings.

The retort-charging machine or scoop, which I call D, is carried on a traveling frame, A. This frame has two motions, one parallel to the face of the retorts on the wheels M M′ and rails I I, and the other at right angles to this and into the retorts. This frame is carried forward and backward on the tracks P P P′ P′, on the wheels O O O′ O′. The lower wheels, O′ O′, serve to keep the scoop constantly horizontal and prevent the tipping or upsetting of the traveler A.

Motion is communicated to this traveling frame by means of a chain or rope, G G, which is carried by two pulleys, W W′. Power is communicated to this rope by means of a sheave or pulley, W. The revolution of this wheel W in either direction is determined by its contact either with R or R′, which are two wheels revolving in contrary directions, as will be seen by the arrows. These wheels revolve the pulley W by means of a V-friction, and either wheel can be at will made to engage with the pulley W. The chain G is firmly connected to the traveling frame A, and its motion either in the direction of "withdraw" or "enter," as is indicated by the arrows, will cause the scoop D to retire from or enter the gas-retort. The scoop D slides in vertical guides in the frame A, and is supported and its elevation is regulated and determined by means of a screw, F, shown clearly in Figs. 3, 11, and 13, which may be revolved by any suitable means. This scoop D has a movable bottom, E, having a rack upon its lower surface, into which the rack-wheel *g* engages, as shown in Figs. 4, 5, and 6. The revolution of the rack wheel or pinion *g* in the direction of the hands of a watch will withdraw the sliding bottom, which travels in guides in the sides of the scoop. This bottom may be corrugated for extra strength, Fig. 5. The scoop is also provided with a number of swinging plates, K K, one of which is shown in Figs. 7 and 8; the bottom of these plates being shaped to correspond with the longitudinal grooves in the bottom E.

It is evident that this bottom must have something to support it in its withdrawn position. This supporting mechanism consists of two rods, usually made tubular, marked *n* and *n'*. The removable bottom E has attached to it two pipes or tubular guides, *m* and *m'*, Fig. 5, corresponding with these guide-rods *n*, into which these guide-rods enter. When, therefore, the sliding bottom E is withdrawn it slides upon the guides *n* and *n'*, and is supported by them, as is shown in Fig. 6. Now, it is evident that this guide *n* must be adjustable in height, since the scoop D is adjustable. The vertical adjustment of D is, of course, only accomplished by the revolution of screw F when it is in its retired position and withdrawn from the retort, and my invention enables me to alter the height of the scoop D when in its retired position, while, when it is in its forward position the guide-rods *n* are firmly locked. The back end of the guide-rod *n* rests against a stake, S', forming part of the stationary frame of the machine, which frame has upon it a roughened or grooved surface, marked *h*. This surface or strip of roughened metal extends far enough vertically to allow for any of the elevations of which the scoop D is capable, and these indentations or gross grooves serve to support the ends of the rods *n* and *n'*, which carry a locking apparatus. This locking apparatus is so arranged that its weight causes the surface *a'*, roughened to correspond with the indentations in the surface *h*, to engage with these indentations, and to hold the rod *n* firmly in whatever position of elevation it may have been left by the advancing scoop.

On the horizontal vibrating arm of this locking-piece *a'* there is a wheel, *c*, which wheel may be raised on an inclined plane, *d*, carried on the rear end of the scoop D, as is clearly shown in Figs. 11 and 13. The raising of the wheel *c* disengages *a'* and *h*, and renders it possible to elevate or depress the scoop while the rods *n* are disconnected from the supporting-surface *h*. As soon, however, as the scoop begins to advance the wedge *d* passes from beneath the roller *c*, the locking apparatus drops, *a'* engages with *h*, and the rear end of *n* is held firmly in position. Thus the forward movement of the scoop D locks the guide-rods *n* and *n'*, while its backward movement unlocks them, frees them from the supporting-surface *h*, and renders it possible to elevate or depress D by means of the screw F. While the scoop D is in its retired position it is filled with coal by apparatus not shown in these drawings. Then the advancing motion of the traveler A carries it into the retort. It then becomes necessary, in order to deposit the coal in the retort, to withdraw the bottom, which withdrawal is accomplished by means of the rack-wheel *g*, as has been previously described. This rack-wheel *g* is carried on a horizontal shaft, *y*, which horizontal shaft is actuated by means of the miter-gears *l l'*, Fig. 5. Through the center of the miter-gear *l* there passes a vertical shaft, B. The miter-gear *l* is supported by a collar, *s'*, connected to the scoop D, and is connected with the ratchet-clutch *p'*, which rests upon the collar *s'*. The miter-gear *l* and ratchet-clutch *p'* turn freely in the collar *s*. Motion is communicated to the miter-gear *l* by means of the clutch *p'*. The power which turns the miter-gear is applied by means of the shaft B, which shaft actuates the ratchet-clutch *p*. This ratchet-clutch *p* slides vertically on the shaft B, and rotation is communicated to it from the shaft B by means of a feather traveling in a groove in the shaft. The ratchet-clutches are so arranged as only to communicate power in one direction, as will be clearly seen in Fig. 5. The ratchet-clutch *p*, Fig. 2, is carried in a collar, *s*, supported by a horizontal vibrating arm, *t*. The arm *t* is raised or lowered by the vibration of a shaft, *y'*, which passes through the scoop, as is shown in Fig. 5.

This shaft is vibrated by means of the vibration of the vertical lever *v*. The vibration of *v* to the right or to the left, of course, vibrates the shaft *y'*, and its vibration raises or lowers the horizontal arm *t*, as is shown in Figs. 13 and 14. As *v* is thrown to the right the horizontal arm *t* raises the collar *s* and ratchet-clutch *p'*, and disengages *p* from the lower ratchet-clutch *p'*, and consequently the ratchet-clutch *p* does not communicate its revolution to the miter-gears.

The arm *v* is held in its position to the right and the ratchet-clutch *p* is held in its elevated position by means of the locking apparatus *a*. This locking apparatus is pivoted at *i*, and has on its lower surface a tooth or corner, *z*, Figs. 11 and 12, which engages with a pin, *f*, on the lever *v*. This locking apparatus has attached to its upper arm the wheel *g'* above its center of support, so that if pressure be applied to *g'* from the left, the locking apparatus *a* will be raised, and its elevation will free the pin *f* from the corner *z*. As soon as *v* has been freed from *a* the weight of the horizontal arm *t* and of the ratchet-clutch *p* will cause the latter to drop into the lower clutch *p'* and to engage with it. The revolution of B will thus be communicated to the miter-gears, and the bottom E will be withdrawn.

This unlocking of the lever *v* and engagement of the ratchet-clutch is accomplished automatically by the movement of my machine. As the scoop D is carried forward into the retorts, the wheel *g'* is so arranged that it comes in contact with a vertical arm or stake, S. The continued forward motion of D necessarily forces the wheel *g'* and the upper part of the lock *a* to the right, and raises the corner *z* free from the pin *f*. Then the miter-gears withdraw the bottom E, which withdrawal continues until the ratchet-wheels are again disengaged.

This is automatically accomplished in the following manner: The vertical lever *v* has upon its lower extremity a pin, *e*, Fig. 5, which passes through a slot, *w*, in the side of the scoop, and projects into the scoop immediately above the removable bottom. This removable bottom carries upon its forward end a lug, x, which is so arranged that it will engage with the pin e on the withdrawal of the bottom. The lug x, carried backward by the bottom E, strikes the pin e, swings the vertical lever v to the right, raises the horizontal arm t, and disengages the ratchet-clutch p from the ratchet-clutch p', when the withdrawal of bottom E necessarily ceases. As v is vibrated backward, the pin f passes by the corner z, and allows the locking apparatus a to fall, so that the arm t is kept in its elevated position until a is again disengaged by its contact with S. This withdrawal of E, of course, deposits the coal in the retort. Then the traveling frame A is withdrawn by a reverse motion of the pulley W, and the scoop is withdrawn with it. The withdrawal of the scoop D slides the bottom E still farther back on the guide-rods n until the rear end of E brings up against a stop on the guide-rod n, then the continued withdrawal of D forces the bottom E to enter again into the bottom of the scoop D. As it enters D it is supported by the guide-rods n and by the guiding-channels in the bottom of the scoop, and the scoop, as it passes back over the bottom E, carries with it the rack-wheel g. This wheel g, as it is geared in the rack of E, is necessarily revolved by its passage over the rack, and communicates its revolution to the miter-gears l' and l, and to the ratchet-clutch p', which, as it is now disengaged from p, revolves freely in its supporting collar s.

The operation of the machine is as follows: The whole apparatus is first moved on tracks I I opposite the retort to be charged. The scoop D is then brought to the proper height to correspond with the retort to be charged by means of the screw F. It is then filled with coal by apparatus not here shown. Power is then applied to the pulley W in the direction of "enter," which forces the scoop into the retort. The forward and backward movement of the frame is limited by means of buffers, (shown in Fig. 1,) which may be either air-cylinders, or rubber or other springs. Power meanwhile has been applied to the grooved shaft C. This shaft actuates the miter-gear N, which is carried in a collar, travels with the traveler, and is turned by a feather. This actuates the miter-gear N′ and the miter-gear l.

The shaft B may be kept continually revolving by the revolution of the shaft C, or it may only be revolved when it is necessary to withdraw the bottom.

The forward motion of the scoop at a certain point automatically causes the clutches p and p' to engage, and the bottom E is thereby withdrawn, depositing the coal in the retort. The clutches are then automatically disengaged, and power is then applied to the pulley W in the direction of "withdraw," and the traveling frame A and scoop D are withdrawn. This withdrawal again places the bottom in the scoop, and the apparatus is ready to be moved on to the next retort.

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

1. The combination of a scoop, having a removable bottom, with a screw-elevator, whereby the elevation of the scoop is altered to correspond with that of the retort to be charged, substantially as described.

2. The combination of a scoop, having a removable bottom, with apparatus, substantially as described, whereby the bottom is automatically withdrawn when the scoop is in position to deposit the coal in the retort.

3. The combination of a scoop, having a removable bottom, with apparatus for withdrawing the bottom and a stop or tripping device, which throws the bottom-withdrawing mechanism into operation at the right position of the scoop, substantially as described.

4. The combination of a scoop, having a removable bottom, with apparatus for withdrawing the bottom and a latch or locking apparatus which prevents the operation of the bottom-withdrawing apparatus until the latch is tripped, substantially as described.

5. The combination of a scoop, having a removable bottom, with apparatus for causing the withdrawal of said bottom and a lug or equivalent device connected with the bottom and acting at the proper time upon the bottom-withdrawing mechanism to prevent the further removal of the bottom, substantially as described.

6. The combination of a scoop, having a removable bottom, with a bottom-supporting guide or guides and a supporting locking apparatus for the purpose of sustaining the end of said guide, substantially as described.

7. The combination of a scoop-bottom supporting-guide with a locking apparatus, substantially as described, whereby the withdrawn bottom is supported at different elevations, substantially as described.

8. The combination of a scoop, having a bottom-withdrawing mechanism, with a locking apparatus which supports the bottom when in its withdrawn position, and is freed by the return of the scoop, substantially as described.

9. A scoop having a removable bottom and a bottom-supporting guide and locking apparatus, whereby the withdrawn bottom is supported at different elevations, in combination with mechanism whereby the scoop-bottom and guides are elevated or depressed when the scoop is in its withdrawn position, substantially as described.

10. The combination of a scoop, having a removable bottom, with a supporting traveling frame, which carries said scoop, and is itself supported upon two sets of runners or rollers, one set of which travels upon the upper surface of a rail, while the other set travels upon the under surface of a rail, substantially as described.

11. The combination of scoop-supporting

frame with spring-buffers, whereby the forward and backward movement of the frame is limited, substantially as described.

12. The combination of a scoop and its bottom-supporting mechanism with a roughened surface, *h*, substantially as described.

13. A scoop and removable scoop-bottom combined with mechanism, substantially as described, whereby the withdrawn bottom is forced into its original position by the return movement of the scoop.

14. The combination of a scoop, having a removable bottom, with a bottom-supporting guide, which is automatically locked against a supporting-frame by the advance of the scoop, and is automatically detached by the return of the scoop, substantially as described.

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