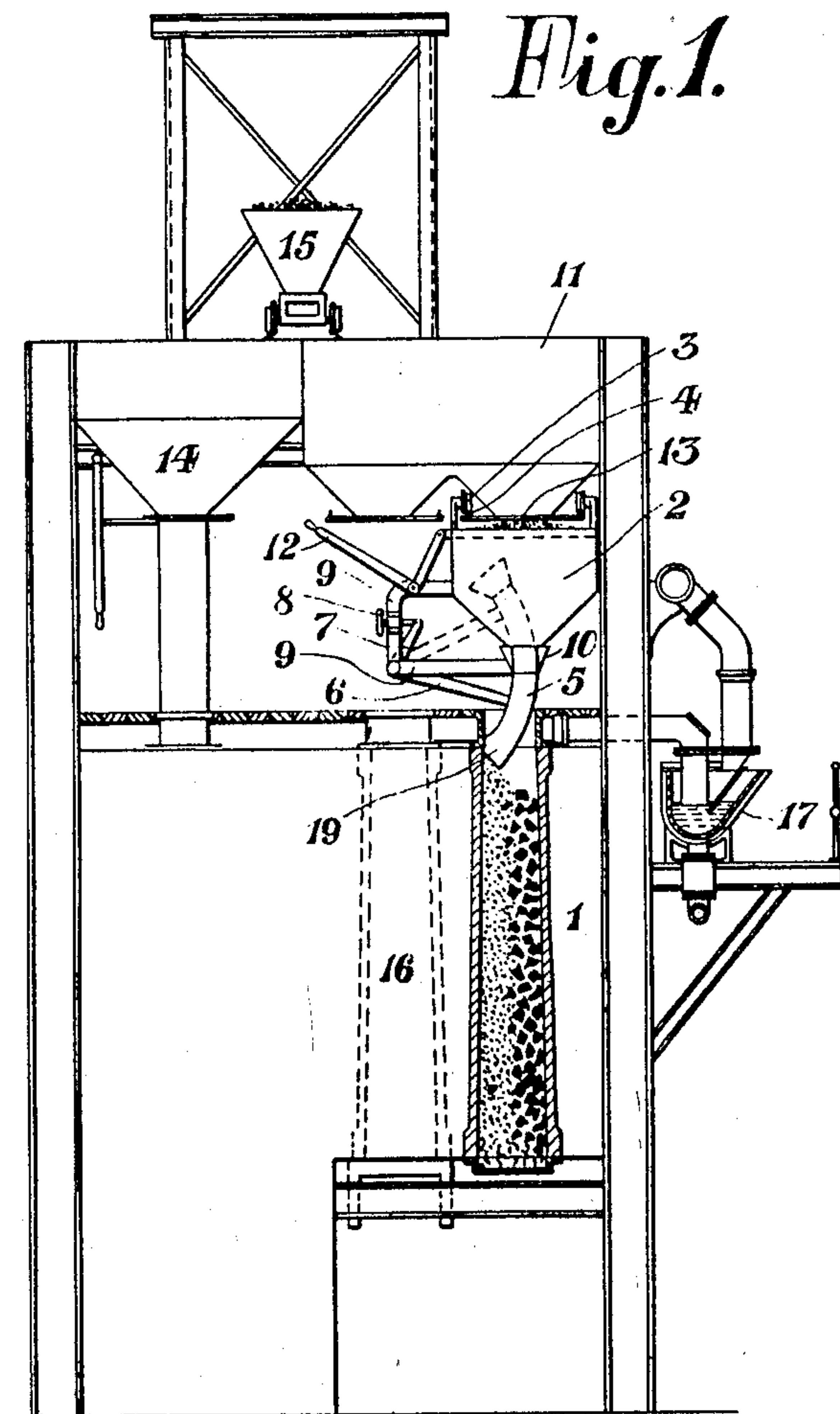


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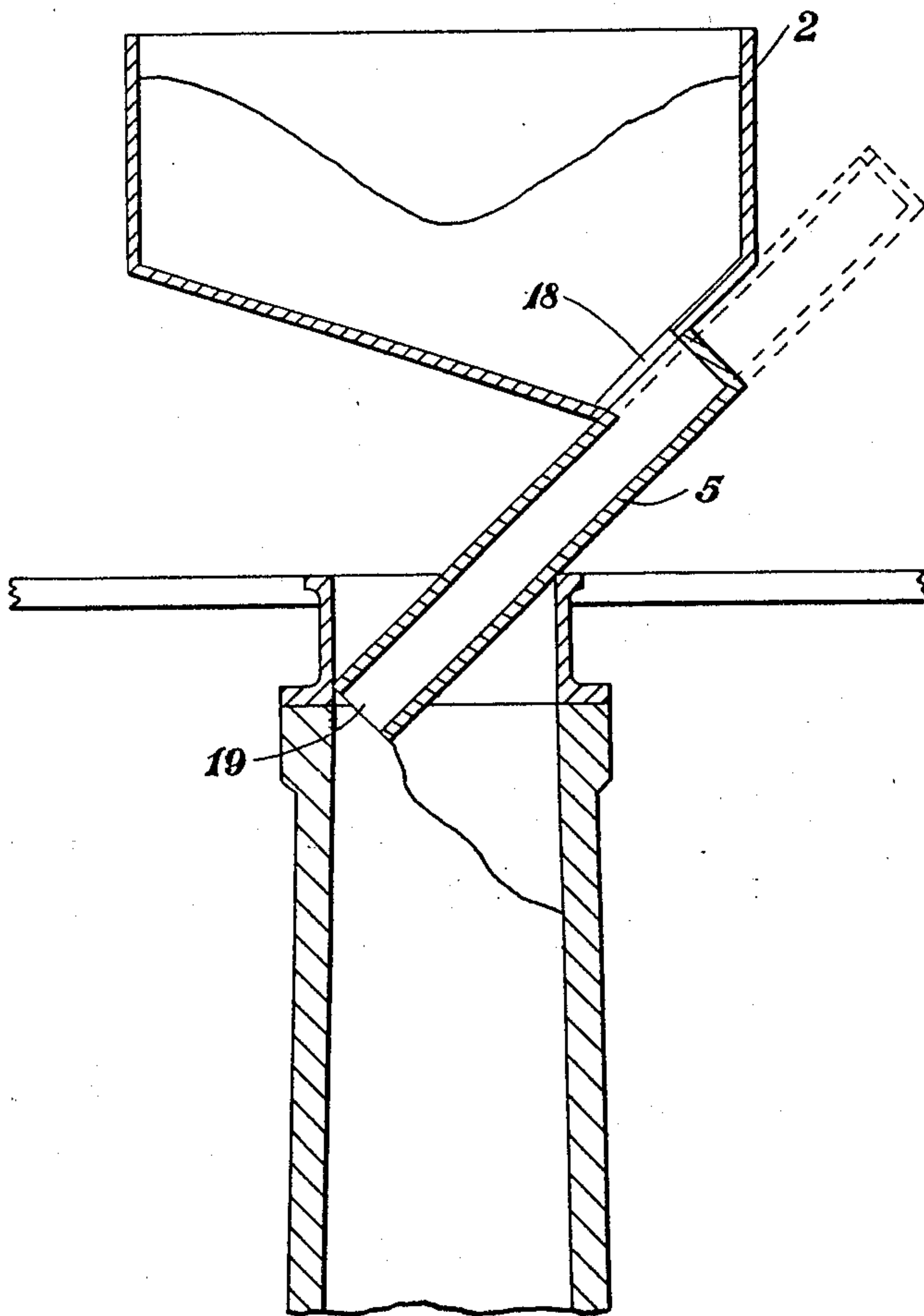
Patented Dec. 21, 1909.  
4 SHEETS—SHEET 1.



Witnesses:  
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H. Allen

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by Herbert W. Jenner.  
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*Fig. 2.*



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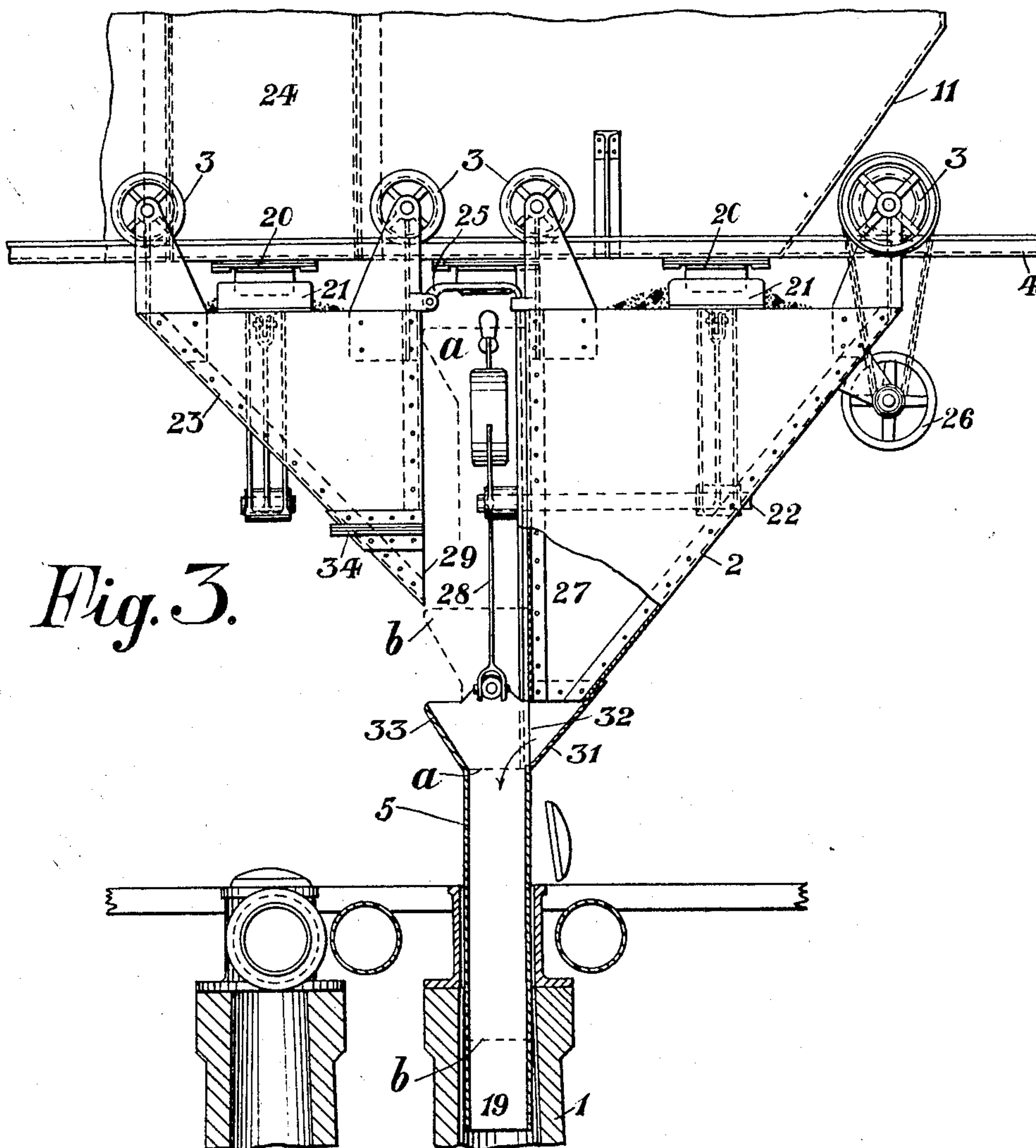
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4 SHEETS—SHEET 3.



*Fig. 3.*

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4 SHEETS—SHEET 4.

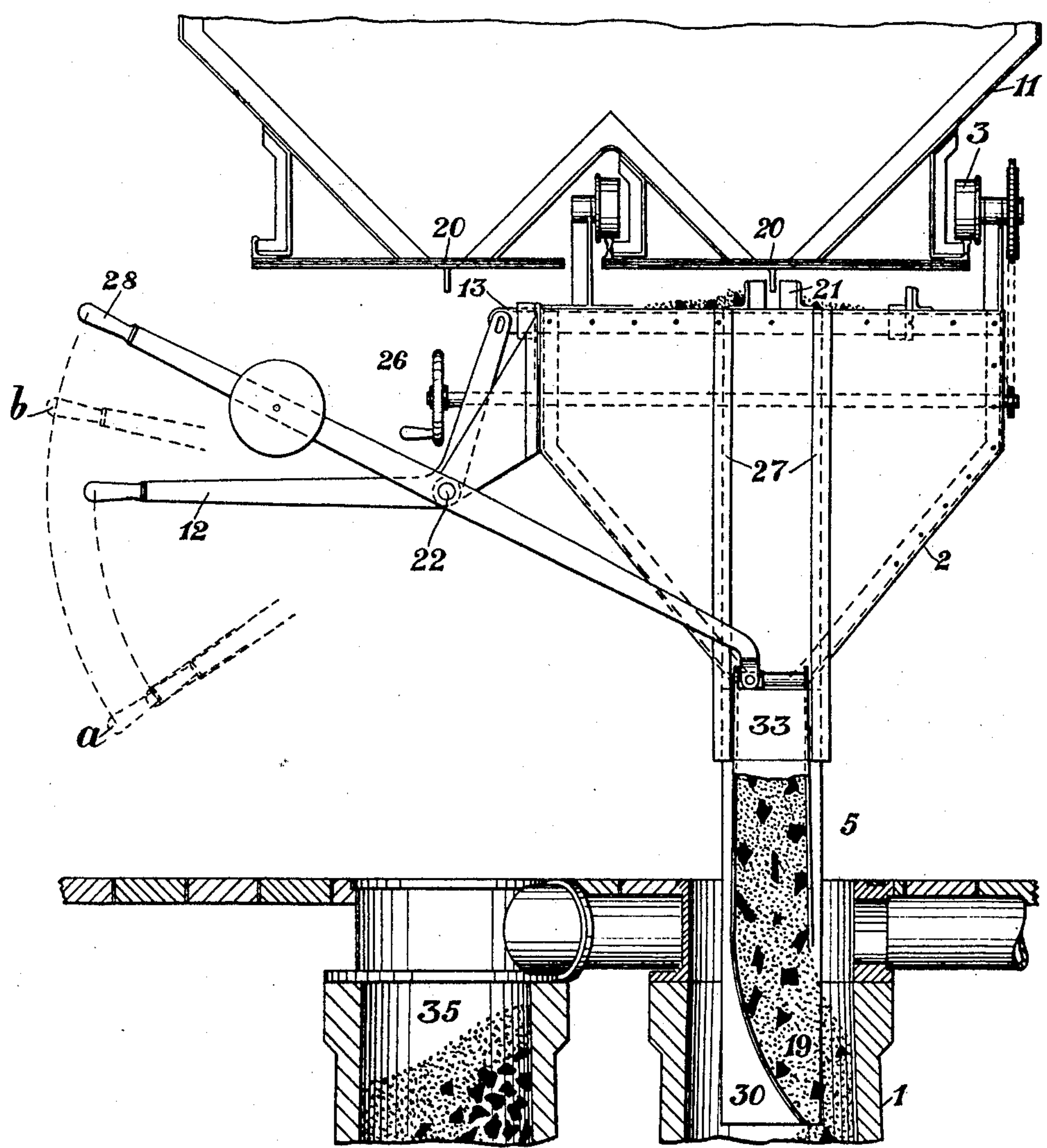


Fig. 4.

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# UNITED STATES PATENT OFFICE.

HERBERT JOHN TOOGOOD, OF ELLAND, ENGLAND, ASSIGNOR TO ROBERT DEMPSTER & SONS, LIMITED, OF ELLAND, ENGLAND.

## CHARGING OF GAS-RETORTS.

944,004.

Specification of Letters Patent. Patented Dec. 21, 1909.

Application filed April 26, 1909. Serial No. 492,294.

*To all whom it may concern:*

Be it known that I, HERBERT JOHN TOOGOOD, residing at Elland, in the county of York, England, have invented certain new and useful Improvements in or in Connection with the Charging of Gas-Retorts; and I 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.

The present invention relates to special apparatus for use in connection with the invention described in the specification of my previous application for patent Serial No. 492,052, filed April 24, 1909.

According to my present invention I propose to deliver the coal to the retorts from a traveling hopper, truck, conveyer or other appliance through a movable chute, which chute enters for a certain distance into the mouthpiece and the retort in charging. Upon the retort being filled up to the point at which the coal therein reaches and seals the lower aperture of the chute, the flow of coal down the chute is thereby stopped until the chute is raised. Such raising of the chute then cuts off the supply of coal to the upper aperture of the chute, and the said chute on being raised empties itself into the retort, completing the charge.

Where the coal is fed at one side of the retort as described in my said prior specification, the lower aperture of the chute during the charging operation may be inclined at an angle to the axis of the retort, and the said chute in rising delivers over that part of the retort not previously filled the small quantity of coal remaining in the said chute, the capacity of the said chute being such as to regulate this quantity according to requirements. By this means, an intermittently charged retort is made to act as its own measure, that is to say it cannot be overcharged or undercharged, the charge being automatically adjusted to the capacity of the retort. The importance of this will be obvious, as it is well-known that a retort when fouled with a deposit of carbon will hold less coal by say two or three cwts. than when in a clean condition, that is, for example, after being newly scraped or "scurfed." Also, if the traveling hopper be charged from overhead bunkers, and the door of such a bunker remain open during

the charging of one retort, the hopper will be full of coal after such charging has been completed. This coal may then be used to charge the next succeeding retort, consequently it is only necessary to open one of the doors in the storage bunker for every two retorts charged.

In order that my said invention may be clearly understood, I have hereunto annexed drawings illustrating by way of example several modes of putting the same in practice.

Figure 1 is a section or diagram of a retort bench on which is placed a traveling hopper having combined therewith an automatic "measuring chute" embodying my invention. Fig. 2 is a diagram illustrating the operation of an inclined chute in place of the curved one shown in Fig. 1. Fig. 3 is a sectional elevation illustrating the use of a straight chute moving vertically. Fig. 4 is an elevation taken at right angles to that in Fig. 3, the coke hopper 23 being removed.

Referring firstly to Fig. 1, number 1 indicates the retort being charged, 2 the hopper which is provided with wheels 3 traveling on rails 4. A curved chute 5 is carried by an arm 6, engaging or secured to the boss of a lever arm 7 linked to a screw operated by the hand wheel 8 the said screw and arms being supported by a bracket 9 on the hopper 2. The top of the chute 5 is bell-mouthed or provided on three sides with an enlarged funnel or fence 10, the remaining side being adapted to receive coal from an opening (not seen in this figure) at the bottom of the hopper 2. By rotating the hand wheel 8, the bell-crank lever arm 7 is drawn to the left so as to raise the chute 5, which works against the flat face of the hopper 2, into the position shown in dotted lines, the chute thereby closing the outlet of the hopper and cutting off the supply of coal, while during such rising movement the small quantity of coal contained in the chute is distributed over the sloping bank of coal shown in the retort in such manner as to approximately level up the charge of coal to the top of the retort. A separate hopper is or may be employed to supply the small quantity of coke usually dropped into the bottom of the retort before charging.

11 indicates the continuous storage bunkers, 12 a bell-crank lever for actuating a sliding bar 13, which, by suitable catches,



opens and closes the slide doors in the said bunkers; 14 represents a coke bunker for the furnaces, 15 a truck, conveyer or like means for supplying the bunkers with coal and coke or coke breeze, 16 a retort of the inner row, and 17 the ordinary or other hydraulic main with its appurtenances.

Instead of employing a bell-crank lever to effect the lifting of the chute 5, any other suitable means may be employed, as for instance a worm and wheel, the arm 6 being connected to the boss of the worm wheel.

In the modification shown in the diagram Fig. 2, an inclined chute 5, when in the position shown in full lines, receives coal from the hopper 2 through the opening 18. Upon the retort being filled up to the mouth 19 of the chute 5, the descent of coal ceases; and upon the chute 5 being drawn back into the position shown in dotted lines, the said chute acts as a slide door to close the said opening 18, while the coal contained in the chute falls into the retort and completes the charge.

Referring to Figs. 3 and 4, the traveling coal charging hopper 2 may be supplied from continuous coal storage bunkers 11 through slide doors 20 operated by catches 21 on the sliding bar 13, which bar can be reciprocated by means of the bell-crank lever 12 on the shaft or stud 22. A separate coke hopper 23 which may similarly be supplied with coke from compartments 24 formed in the continuous bunkers 11 for storing coke or coke breeze is coupled to the coal hopper 2 by the hook 25; or, if desired, the two hoppers may be built as one or may always work independently. The two hoppers are suspended from wheels 3 traveling on rails 4, and for exact adjustment a chain drive may be operated from the hand wheel 26. The straight chute 5 works in guides 27 on the flat face of the hopper 2, and can be raised and lowered by operating the weighted hand lever 28; the said chute is shown in full line in its lowest position, while the dotted lines at *a a* in Fig. 3 indicate the height at which the top and bottom of the said chute is carried when the hopper is traveling, and the dotted lines at *b b* the height thereof when receiving coke from the hopper 23 through the outlet 29 of the latter. The same letters, *a* and *b*, in Fig. 4, refer to the dotted lines showing the corresponding positions of the hand lever 28. The flange or web 30 on the chute engages the guides 27. The hopper 2 has an inclined extension 31 which meets the top of the chute 5 when in its lowest position, the coal being then free to pass down the incline 31 through the opening 32 into the chute, but the opposite side of the chute is extended outward and upward as shown at 33, to a height approximately equal to that of the top of the opening 32, to prevent overflowing of the coal from the chute.

When commencing to charge the retort,

the chute 5 is lowered from position *a* to position *b*, the back of the chute still closing the opening 32, the slide 34 is withdrawn by any suitable means, as by hand, allowing a sufficient quantity of coke to pass through the opening 29, down the incline 33 into the chute, and so into the retort; the slide 34 being then closed, the chute is lowered into the position shown in full lines and begins to receive coal through the opening 32. Upon the retort being filled up to the mouth 19 of the chute 5, the coal ceases to descend the said chute; and the chute being then lifted out of the retort re-closes the opening 32, and the coal contained in the chute falls into the retort, completing the charge. The space between the chute 5 in its raised position and the retort mouth-piece, can be sufficient to allow of the retort lid being closed before moving the traveling hopper 2. The door 20 in the bunker 11 is then closed, and, assuming the hopper 2 to contain sufficient coal for charging the next succeeding retort, another door 20 in the bunker need not be opened until the hopper reaches the retort next but one, and so on alternately.

In Fig. 4 the underside of the chute is shown curved, so as to direct the coal to one side; but this formation, though desirable for other reasons, is not essential to the practice of the present invention.

By varying the length or downward movement of the chute 5, I am enabled to fill the retort up to any predetermined point, that is either to the top of the retort, or short of the top, so that the free space 35 (Fig. 4) can be regulated in size as desired.

The method of charging herein described, although especially advantageous in connection with vertical retorts, may also be applied to the charging of inclined or other forms of retorts.

I claim as my invention:—

1. Means for charging a gas retort to a predetermined level independent of the capacity of the said retort, such means comprising a hopper, and a chute forming a sliding door on the face of the said hopper, the said chute having a receiving aperture which coincides with the discharging outlet of the said hopper only when the said chute is in its operative position, substantially as described.

2. The combination of a gas retort, a movable chute adapted to enter and to be withdrawn from the said retort the said chute having an open receiving aperture and a traveling hopper having an open discharging outlet which, when the said chute is lowered into an operative position, coincides with the said receiving aperture, and which discharging outlet is adapted to be closed by the said chute in its rising movement for purposes described.

3. The combination of a gas retort, a mov-



able chute adapted to enter and to be withdrawn from the said retort, and two hoppers each hopper having an open discharging outlet, the said discharging outlets being  
5 at different heights, and the said chute being adapted to communicate when lowered into an operative position with the said discharging outlets in succession and to close both

the said outlets when raised to its highest position, for purposes described. 10

In testimony whereof I affix my signature, in presence of two witnesses.

HERBERT JOHN TOOGOOD.

Witnesses:

ERNEST PRIESTLEY NEWTON,  
JOSEPH LANCASTER FLEMMING.