

Nov. 26, 1929.

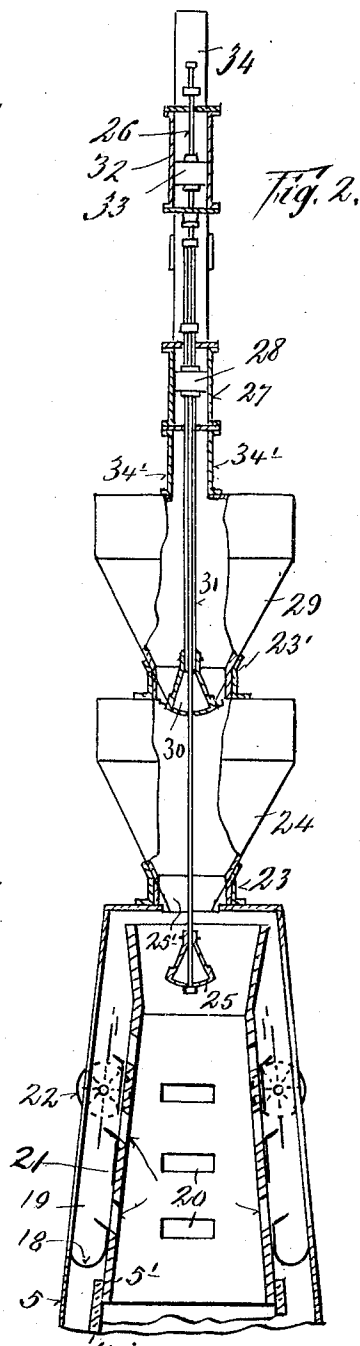
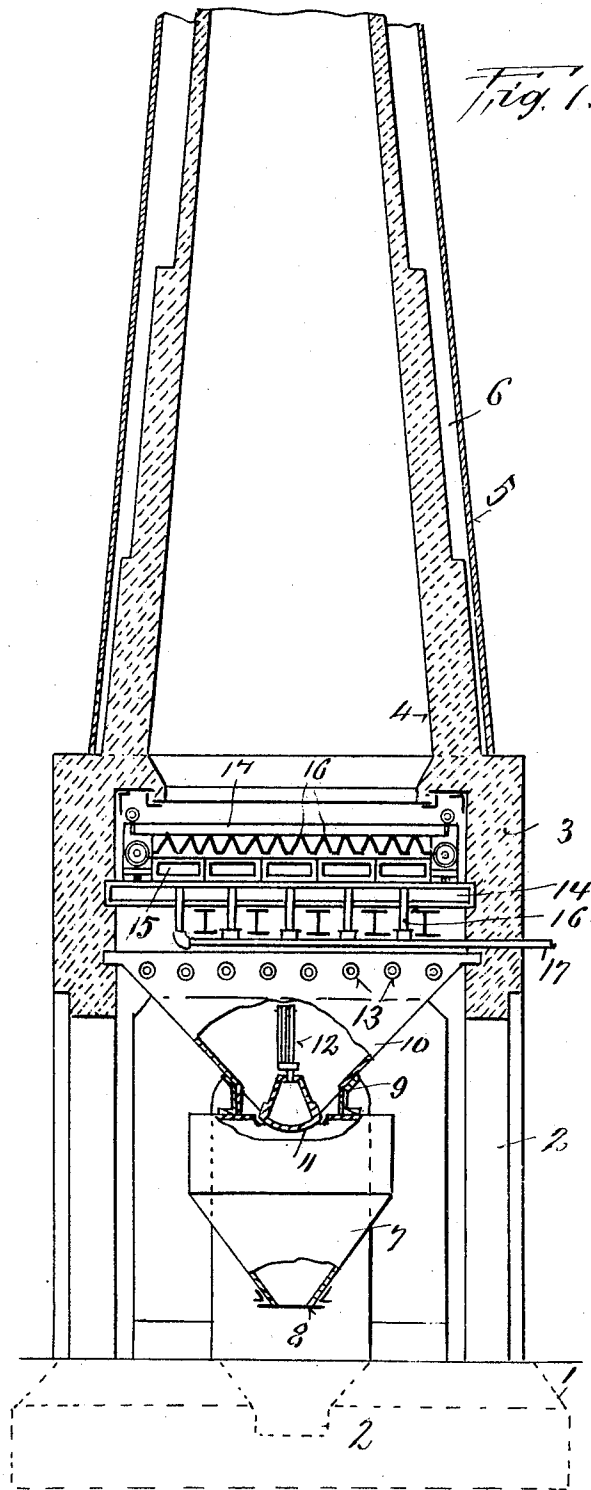
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1,737,170

FEEDING DEVICE FOR RETORTS

Filed Dec. 14, 1926

2 Sheets-Sheet 1



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BY

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**Nov. 26, 1929.**

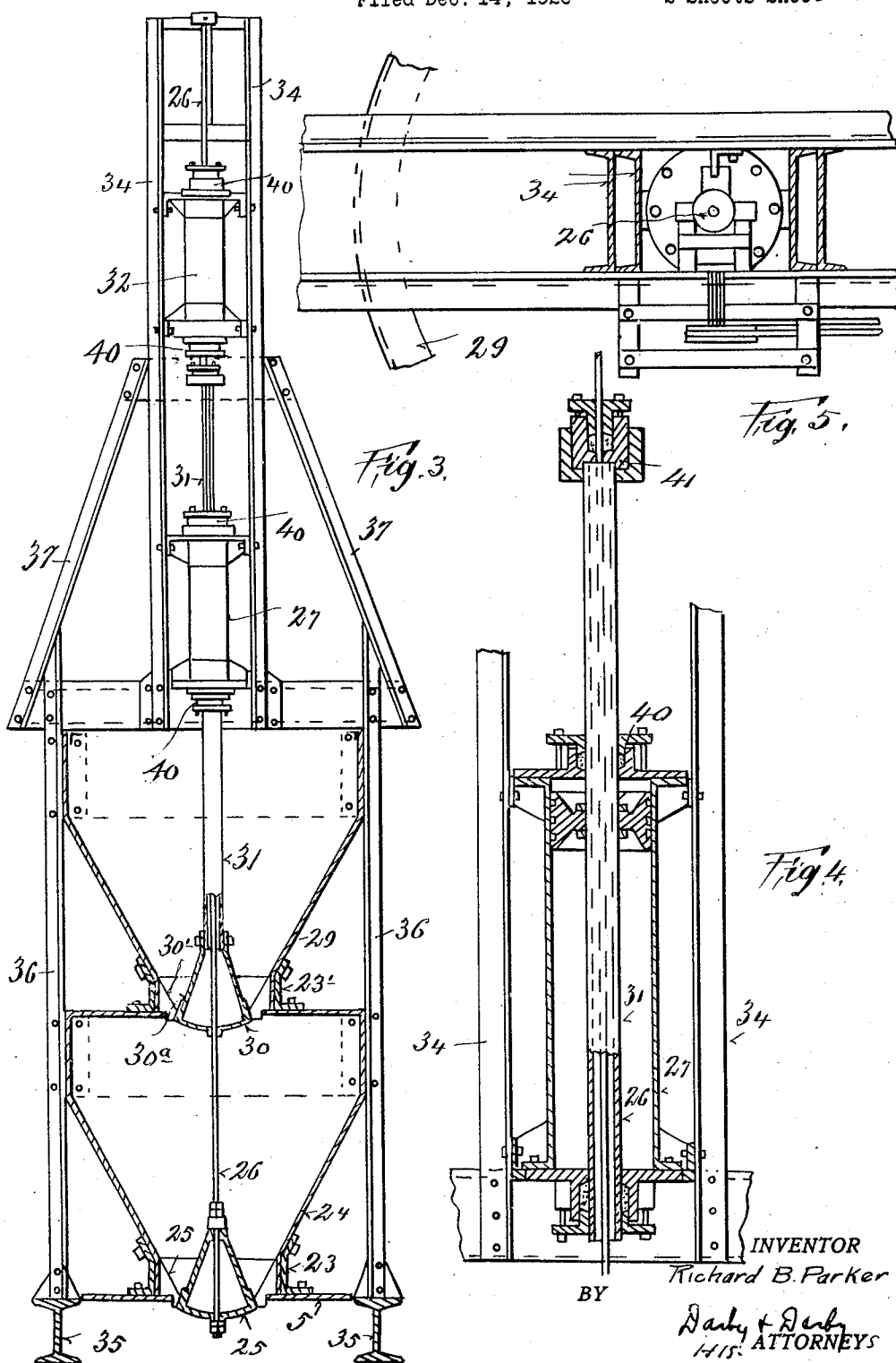
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**1,737,170**

## FEEDING DEVICE FOR RETORTS

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2 Sheets-Sheet 2



## UNITED STATES PATENT OFFICE

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## FEEDING DEVICE FOR RETORTS

Application filed December 14, 1926. Serial No. 154,696.

This invention relates to arrangements for feeding and removing materials from a retort.

One of the objects of this invention is the provision of hopper feeding devices to supply materials to close the retorts without opening them to the atmosphere.

A further object of this invention is the provision of means for feeding materials to retorts which may be operated by fluid pressure.

Another object of the invention is the construction of feeding devices having valves therein, adapted to automatically force material from their seats as they close.

A still further object of the invention is the construction of feeding devices for retorts adapted to force the material into the retort.

Another object of the invention is the construction of a device for feeding materials to a retort comprising a plurality of valve controlled hoppers constructed, so that one valve operates through the other. These and many other objects are obtained by the construction to be described hereinafter.

This invention resides substantially in the construction, combination, arrangement and relative location of parts as will be more fully indicated in the following disclosure.

Referring to the drawings in which the same reference numerals will be used in the several views to indicate the same parts, Figure 1 is a cross-sectional view of the lower portion of the retort.

Figure 2 is a cross-sectional view of the upper portion of the retort, which taken with Figure 1 represents a complete structure.

Figure 3 is an enlarged elevational view with some parts in cross-section of the feeding devices.

Figure 4 is an enlarged cross-sectional view of the cylinder for operating one of the feeding valves; and

Figure 5 is a top plan view with parts broken away of the structure of Figure 3.

This invention relates to a retort in which carbonaceous materials may be treated to secure the volatile constituents thereof. The feeding devices have been shown in conjunction therewith, because they are particularly

adapted for use with a retort of this nature which must be closed to the atmosphere to secure the best results.

I am, of course, aware that this particular feeding device may be used on open as well as closed retorts, and in fact in many other places, where it is desired to feed material, and I do not, therefore, desire to be limited to the particular use for the feeding device disclosed herein.

One particular embodiment of this apparatus employing these feeding devices is shown and described in my copending applications, Serial Nos. 154,694 and 154,695 filed respectively December 14, 1926 and December 14, 1926.

Referring to the drawings, the foundation for the retort is shown at 1, which supports the uprights 2. The grate chamber 3 is supported by the upright and has mounted therein the retort 4. A metallic casing 5 is provided about the retort walls and the space 6 therebetween may be filled with some heat resisting materials, such as sand, if desired. Supported below the grate chamber is a hopper 7 having a gate 8 covering an opening at the bottom thereof. Supported, on the top of the hopper 7 is a ring 9 in which is nested another hopper 10, having a valve 11 therein. This valve may be raised and lowered by means of the levers 12. A series of pipes 13 are mounted at the top of the hopper 10, and are used to supply quenching materials to cool the residue fed from the retort to the hopper 10. Extending across the grate chamber are the bars 14 which support the gas boxes 15 and the grate bars 16. This construction forms no part of this invention as it has been fully disclosed in my copending application, Serial No. 154,698, filed December 14, 1926.

The element 17 is a cutter bar which moves over the surface of the grate as described in my copending applications. The short pipes 16 connect the gas boxes 15 to the main pipe, 17.

Referring to Figure 2, the wall 18 provides in conjunction with the casings 5, 5' a closed chamber 19 as shown. The casing 5' has a series of vertically aligned openings 20 on

each face thereof. A gate 21 is provided on each side of the casing 5' and is intended to be moved thereover by means of the hand wheel structure 22 to control these openings. This structure is described in detail in my copending application, Serial No. 154,697 filed December 14, 1926.

Supported on top of the retort by means of the ring 23 is a hopper 24. Encircling the opening at the bottom of the hopper is a ring 25' which forms a seat for the valve 25. This ring 25' is made of steel or other suitable material, and is provided with a sharp-edged seat which cooperates with the valve 25 to crush out any material which may get therebetween. The valve 25 is mounted on the vertically slideable shaft 26, which is connected to the piston 33 to slide in the cylinder 32. A ring 30' supports the hopper 29 on top of the hopper 24. A valve 30 cooperates with the steel ring 23' to control the opening at the bottom of the hopper 29. The valve 30 is mounted on the hollow shaft 31, which is connected to the piston 28, which operates in the cylinder 27. It will be noted that the rod 26 operates through the hollow shaft 31 and piston 28. The pistons are supported by means of the angle beams 34' and 34.

Referring now to Figures 3, 4 and 5, the method of mounting hoppers and cylinders is shown in more detail. The whole structure is supported by I-beams 35, which support the angle uprights 36, 37 and 34. The construction of the hoppers 24 and 29 and the valves therein are clearly shown as well as the steel rings 25, which form seats for the valves. It will be noted that the valves are provided with raised projections, such as 30<sup>a</sup>, the surfaces of which are roughened so that should any material get between the valve and the seat, it will roll out therefrom or be quickly crushed, so that the valve can easily seat. The two cylinders 27 and 32 are supported in the framework and have the usual packing glands 40 at each end thereof.

Referring to Figure 4, the method of passing the shaft 26 through the hollow shaft 31 is clearly shown. A packing gland 41 is provided so that no fluid pressure may leak through the hollow shaft 31 past its sliding joint with the rod 26.

The operation of this device is readily apparent from the foregoing description. However, it may be said that fuel is supplied to the upper open hopper 29. When it is desired to feed fuel to the retort fluid pressure is admitted below piston 33 to cause the valve 25 to seat. Fluid pressure can then be supplied to the upper face of piston 28, to cause the valve 30 to open. The fuel will then flow from the upper hopper 29 into the lower hopper through the action of gravity. The valve 30 can then be seated by opening the upper portion of the cylinder 27 to exhaust

and admitting fluid pressure to the lower face of the piston. The lower portion of cylinder 32 is then opened to exhaust and fluid pressure is admitted to the upper face of piston 33 to cause valve 25 to open. Fuel may then flow from the hopper 24 into the retort from the force of gravity. When desired the piston 33 may be moved downwardly still further, so that the valve will come in contact with the column of material within the retort to force it more compactly within the retort. The pistons are constructed of sufficient size, so that this action may readily occur, as well as providing sufficient force to cause the valves to close and crush any material between them and their seats. It will be noted that during these operations the retort proper is substantially closed, so that practically no air is admitted thereto. The connection of the pipes to the cylinders has not been shown for the sake of clearness, since it is at once evident to those skilled in the art how to supply the fluid pressure to the cylinders to secure their operations. I have disclosed one method of doing this automatically in my copending applications cited above. I do not desire, however, to be limited to any particular method of operating the pistons in this particular application.

I have described with considerable detail one physical embodiment of the principles of my invention for the purpose of illustrating it, but I do not desire to be restricted to the particular forms illustrated, but rather to the scope of my invention, which I have defined in the subjoined claims.

I am aware that many changes in the details of construction and relative arrangement of parts will readily occur to those skilled in the art.

What I seek to secure by United States Letters Patent is:

1. In a retort feeding device the combination with a retort of double hoppers having valves therein, pistons and cylinders for operating the valves said cylinders being arranged in vertical alignment, a hollow piston rod connecting one of said valves to one of the pistons and a solid connecting rod connecting another of said valves with another piston said valves being independently operable in both directions by their corresponding pistons and cylinders.

2. In a retort feeding mechanism, the combination with a retort, of a plurality of hoppers supported one above the other, valves for said hoppers, seats on said hoppers for said valves arranged for crushing surfaces in cooperation with the valves, a plurality of cylinders supported one above the other each having a piston therein, the piston in the lowest cylinder being connected to the lowest valve by a hollow piston rod and having a hole therethrough, and a rod connecting the piston in the cylinder above with the valve

above, said pistons being positively actuated  
to operate the valves independently in either  
direction and adapted on raising the valves  
to cause them to seat with sufficient force to  
crush any material between them and the  
valve seats.

In testimony whereof I have hereunto set  
my hand on this 11th day of December A. D.,  
1926.

RICHARD B. PARKER.