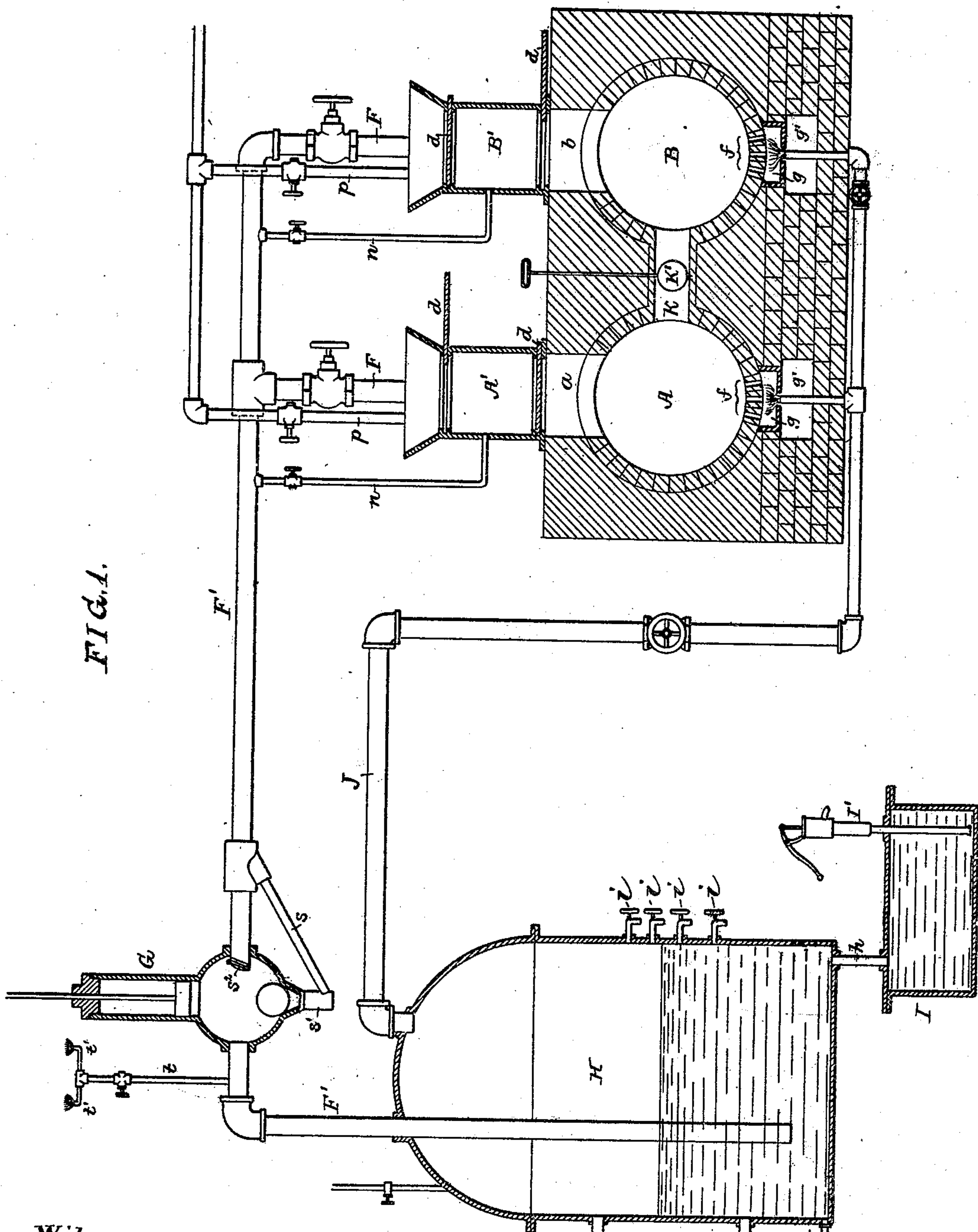


(No Model.)

2 Sheets—Sheet 1.

C. J. BEST & W. A. HALL.  
APPARATUS FOR TREATING GARBAGE OR LIKE WASTES.  
No. 501,760.  
Patented July 18, 1893.



Witnesses:  
Hamilton D. Turner  
Alex. Barkoff

Inventors:  
Charles J. Best & Walter A. Hall  
by their Attorneys  
Howson & Howson

(No Model.)

2 Sheets—Sheet 2.

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FIG. 3.

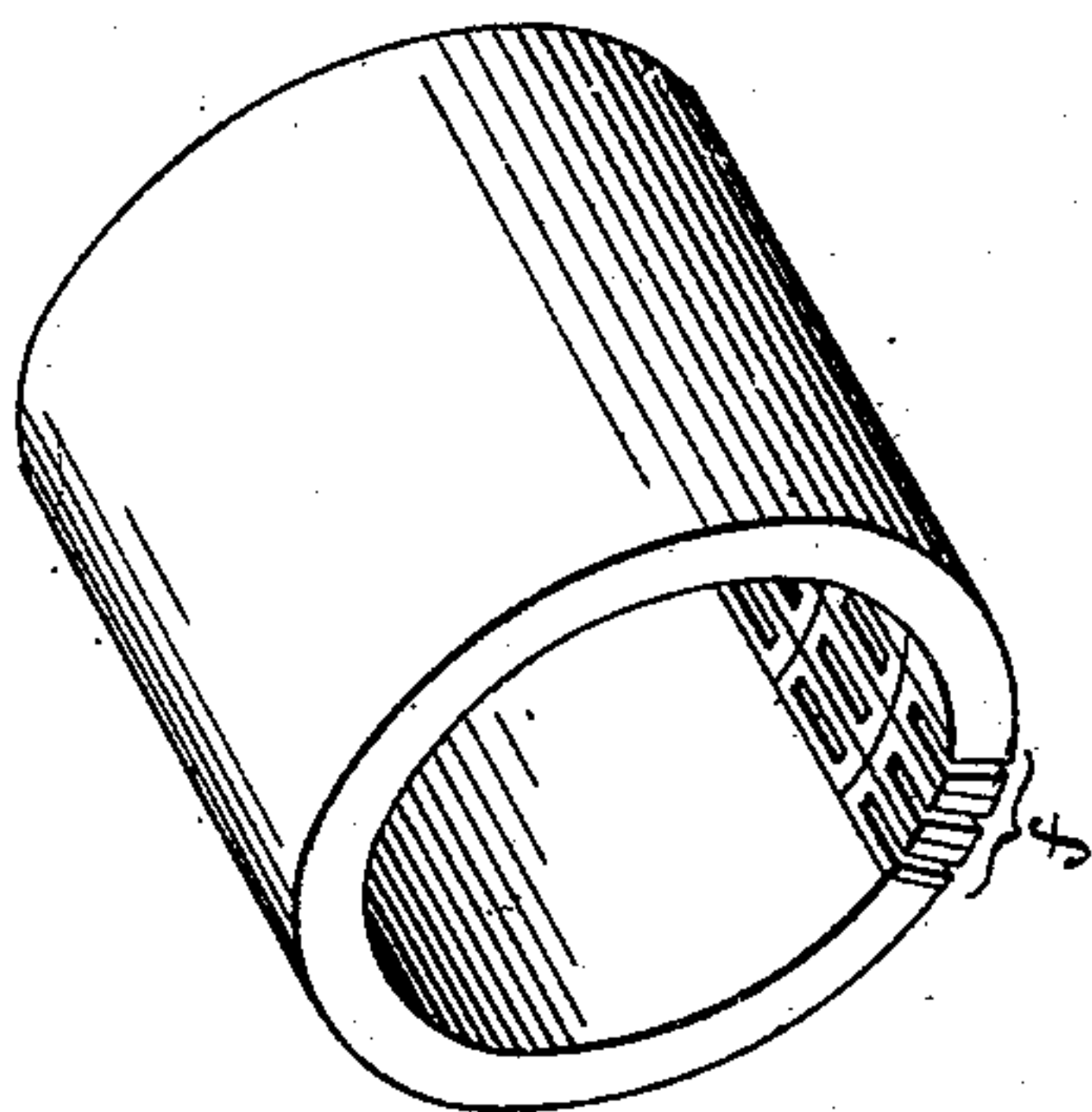
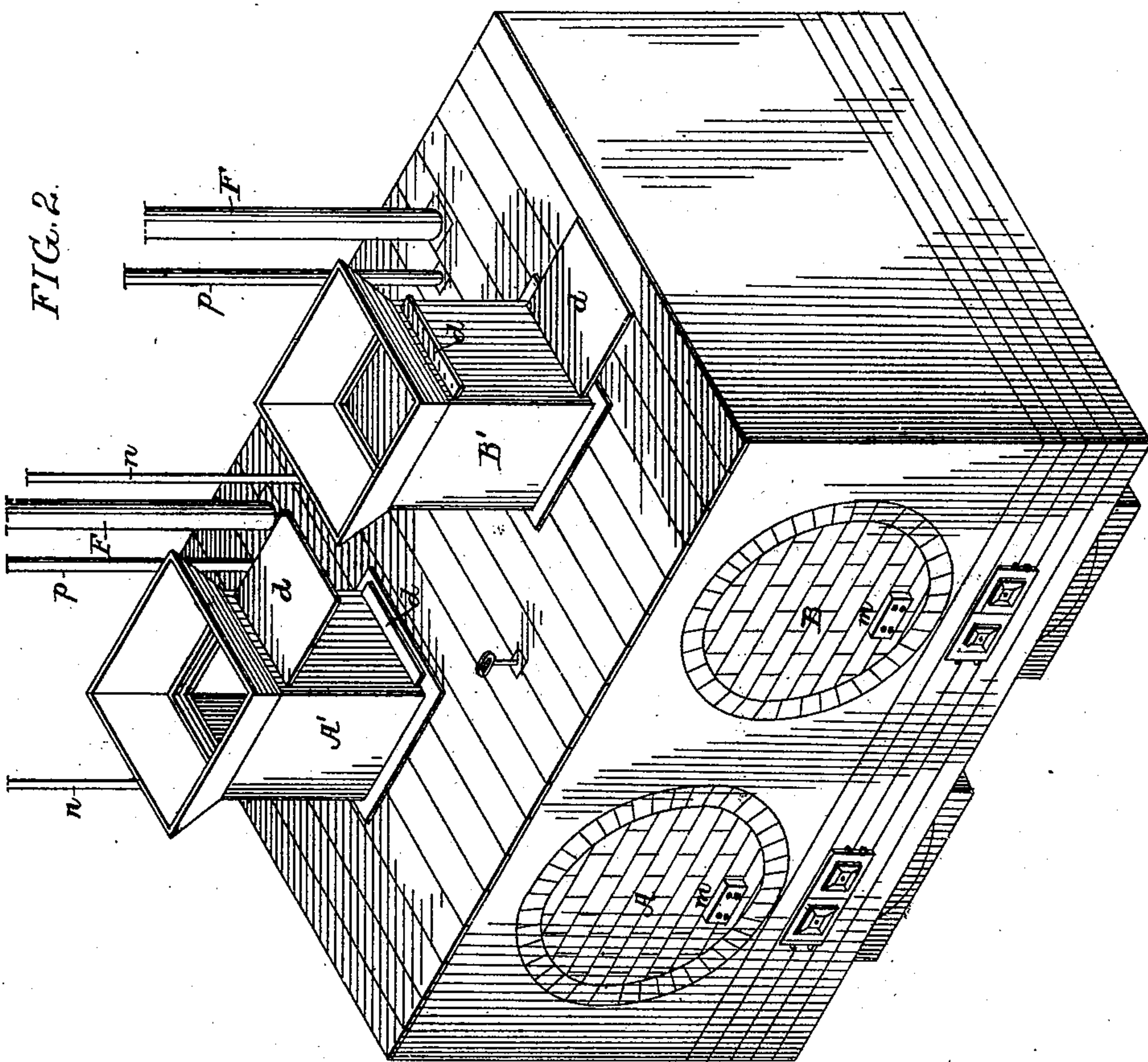


FIG. 2.



Witnesses:

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# UNITED STATES PATENT OFFICE.

CHARLES J. BEST AND WALTER A. HALL, OF SEATTLE, WASHINGTON, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO THE CHEMICAL GARBAGE REDUCTION COMPANY, OF CHICAGO, ILLINOIS.

## APPARATUS FOR TREATING GARBAGE OR LIKE WASTES.

SPECIFICATION forming part of Letters Patent No. 501,760, dated July 18, 1893.

Application filed December 21, 1892. Serial No. 455,976. (No model.)

### *To all whom it may concern:*

Be it known that we, CHARLES J. BEST and WALTER A. HALL, both citizens of the United States, and residents of Seattle, King county, Washington, have invented certain Improvements in Apparatus for Treating Garbage and Like Wastes, of which the following is a specification.

The object of our invention is to provide for the treatment of garbage and like wastes in such manner as to obtain valuable products therefrom, to prevent the escape of noxious or unpleasant gases or vapors, and to utilize the inflammable portions of the gases or vapors driven off from the garbage for the purpose of heating the latter. These objects we attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1, is a longitudinal section of garbage treating apparatus constructed in accordance with our invention. Fig. 2, is a perspective view of the retort or furnace structure forming a part of said apparatus; and Fig. 3, is a view of part of the retort or furnace illustrating a feature of construction of the same.

In carrying out our invention the garbage, preferably after being dried, is subjected to heat in a retort to which only a limited supply of air is admitted, and by this means the volatile or vaporizable constituents of the garbage are driven off, the remaining portions being carbonized and accumulating in the retort until their removal becomes necessary. The vaporized constituents are passed into a condenser whereby the tar, flats, salts, and like constituents are separated from the gaseous portions of the vapor, the latter being then conducted to the retorts and there ignited so as to serve the purpose of heating said retorts and supplying fuel for the continuance of the operation, fuel independent of the garbage itself being necessary only in starting the operation.

A and B represent a pair of retorts cylindrical in the present instance and communicating through passages *a* and *b* with hoppers A' and B' mounted on the top of the structure

containing the retorts, each of these hoppers being provided with upper and lower valves *d* so that when the lower valve is closed and the upper valve opened, garbage may be deposited in the hopper, and on closing the upper valve, may be subjected to heat therein so as to dry or partially dry it, the opening of the lower valve then permitting the dropping of the dried or partially dried mass of garbage into the retort beneath.

In the lower portion of each retort is a series of perforated bricks *f*, and beneath this portion of the retort is a box *g* and an ash pit *g'* for a purpose described hereinafter.

Each of the retorts is furnished with an escape pipe *F* provided with a suitable valve, and these pipes *F* communicate with a pipe *F'*, the continuity of which is, in the present instance, interrupted by a pump *G*, so that in starting the operation, the vapors may be withdrawn from the retorts by the action of said pump if desired. The discharge end of the pipe *F'* is bent downward and terminates in the lower portion of a condenser *H* which is partially filled with water, so that the vapors arising from the heated mass of garbage in the retorts are caused to pass through this body of water, whereby the condensable constituents of such vapors are separated therefrom and remain in the condenser either in the form of tars, oils, salt solutions or the like, the heavier elements settling to the bottom of the condenser and passing therefrom through a pipe *h* into the tar well *I*, while the lighter elements float upon the top of the water in the condenser, from which they can be removed if desired through suitable try cocks *i*, the gage glass serving to indicate the level of liquid in the condenser. The condenser can also be drained of its water through a discharge cock *i'*, and the contents of the tar well can be removed by means of a pump *I'*.

The gaseous or non-condensable elements of the vapors emanating from the heated masses of garbage in the retorts escape from the condenser *H* through a pipe *J* which has suitable branches communicating with the boxes *g* beneath the retorts, and the gas can be ignited as it issues from these branches so as to sup-



ply heat for carbonizing and driving off the vapors from the masses of garbage in the retorts; hence fire need be kindled beneath the retorts only in starting the operation, the inflammable gases produced by the heating of the garbage supplying the fuel for maintaining the retorts in the heated condition after the operation is well under way. The ash pits  $g'$  receive the ashes from the solid fuel which is used in the fire boxes  $g$  in starting the operation.

The retorts are connected by a branch pipe  $K$  having a valve  $K'$  operated by a suitable handle leading to the outside of the casing, so that said valve can be turned to open or close communication between the retorts  $A$  and  $B$  through the passage  $K$ , and the degree of heat in each retort can thus be regulated, or the retorts can be used singly if desired. For instance, there may be dry garbage in one retort and wet garbage in the other, or it may be advisable to convey the vapors or gases from one retort to the other, or in either circumstances it may be advisable to have the action of one retort entirely independent of that of the other, which different methods of operation are provided for by the valved passage.

The perforated bricks forming the courses in the bottom of each retort provide a fire brick grate upon which the garbage is supported and through which the gas passes for igniting the garbage, and in the front of each retort is a register plate  $m$  with openings for supplying air in limited volume to the retort, it being advisable to effect a slow combustion or distillation of the garbage so that the solid portions of the latter will be carbonized and will constitute a valuable product for fertilizing or other purposes.

The vapors or gases generated by the heating or drying of the garbage in the hoppers  $A'$  and  $B'$  are permitted to escape therefrom through valved pipes  $n$  communicating with the discharge pipe  $F'$ , and valved pipes  $p$  serve to introduce steam into the retorts when it is considered advisable to reinforce by the addition of such steam the gases or vapors emanating from the heated masses of garbage in the retorts.

A branch pipe  $s$  leads from the discharge pipe  $F'$  into a well  $s'$  at the bottom of the pump  $G$ , so that any liquid which may condense in the pipe  $F'$  will be conveyed into said well, and will not interfere with the operation of the valve  $s^2$  which closes the end of the pipe projecting into the suction chamber of the pump.

A valved pipe  $t$  communicates with the pipe  $F'$  and is provided with burners  $t'$ , this pipe and its burners serving as a test pipe to de-

termine the inflammability of the gases which are driven off from the retorts.

It will be evident that by the process and apparatus which we have described, the garbage may be treated without the escape of any noxious or offensive gases or odors, and such treatment may be effected with a minimum of expense owing to the fact that the gases from the garbage itself serve to aid in supplying a heat, and to the additional fact that all of the valuable constituents of the garbage are saved in such form as to be of commercial value.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. The combination, in garbage treating apparatus, of the retort having a supply hopper and discharge pipe, a fire box beneath the retort for heating the same, and means for supplying air in limited volume to the retort so as to restrict combustion therein and cause a charring of the solid portions of the garbage, substantially as specified.

2. The combination, in garbage treating apparatus, of the retort having a feed hopper and discharge pipe, a fire box beneath said retort for heating the same and in communication therewith, means for admitting air in limited volume to the retort, and a pipe whereby a portion of the volatilized products escaping from the retort is returned to the fire box, substantially as specified.

3. The combination in apparatus for treating garbage, of the retort having a feed hopper, discharge pipe and pump, a grate of refractory material in the lower portion, and a fire box located directly beneath said grate, substantially as specified.

4. The combination in apparatus for treating garbage, of a pair of retorts located side by side and each having a feed hopper, a discharge pipe and heating devices, with a valved passage connecting the retorts and serving to convey heated vapors from one to the other when the flow of the same through the main discharge pipe is cut off, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES J. BEST.  
WALTER A. HALL.

Witnesses to the signature of Charles J. Best:

ALBERT POPKINS,  
SAM'L. H. MOSSLER.

Witnesses to the signature of Walter A. Hall:

I. M. HALL,  
W. H. MORRIS.