(No Model.) 2 Sheets—Sheet 1.

G. M. NEWHALL.

DISSOLVING APPARATUS.

No. 535,719. Patented Mar. 12, 1895.

FIG. 1

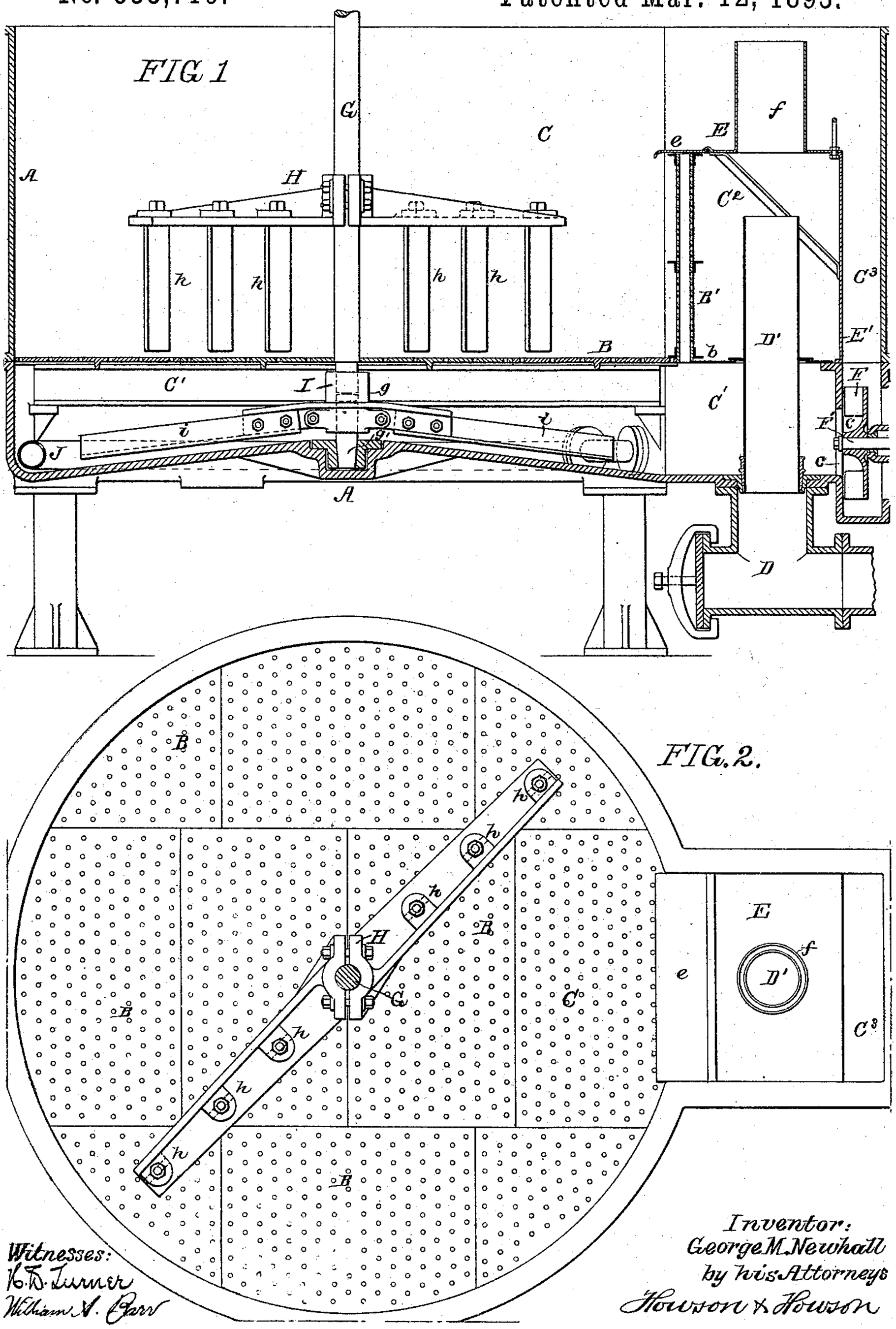

FIG. 2.

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

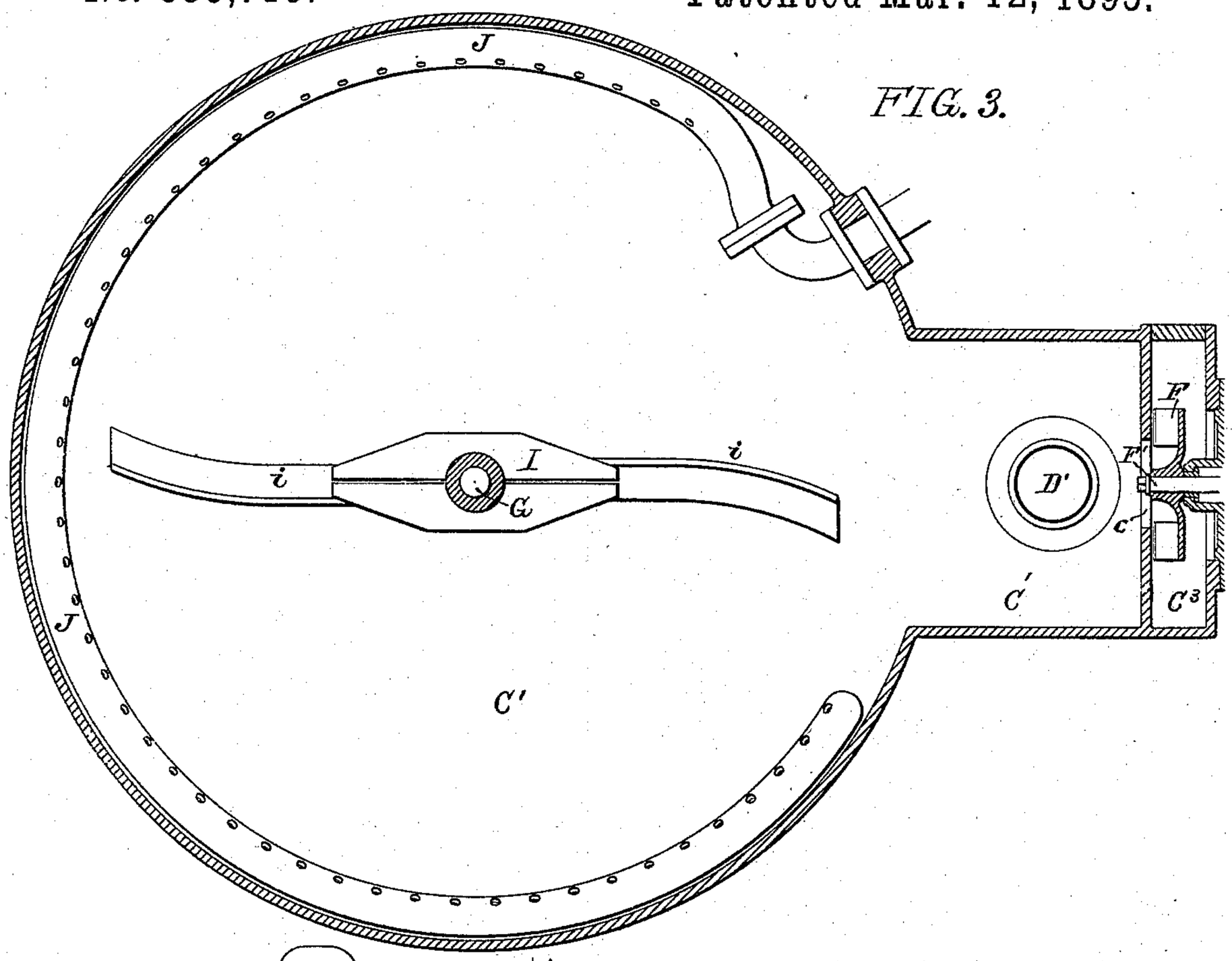


FIG. 4.

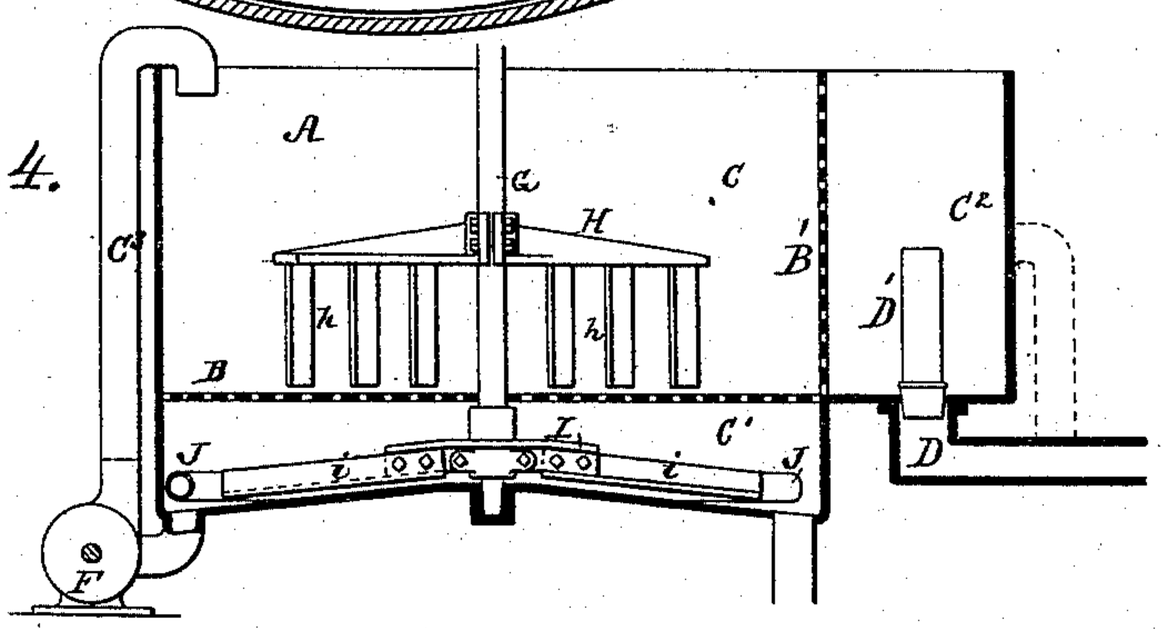
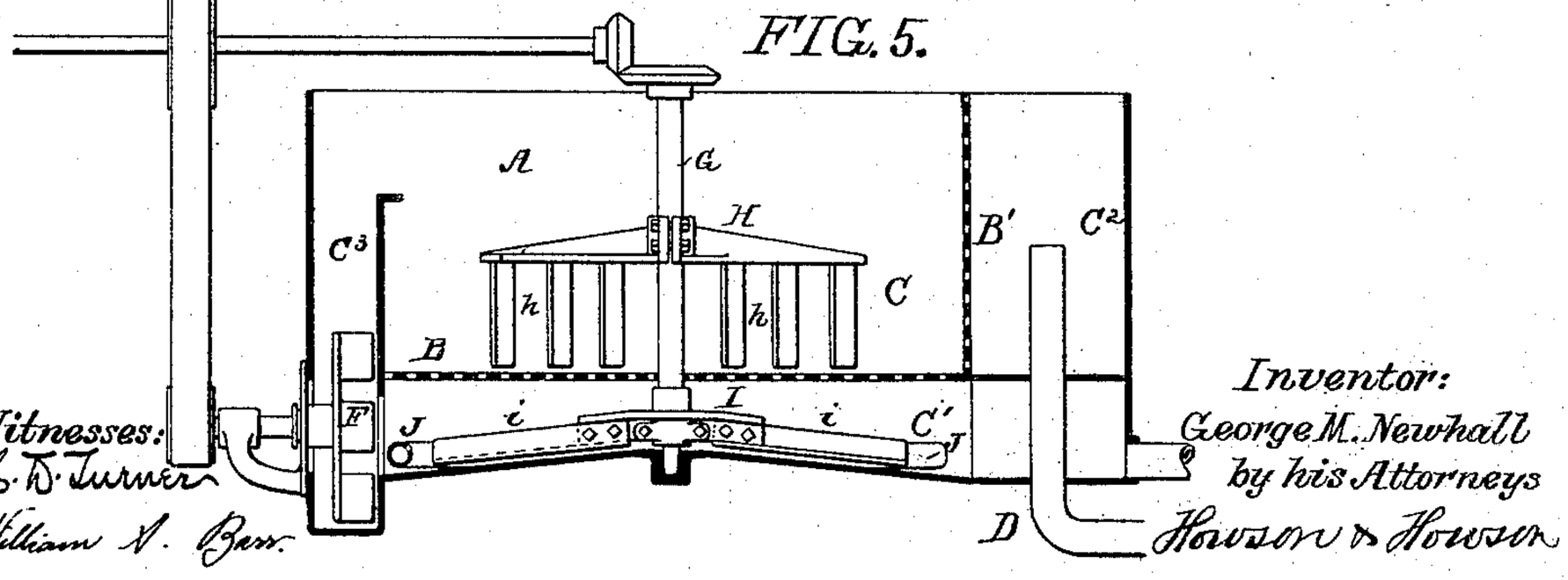


FIG. 5.



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UNITED STATES PATENT OFFICE.

GEORGE M. NEWHALL, OF PHILADELPHIA, PENNSYLVANIA.

DISSOLVING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 535,719, dated March 12, 1895.

Application filed November 13, 1893. Serial No. 490,825. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. NEWHALL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Dissolving Apparatus, of which the following is a specification.

My invention relates to improvements in apparatus for dissolving materials for refining and other purposes, the invention being particularly used in the dissolving of raw sugar and similar substances.

The object of the invention is to thoroughly dissolve the solid and semi-solid matter and to hold back insoluble animal, vegetable or mineral matter and to draw off a comparatively clear solution, and to circulate the material under treatment.

In the accompanying drawings:—Figure 1, is a sectional view in elevation of my improved dissolving apparatus. Fig. 2, is a plan view. Fig. 3, is a sectional plan view through the lower chamber. Figs. 4 and 5, are views illustrating modifications of the invention.

Referring in the first instance to Figs. 1, 2, and 3, A is the dissolving tank having upper and lower compartments C C′ separated by a screen B, in the present instance made in sections supported upon suitable framework. At one side of the tank is a chamber C^2 separated from the chamber C by a double screen B′ and from the lower chamber C′ by a partition *b*.

D is the discharge pipe and fitting in the mouth of this pipe is a stand pipe D′ extending up through the partition *b* into the chamber C^2, as clearly shown in Fig. 1. The chamber C^2 has a cap E and in the cap is an opening *f* through which the overflow pipe can be operated and in some instances withdrawn from the machine. A deep flange surrounds this opening which prevents the liquid in the tank gaining access to the chamber C^2 without first passing through the double screen B′. A partition E′ separates the chamber C^2 from a passage C^3 which communicates with the lower chamber C′ through an opening *c*. The passage C^2 opens into the chamber C at the top.

Mounted on a shaft F′ in the bottom of the chamber C^3 is a centrifugal pump F driven by a belt or other driving mechanism, and this pump lifts the material as it enters the chamber through the opening *c*, up through the chamber C^3 and discharges it over the cap E into the chamber C, thus insuring the continuous circulation of the material in the tank and the thorough mixture of the heavy material with the light material.

G is a vertical shaft which is driven in any suitable manner, preferably from a horizontal shaft through the medium of a pinion and bevel wheel as shown in Fig. 5. Mounted on the shaft in the chamber C is the stirrer H depending from the arms of which are blades *h* which stir the material in the said chamber C. The shaft extends through the perforated partition B and is secured to a hub I having radial blades *i* which are placed at an angle and are slightly curved. The shaft rests on a disk *g* which in turn rests on the center post *g′* mounted in a suitable step. Thus the bearing or step for the shaft is within the hub I. The blades *i* give motion to the material in the chamber C′ below the partition B so that the material will readily flow to the pump F.

Extending around the chamber C′ is a steam pipe J which is connected to a suitable steam supply. The pipe in the present instance is perforated, so that the material under treatment is heated by the direct action of the steam to a certain degree and thus more readily dissolved, but the pipe may be simply a steam coil, the steam heating the material indirectly.

The front edge *e* of the cap E is hinged so that it can be elevated to remove the screens B′ for cleaning or repairing and the cap E and partition E′ are connected together so that they can be removed bodily.

It will be seen by the above description that the chamber C is first charged with material, motion being given to it by the mixing blades *h*. The heavy material gradually passes through the perforations in the partition B entering the lower chamber C′, the material in this lower chamber being stirred by the blades *i* and heated through the steam pipe J. The material from this chamber passes to the pump F and is elevated and discharged into the chamber C in order to be thoroughly dissolved.

The dissolved or light material passes direct from the chamber C to the chamber C^2 through the screen B′ and out the stand pipe D′.

When it is wished to clean the melting apparatus the stand pipe is removed and the material allowed to flow directly through the discharge pipe D. Water can be admitted to the tank and the tank thoroughly cleaned by this means.

In Fig. 4, I have shown the stand pipe at one side of the tank and the inlet and outlet for the pump at the opposite side, the pump being entirely outside the tank and connected to the tank by suitable pipes.

In Fig. 5, I have shown the chamber C^3 at one side of the tank and the chamber C^2 at the opposite side, the said chamber C^3 communicating directly with the lower chamber C′ and the upper chamber C. In Figs. 4 and 5, I have shown independent cleaning pipes for the lower chamber C′.

The overflow opening may be made in the side of the tank, as shown by dotted lines in Fig. 4, instead of using the stand pipe, but I prefer to use the stand pipe as shown.

I claim as my invention—

1. The mode herein described of treating raw sugar, said mode consisting in circulating the undissolved sugar through a receptacle in a vertical plane and continuously decanting the thin liquid as it is dissolved.

2. The combination in a dissolving apparatus, of a tank, a fixed perforated partition forming receiving and delivery chambers, a discharge pipe opening into the delivery chamber of the tank some distance from the bottom thereof, circulating pump connected to the tank, and a pipe connecting the said pump with the receiving chamber above the discharge pipe of the delivery chamber, whereby the material is circulated in a vertical plane and the thin liquid is continuously decanted as it is dissolved, substantially as described.

3. The combination in a dissolving apparatus, the tank, a receiving chamber therein, a heating chamber below the receiving chamber and separated therefrom by a perforated partition, a delivery chamber at the side of the receiving chamber and also separated therefrom by a perforated partition, an outlet pipe opening into said delivery chamber, with a pump communicating with the heating chamber and discharging into the receiving chamber, substantially as described.

4. The combination of the tank, the horizontal perforated partition B therein forming an upper chamber C and a lower chamber C′, a vertical shaft, stirrers thereon, one set of stirrers being in the upper chamber and the other set in the lower chamber, an outlet opening communicating with the upper chamber and a pump for carrying the material from the bottom of the lower chamber and discharging into the upper chamber, substantially as described.

5. The combination of a dissolving tank, the horizontal partition B and the vertical partition B′ forming three chambers in the tank, stirring blades in the upper and lower chambers, an overflow pipe in the side chamber and extending into the lower chamber, said overflow pipe being removable so that the entire contents of the melter can be discharged, substantially as set forth.

6. The combination of the tank, the horizontal perforated plate forming with the sides of the tank an upper chamber C and a lower chamber C′, a vertical shaft, stirring blades mounted on said shaft, one set of blades being in the upper chamber C and the other set of blades being in the lower chamber C′, a heating pipe in the lower chamber, a side chamber C^2 communicating with the upper chamber and separated from the said chamber by a perforated plate, a removable overflow pipe in said side chamber, a pump communicating with the lower chamber and with the upper portion of the upper chamber, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE M. NEWHALL.

Witnesses:

WILLIAM A. BARR,

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