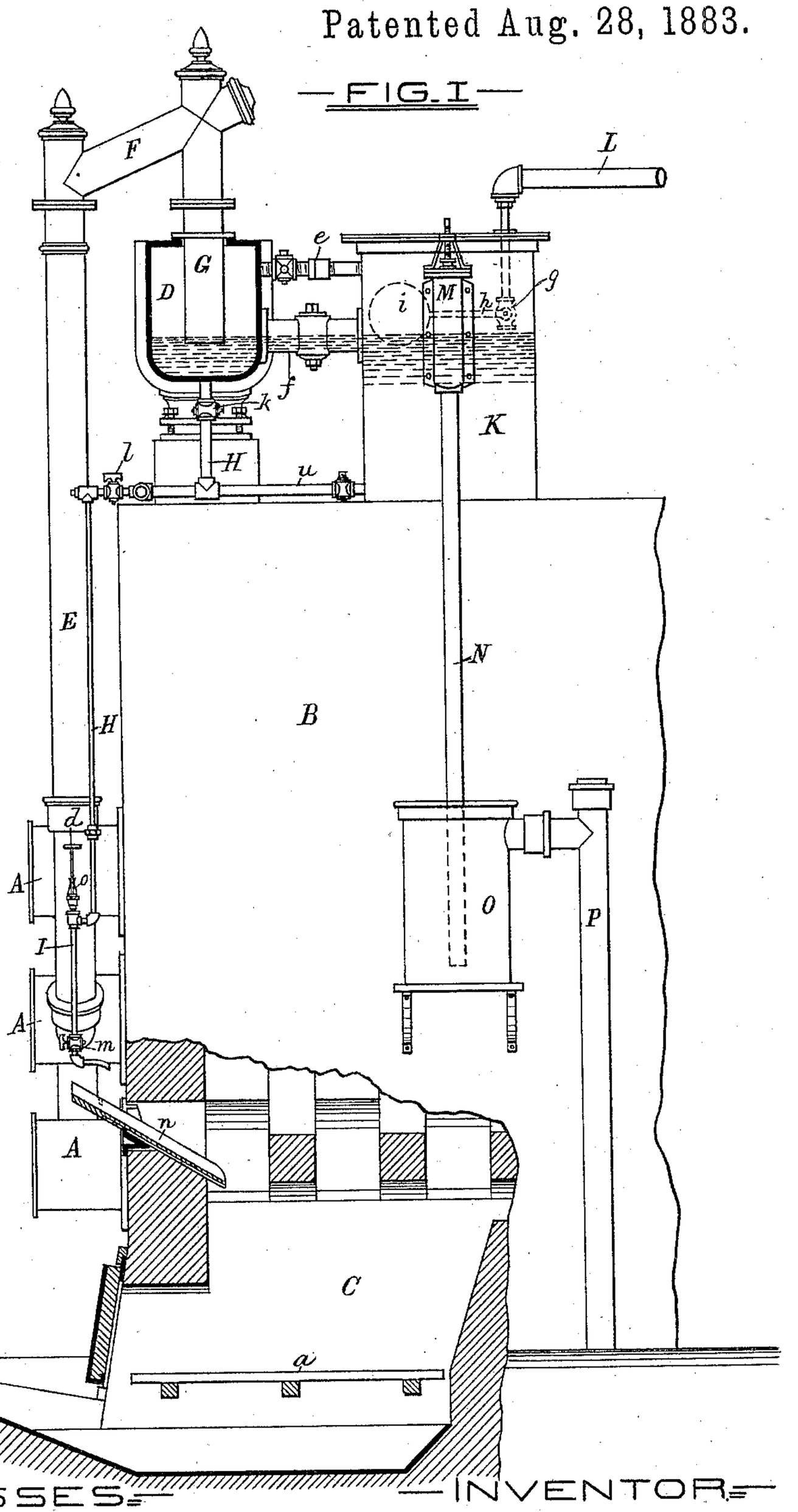
(No Model.) 2 Sheets—Sheet 1.

F. C. KNIESE.

GAS MAKING APPARATUS.

No. 283,897. Patented Aug. 28, 1883.

FIG. I



WITNESSES:

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INVENTOR:

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attys.

(No Model.) 2 Sheets—Sheet 2.

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FIG. II.

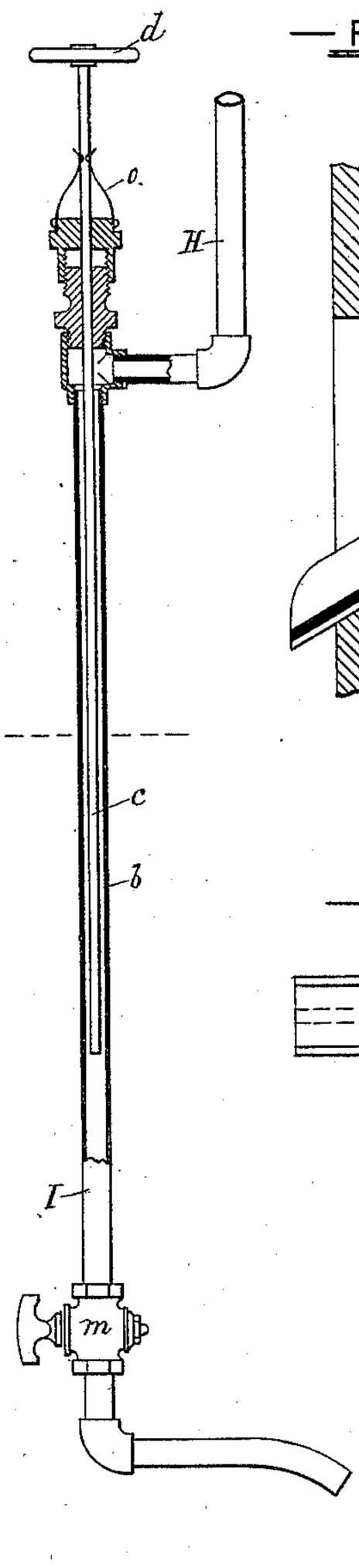

FIG. III.

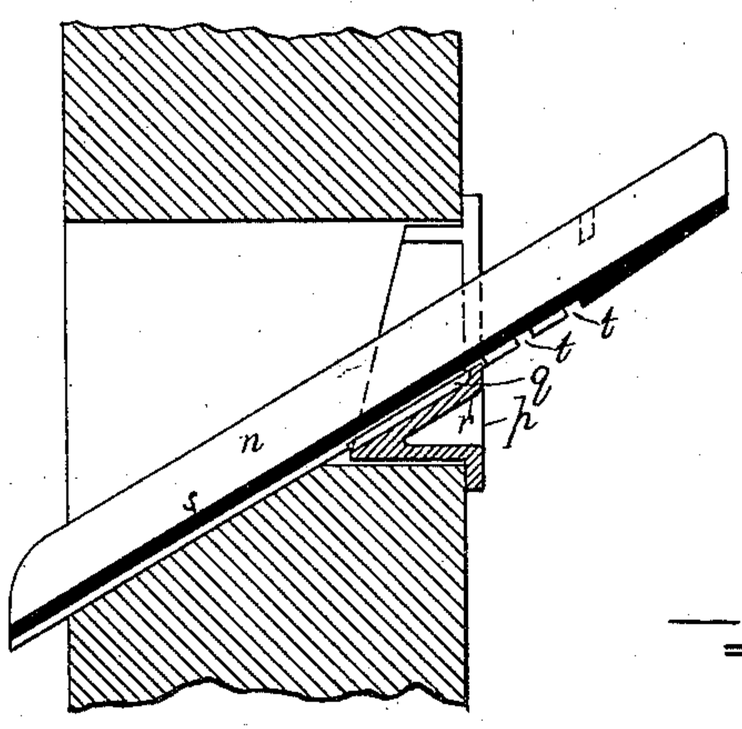

FIG. IV.

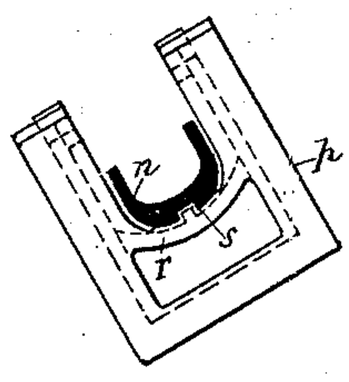

FIG. V.

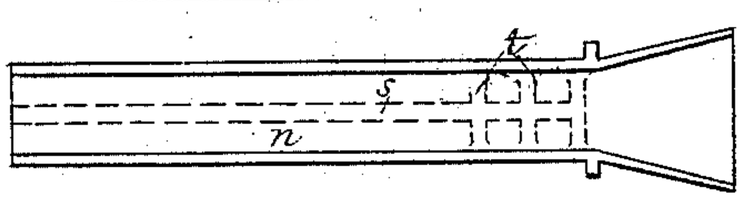

FIG. VI.

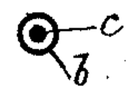

FIG. VII.

FIG. VIII.

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UNITED STATES PATENT OFFICE.

FREDERICK CHARLES KNIESE, OF BALTIMORE, MARYLAND.

GAS-MAKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 283,897, dated August 28, 1883.

Application filed March 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK CHARLES KNIESE, of the city of Baltimore and State of Maryland, have made certain Improvements in Gas-Making Apparatus, of which the following is a specification.

This invention relates to certain improvements in apparatus whereby the tar which collects in the hydraulic main is conducted to the furnace underneath the retorts to be burned as fuel, and, further, to means for maintaining a regular seal for the dip-pipe without reference to the depth of tar in the said main.

In the description of the apparatus which follows, reference is made to the accompanying drawings, forming a part hereof, and in which—

Figure I is a partly-sectional side view of a bench of retorts provided with my improved apparatus. Figs. II to VI, inclusive, are details of the apparatus on an enlarged scale. Figs. VII and VIII illustrate modifications in the construction of a part of the invention.

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

A A are retorts built in brick-work, B, in the usual manner.

C is the furnace, with grate-bars *a*.

D is the hydraulic main, which is of the type generally employed.

E, F, and G are respectively the stand-pipe, bridge-pipe, and dip-pipe, the last-named one of which enters the hydraulic main D, and is sealed by tar or water, as is usual.

H is a pipe extending from the bottom of the hydraulic main D to a tar-regulating valve, I. This valve consists of a pipe, *b*, having a central rod, *c*, which is vertically adjustable therein, and a handle, *d*, for elevating and depressing the said rod. The tar-regulating valve is shown in section and on an enlarged scale in Fig. II.

K is a tank in communication with the hydraulic main D by means of pipes *e* and *f*, both of which are provided with suitable cocks or valves.

L is the water-supply pipe to carry water to the tank K. The lower end of the pipe L is provided with a cock, *g*, the key of which has a lever, *h*, having a float, *i*, at its free end. M is an overflow-valve located exteriorly of the tank K, and N a pipe to conduct the overflow to a drip-pot, O. The drip-pot also has an overflow-pipe, P, leading to the tar-well. (Not shown.)

Parts of the invention not yet alluded to will be described and their uses fully set forth in the description of the operation of the apparatus which follows.

Supposing the gas-making apparatus to be in full operation, the grate-bars covered with heated coke, and the dip-pipe sealed with tar, the cocks *k* and *l* in the pipe H and the one, *m*, at the lower end of the tar-regulating valve I are opened, when tar flows from the said main to a chute or trough, *n*, and thence to the furnace C, where it is burned to heat the retorts.

By referring to Figs. II and VI it will be seen that the rod *c* is considerably smaller in diameter than the inside of the pipe *b;* consequently there is an annular space around the rod *c* through which the tar has to pass before reaching the lower end of the valve I. Now, it is found in practice that an ordinary cock or valve cannot be used to effect a regular discharge of tar, owing to the viscous nature of the material and its tendency to clog contracted apertures, and particularly where the discharge is around angular surfaces, as in stop valves and cocks. These difficulties in the discharge of tar through a small pipe are obviated by the employment of the valve I, in which the rapidity of discharge is controlled, not by varying the size of the discharge-apertures, but by increasing or diminishing the friction of the downwardly-moving current by depressing or elevating the rod *c*. To fully understand this principle it must be borne in mind that the tar, in passing through the annular space around the rod *c*, is retarded by two frictional surfaces—viz., the inner surface of the pipe *b* and the outer surface of the rod *c*—and this retardation depends on the length of the rod *c* exposed to the action of the tar.

The rod *c* may be threaded where it passes through a plug or cap at the upper end of the pipe *b;* but I prefer to have it plain or threaded and depend on springs *o* to retain it at any desired height.

The chute or trough *n* is a removable device which passes through an aperture in the wall of the furnace; and in order that its projection within the furnace may be adjusted, I provide the outer end of the said aperture with a

casting, *p*, having a tongue, *q*, and cross-piece *r*, and the chute with a groove, *s*, and notches *t*, as shown in Figs. III, IV, and V. The tongue and groove prevent lateral displacement of the chute, while it is held in the other direction by the entrance of the cross-piece *r* in one of the notches *t*, as will be readily understood.

The object of the cock *m* is to shut off the discharge through the valve I in case the tar becomes exhausted, or when the furnace is to be clinkered.

It is intended that the tar should be used with the same rapidity as it is formed and a regular seal maintained; but in practice this uniformity of production and consumption cannot be obtained. I therefore use water in connection with tar in the hydraulic main and regulate the height of the former by means of the ball-cock *g*, before described.

Should the discharge of tar through the pipe H be greater than that warranted by the deposition of tar and ammoniacal liquid from the dip-pipe, the downward movement of the float *i* causes the cock *g* to be opened, and water is admitted to the tank K and the hydraulic main D to maintain the proper seal. The depth of seal may be changed at pleasure by adjusting the tar-overflow valve *m*, which is of ordinary construction, and needs no description herein.

In the proper working of the apparatus—that is to say, when all the tar produced is burned as fuel, (and it is found by experiment that a furnace can about consume the production of tar from six retorts)—the tank K will contain water only; but as this consumption of tar cannot be regularly depended on, the overflow through the valve M and pipe N will at times consist of tar; hence the connection of the pipe P to the tar-well.

The pipe *e* is only necessary to aid in equalizing the pressure in the hydraulic main and the tank K. The pipe *u* is used only when it is necessary to empty the tank K. While it is preferred to have the pipe *b* of the valve I of circular cross-section, as shown in Fig. VI, it may be square or triangular, as shown in Figs. VII and VIII, as desired.

I claim as my invention—

As an improvement in gas-making apparatus, the hydraulic main in communication with a water-tank having a water-supply pipe and a ball-cock to regulate the height of water in the said main and tank, combined with a tar-regulating valve and a discharge leading to the furnace under the retorts, substantially as specified.

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Witnesses:

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