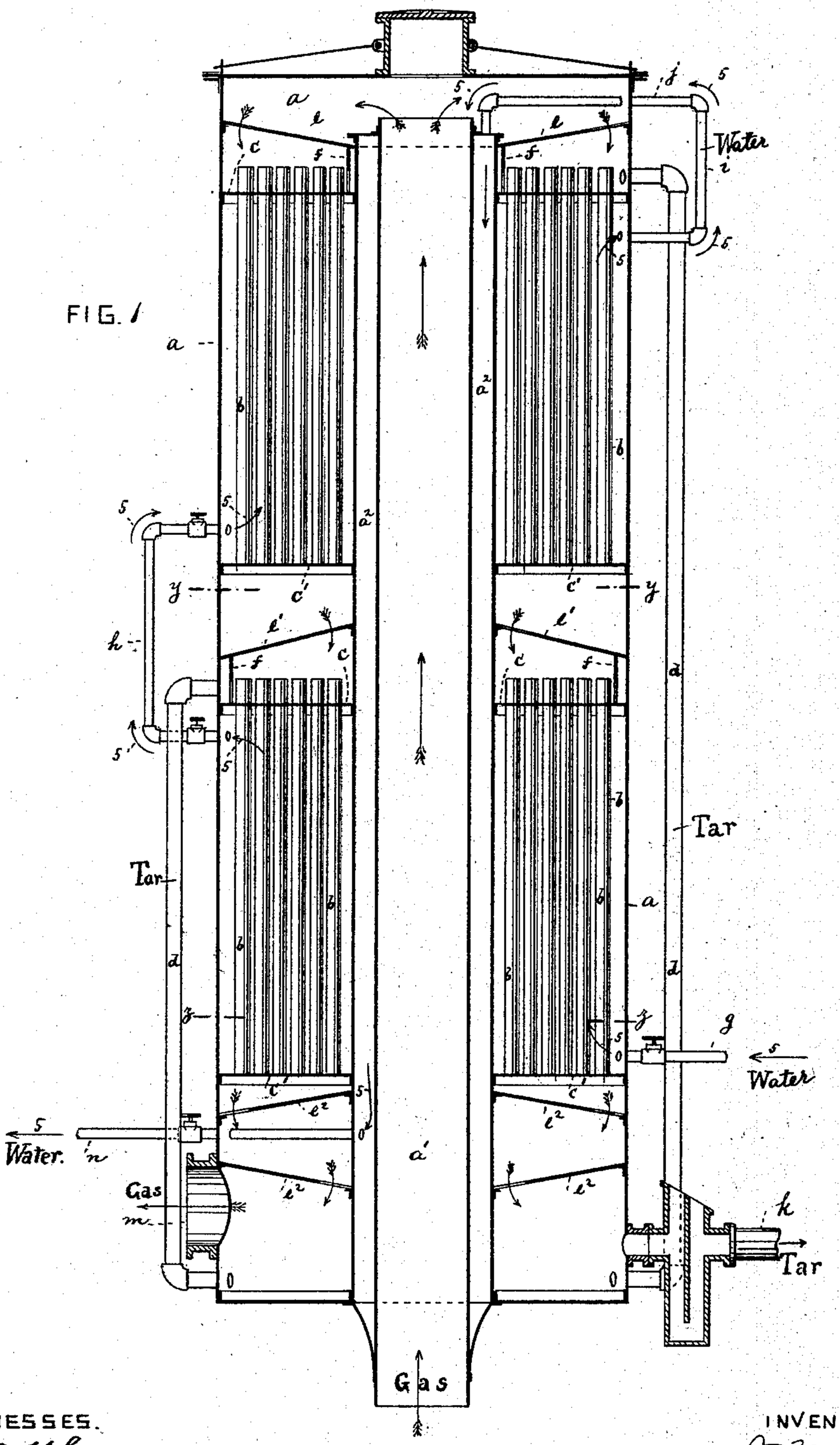
(No Model.) 2 Sheets—Sheet 1.

F. BREDEL.

GAS CONDENSER AND TAR SEPARATOR.

No. 388,474. Patented Aug. 28, 1888.

FIG. 1



WITNESSES.
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Alfred Jonghmans

INVENTOR.
F. Bredel.
by his attorneys.
Roeder & Briesen.

(No Model.) 2 Sheets—Sheet 2.

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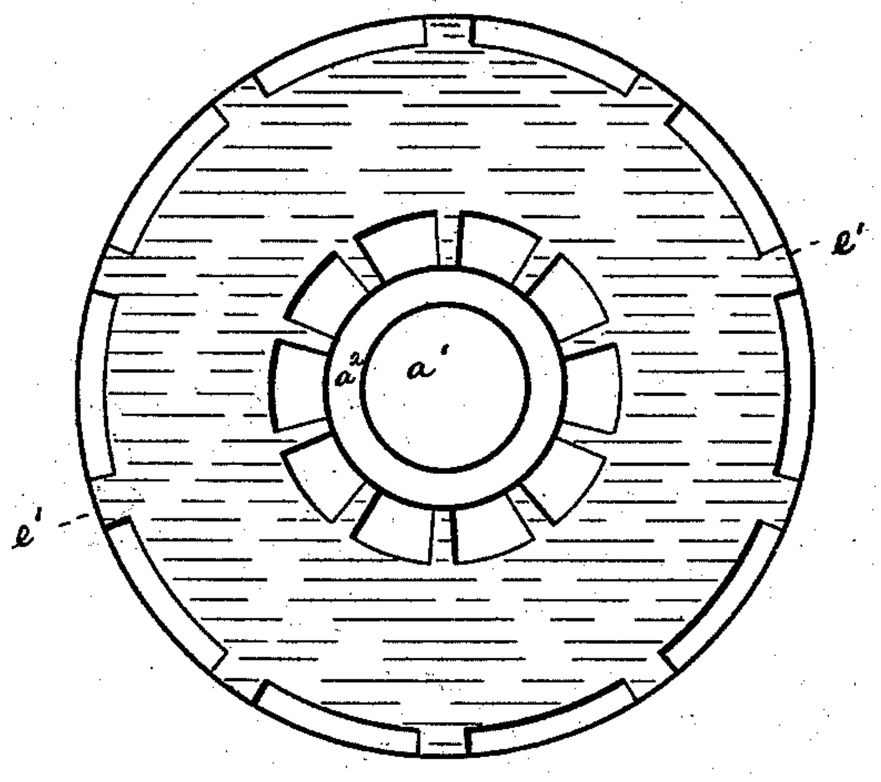

FIG. 2

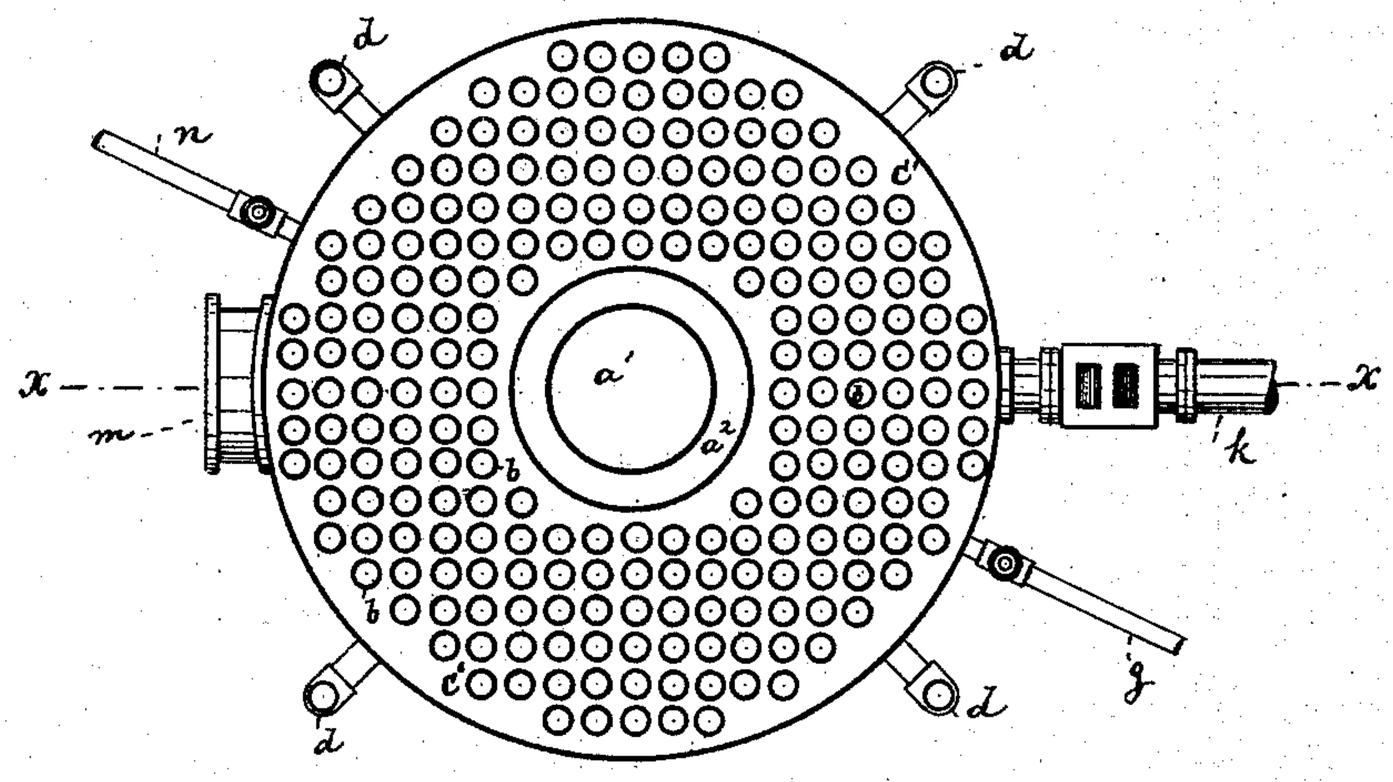

FIG. 3

WITNESSES.
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UNITED STATES PATENT OFFICE.

FREDERICK BREDEL, OF NEW YORK, N. Y.

GAS-CONDENSER AND TAR-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 388,474, dated August 28, 1888.

Application filed April 4, 1888. Serial No. 269,615. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK BREDEL, of New York city, New York, have invented a new and Improved Gas-Condenser and Tar-Separator, of which the following is a specification.

This invention relates to a gas-condenser and tar-separator of improved construction for cooling the gas and extracting the tar. The object of the invention is to produce a machine which will rapidly and effectively attain the desired result.

The invention consists in the various features of improvement more fully pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical central section of my improved gas-condenser on the line *x x*, Fig. 3. Fig. 2 is a horizontal section on the line *y y*, Fig. 1; and Fig. 3, a horizontal section on line *z z*, Fig. 1.

The letter *a* represents the cylindrical body or case of the condenser, having a central tubular passage, *a'*, opening into the case on top. Within the case *a* there are contained two (more or less) tiers of upright tubes, *b*, open at both ends. These tubes are secured in position by means of the annular horizontal plates *c c'*, perforated for the admission of the tubes and secured to the inner side of the case *a*. The plates *c c'* form or inclose a water and gas tight chamber through which the tubes *b* pass. The plates *c* embrace the tubes *b* near their upper ends, while the plates *c'* support the tubes at their base.

A short distance above each of the plates *c* there enter into the case *a* a series of elbow-pipes *d*, which extend downward at the outside of the case, and thence re-enter the case near its bottom. These pipes *d* constitute the tar-outlet pipes.

Above each of the plates *c* there is placed an inclined annular conical shield or plate, *e e'*, of peculiar construction. The uppermost plate, *e*, slopes from the periphery of case *a* toward the tube *a'*, where it is supported upon plate *c* by an open flange, *f*. This plate *e* has large openings near its periphery for the passage of gas, and small openings between flange *f* and tube *a'* for the passage of tar. The plate *e'* over the second tier of tubes *b* is of the reverse construction as the uppermost plate *e*—that is to say, it slopes from the center downward and has the large gas openings near its center, while it has the small tar-holes at its periphery, Fig. 2. If more than two tiers are used in the apparatus, each tier is constructed similar to the uppermost tier shown—that is, it is placed between an upper plate, *e*, and a lower plate, *e'*. Below the lowermost plate, *e'*—that is, in the bottom of case *a*—there are arranged an additional pair of inclined plates, e^2. These slope in opposite directions and have only the large openings, while the small openings are dispensed with. The space within the case *a*, between the tubes *b*, is filled with running water. The course of the water is as follows: it enters by inlet *g* between lowermost tier of tubes, and thence passes by tube *h* between uppermost tier of tubes. Thence it passes through tubes *i j* into an annular tube, a^2, surrounding tube *a'*. From the bottom of this tube the water is discharged at *n*. The course of the water is indicated in the drawings by the arrows marked 5.

The operation of the apparatus with water circulating as described is as follows: The impure gas enters the bottom of tube *a'* and is discharged from the upper end of said tube into the top of case *a*. Here it turns to the sides and then downward, falling upon plate *e*. The first separation of tar from gas will now take place, the tar flowing down the inclined plate *e*, and thence through the small openings and through the open flange *f* upon top plate, *c*, from whence it enters the tubes *d*. The tubes *d* conduct the tar to the bottom of the case *a*. The gas, with the remaining tar, passes through the large peripheral openings of plate *e*, thence flows down between uppermost tier of tubes *b* until it strikes the second plate, *e'*. Here the second separation of tar takes place, the tar again flowing down the incline of plate *e'* upon plate *c*, from which it is discharged by tubes *d*. The gas, with the still-remaining tar, passes through the large central openings of plate *e'*, thence flows down between the lowermost tier of tubes *b* and upon the inclined plates e^2. The tar will now settle with the tar from tubes *d* upon the bottom of case *a*, and after it has assumed a certain height will be discharged through a siphon, *k*. The gas, properly purified, will be discharged through the outlet *m*.

What I claim is—

1. In a gas-condenser and tar-separator, the combination of an upright outer casing, a gas-adit pipe, annular tiers of surrounding tubes, horizontal annular plates forming or inclosing water and gas tight chambers through which the tubes pass, conical perforated shields above each tier, alternate shields being inverted, tar-pipes extending from above each horizontal annular plate to the bottom of the apparatus, water-pipes connecting the several spaces between the tiers of tubes with a water-inlet, and a gas exit pipe near the bottom of the casing, substantially as specified.

2. In a gas condenser and tar-separator, the combination of an upright outer casing, a central vertical gas-adit tube extending from the bottom of the purifier nearly to the top thereof, tiers of annular series of vertical tubes surrounding said central tube, perforated plates over each end of the latter tubes and forming in each tier a water space around the tubes thereof, and forming between the several tiers and above and below them annular chambers connected with said tubes, a truncated conical perforated shield in each of said chambers, alternate shields being inverted, a pipe extending from the bottom of each of the upper annular chambers to the bottom of the lower one, and water-connections for each tier of tubes, and a gas-exit provided near the bottom of the casing, substantially as specified.

FREDERICK BREDEL.

Witnesses:
F. v. BRIESEN.
ALFRED JONGHMANS.