

(No Model.)

4 Sheets—Sheet 1.

T. CRANEY.  
EVAPORATING APPARATUS.

No. 528,859.

Patented Nov. 6, 1894.

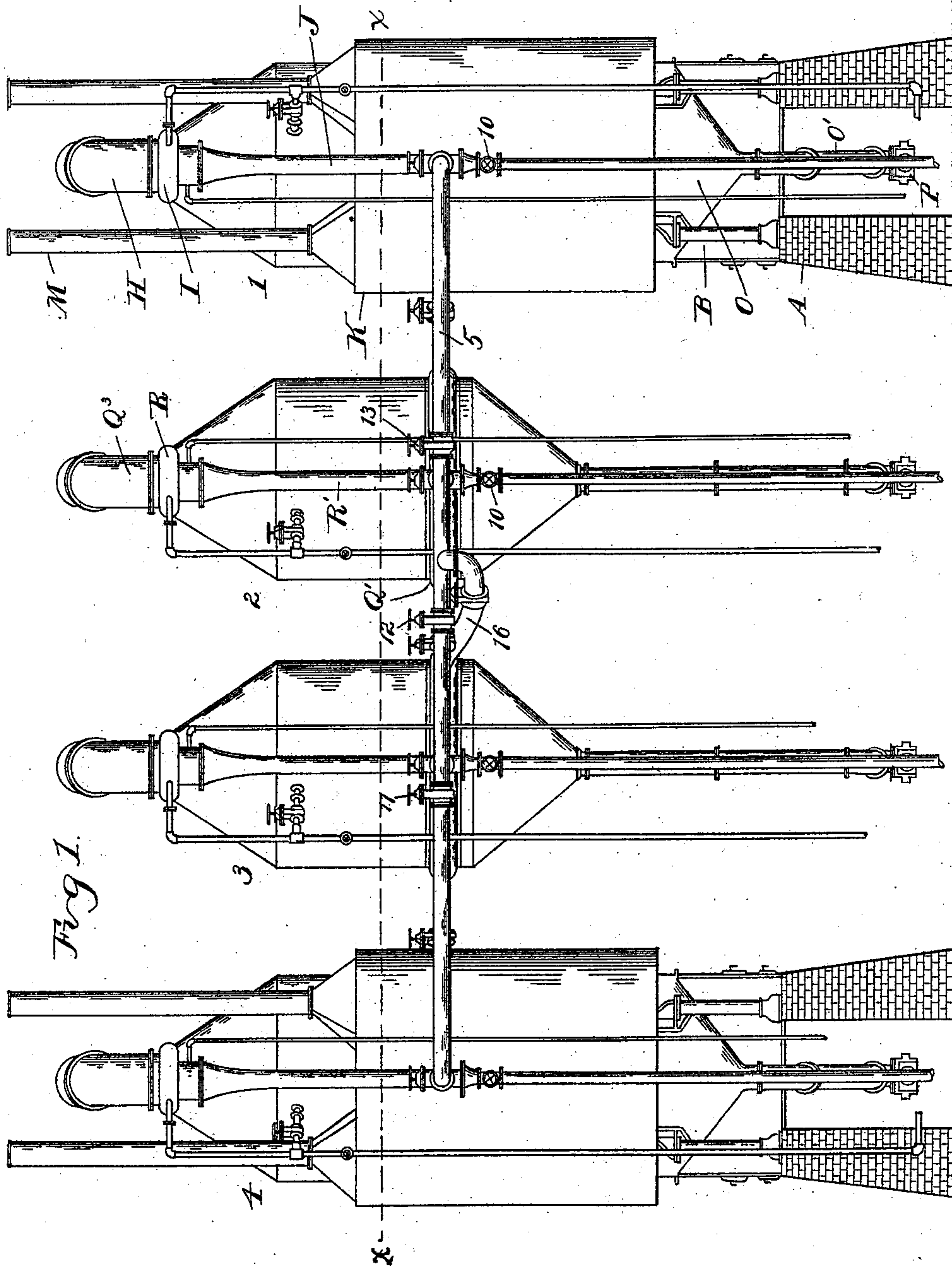


Fig. 1.

Witnesses  
A. L. Stubby  
M. D. Doghearty

Inventor  
Thomas Craney  
By Wm. S. Spague & Son  
Attys.

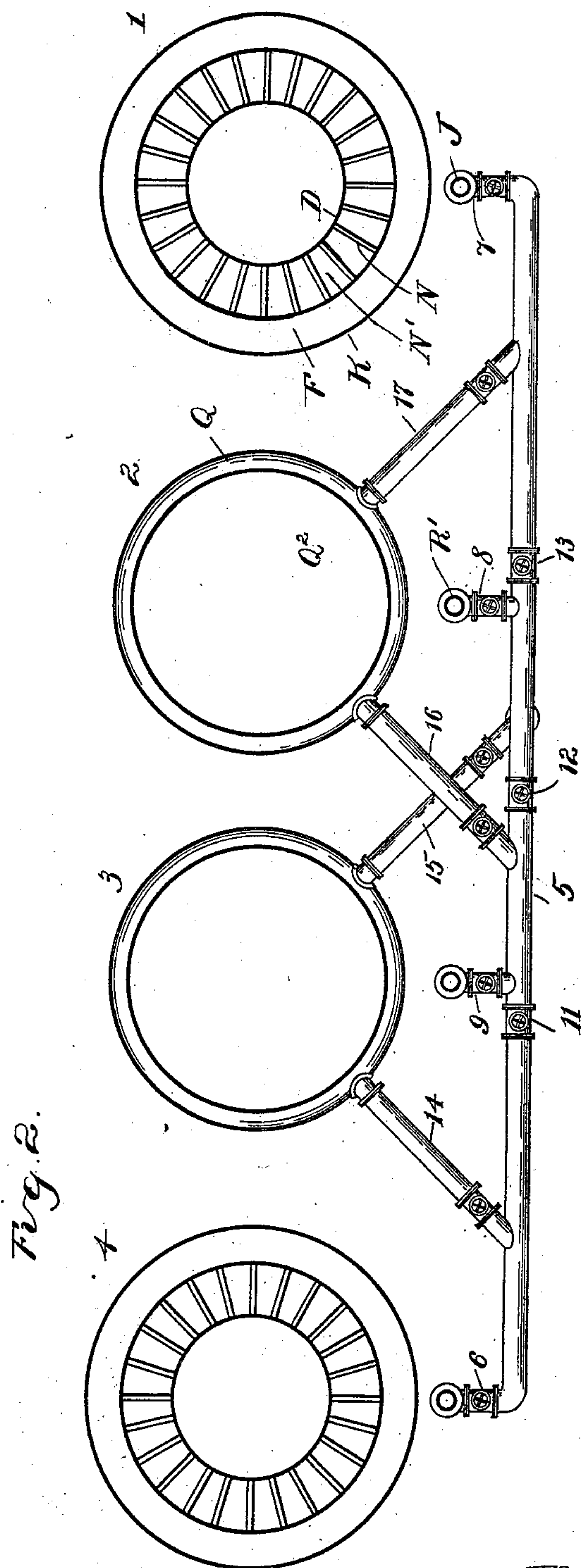
(No Model.)

4 Sheets—Sheet 2.

T. CRANEY.  
EVAPORATING APPARATUS.

No. 528,859.

Patented Nov. 6, 1894.



Witnesses  
A. L. Hobby  
M. B. McPherson

Inventor  
Thomas Craney  
By Thos. S. Spaguet Son,  
Attys.

(No Model.)

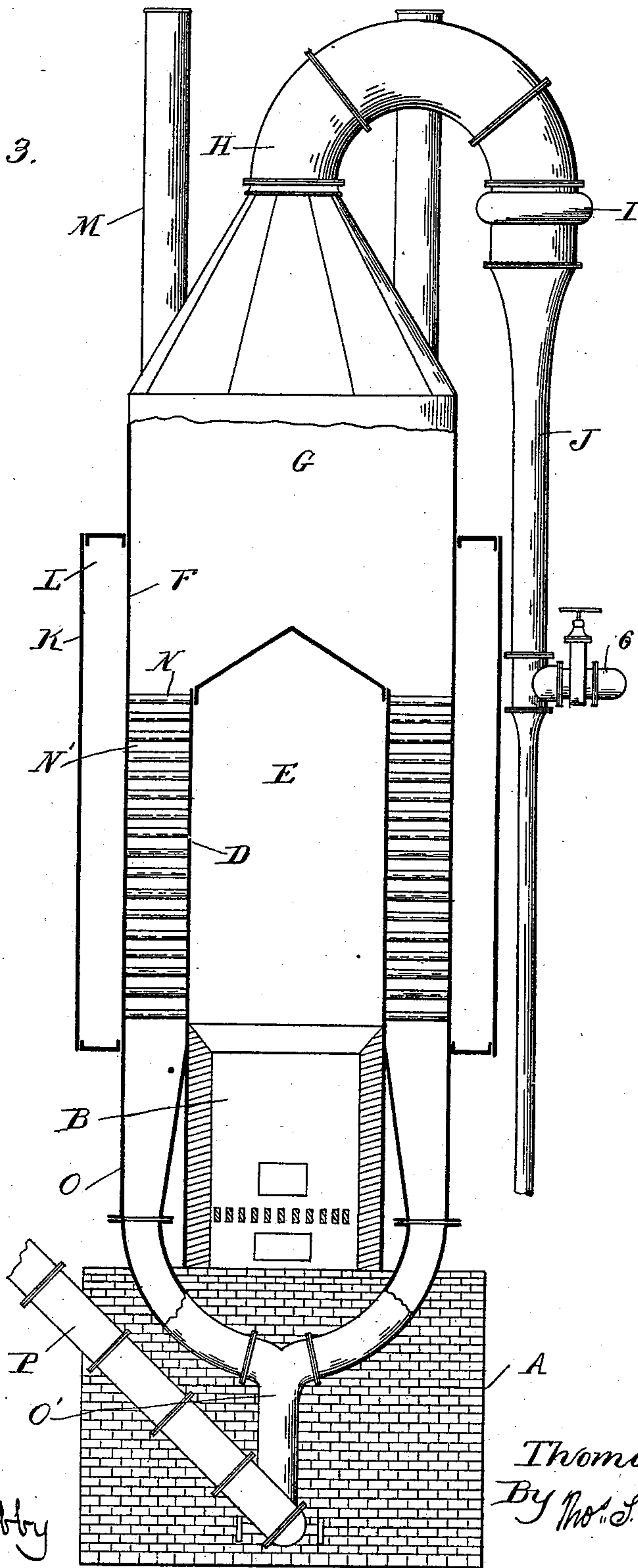
4 Sheets—Sheet 3.

T. CRANEY.  
EVAPORATING APPARATUS.

No. 528,859.

Patented Nov. 6, 1894.

Fig. 3.



Witnesses  
W. L. Stobby  
M. M. Murphy

Inventor  
Thomas Craney  
By Wm. S. Sprague & Son  
Attys.



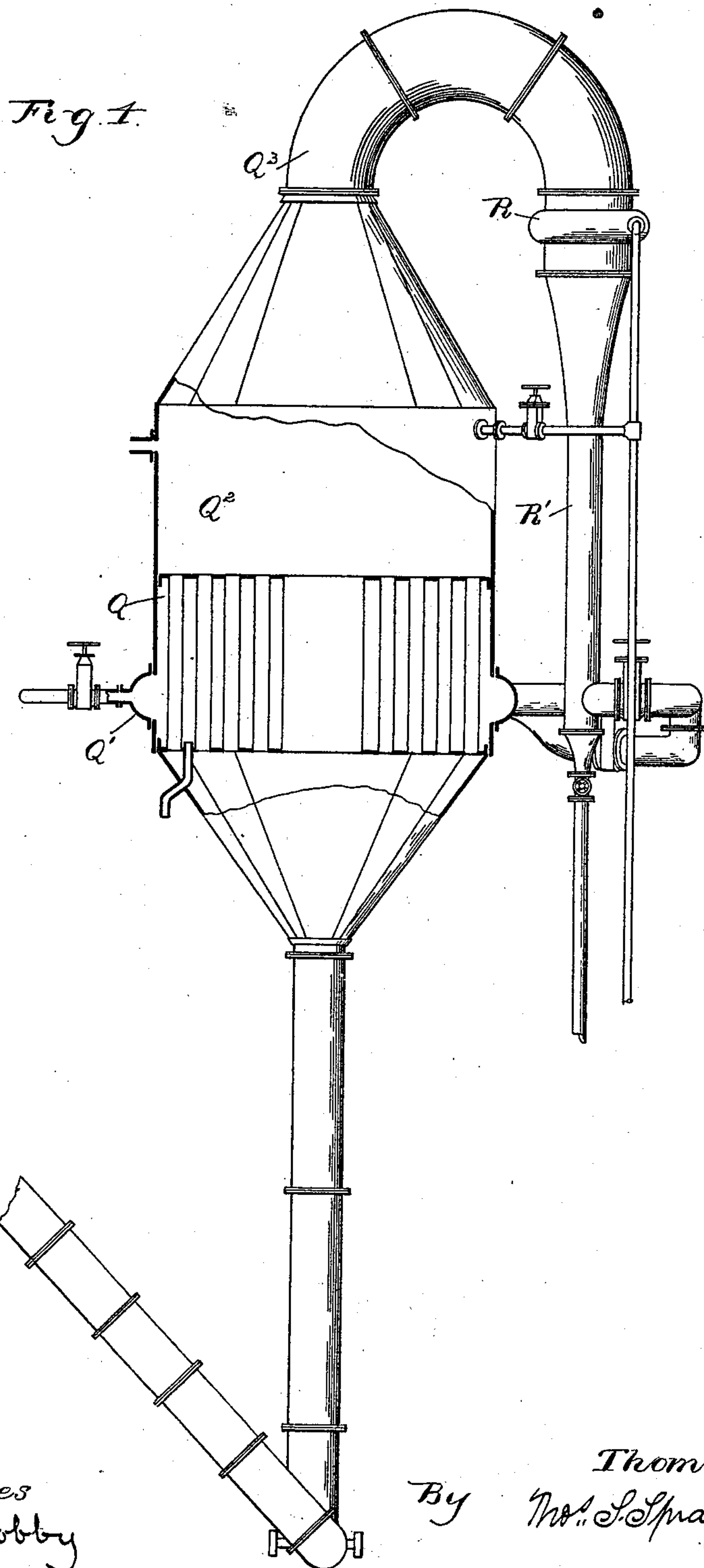
(No Model.)

4 Sheets—Sheet 4.

T. CRANEY.  
EVAPORATING APPARATUS.

No. 528,859.

Patented Nov. 6, 1894.



Witnesses  
A. L. Hobby  
M. D. Murphy

Inventor  
Thomas Craney  
By Messrs. S. Sprague & Son  
Attys.

# UNITED STATES PATENT OFFICE.

THOMAS CRANEY, BAY CITY, MICHIGAN.

## EVAPORATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 528,859, dated November 6, 1894.

Application filed April 7, 1894. Serial No. 506,709. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS CRANEY, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Evaporating Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention consists in the peculiar construction of a furnace evaporating pan and its combination with steam evaporating pans, whereby the steam generated in the first pan may be used for double or triple expansion  
15 in the steam pans.

The invention further consists in the combination with two furnace pans of an intermediate series of steam pans adapted to be connected therewith, so that either furnace  
20 pan may be used independently or for double expansion, or either may be used for triple expansion, and further, in the peculiar construction, arrangement, and combination of the various parts.

25 Figure 1 is a front elevation of my improved apparatus. Fig. 2 is a horizontal section on line  $x x$ , Fig. 1. Fig. 3 is a vertical, central, longitudinal section through one of the furnace pans. Fig. 4 is a similar section  
30 through one of the steam pans.

The furnace evaporating pans are alike. Therefore a description of one will suffice for both.

35 A is a suitable foundation wall. B is a furnace thereon, preferably having feed doors on each side.

D is a casing extending above the furnace and within which is formed the combustion chamber E.

40 F is a casing arranged concentrically to the casing D and extending above the same, forming within the evaporating chamber G.

H is a goose neck on top of the evaporating chamber for carrying off the vapors. I  
45 is a condenser in the downward portion of said goose neck.

J is the discharge pipe below the condenser.

50 Outside of the casing F is an annular casing K forming between it and the casing F a smoke chamber L, which connects at the top into suitable exit flues or chimneys M.

N is a series of tubes connecting the chambers E and L and passing through the annular heating chamber N' surrounding the combustion chamber.

O is a settling chamber below the furnace and connecting with the lower end of the chamber N'.

O' is the settling leg in the lower end into which a suitable elevator P may be connected  
60 for carrying off the salt crystals.

The steam evaporating pans comprise a steam chamber Q connected with an outer steam ring Q', and evaporating chamber Q<sup>2</sup>, a goose-neck Q<sup>3</sup>, a condenser R in the discharge leg thereof, and a discharge pipe R'  
65 from the condenser.

I preferably arrange a furnace evaporating pan, 1, in connection with two steam evaporating pans 2, 3, with suitable connections,  
70 so that the furnace evaporating pan may be used independently or may be used for double or triple expansion, in connection with the steam pans. As such furnace pans may often need repairs, I may arrange a second furnace  
75 pan 4 in similar relation to the steam pans, but at the other end with connecting pipes, so that this pan may also be used independently, or in connection with the steam pan for double or triple evaporation, or I may use  
80 both of the furnace pans together, or in connection with the steam pans to effect a double evaporation of both. The connecting pipes are shown in Fig. 2 and comprise what I call the trunk pipe 5 having valved branches 6,  
85 7, 8 and 9, into which the discharge from the two furnace pans and the two steam pans connect, each of these discharge pipes being provided below the trunk pipe with the controlling valve 10.

11, 12 and 13 are valves in the trunk pipe.

14, 15, 16 and 17 are valved pipes connecting the trunk pipe with the steam ring of the steam pans, two for each pan.

The parts being thus constructed their  
95 operation is as follows: If I desire to use both of the vacuum pans for double expansion, fire being started in both of the furnaces, the steam being generated therein and passing out of the goose necks to both pans and into  
100 the trunk pipe through the branches 14 and 17 respectively and into the steam ring and



steam chamber of the two steam pans, effect-  
ing evaporation therein, the vapor being dis-  
charged through the goose necks of the steam  
pans, the condensers of both pans being in  
5 operation. If it is desired to use but one  
furnace for triple expansion, say the furnace  
pan 1, the vapor will pass from that pan into  
the trunk pipe, through the branch 17, into  
the steam ring of the pan 2, the vapor from  
10 which will pass through the goose neck into  
the branch 8 and thence through the pipe 15  
into the steam ring and steam chamber of  
pan 3, the vapor from which will pass out  
through its goose neck, the condenser in the  
15 discharge pipe being in operation. It is evi-  
dent that the same arrangement may be ac-  
complished, starting with the furnace pan 4.

What I claim as my invention is—

1. In an evaporating apparatus, the com-  
20 bination with the furnace, of an evaporating  
pan thereon, a settling leg and a valved vapor  
discharge pipe, of a plurality of evaporating  
pans having steam heating chambers, settling  
legs and valved vapor discharge pipes, a trunk  
25 pipe into which the discharge pipes lead, the

valved branch pipes 14, 15 leading from the  
trunk pipe into the heating chamber of one  
of the pans, the valved branch pipe 16 lead-  
ing into the heating chamber of the other  
pan, and the valve 12 in the trunk pipe be- 30  
tween the pipes 15 and 16, substantially as  
described.

2. In an evaporating apparatus, the com-  
bination with a plurality of furnaces, of  
evaporating pans above the same, each pro- 35  
vided with settling legs, and valved discharge  
pipes, a plurality of intermediate evaporat-  
ing pans each having steam heating chambers,  
settling legs, valved discharge pipes and con-  
densers, a trunk pipe connecting the dis- 40  
charge pipes of all the pans and a plurality  
of valved pipes leading from the trunk pipe  
into each intermediate pan, substantially as  
described.

In testimony whereof I affix my signature in 45  
presence of two witnesses.

THOMAS CRANEY.

Witnesses:

M. B. O'DOGHERTY,  
O. F. BARTHEL.