

(No Model.)

H. B. FORD.

CONDENSER FOR ICE MACHINES.

No. 363,455.

Patented May 24, 1887.

Fig. 1.

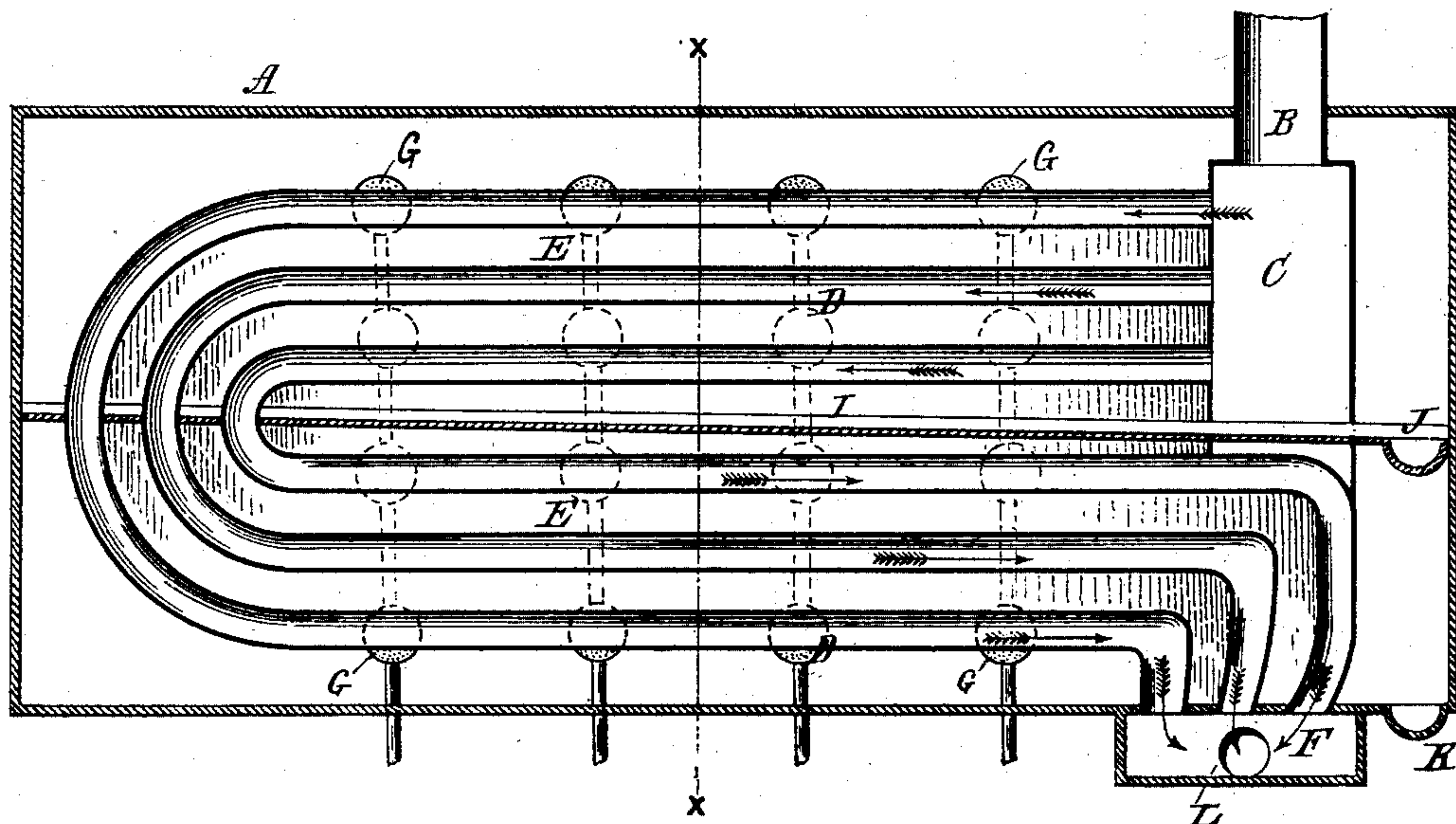
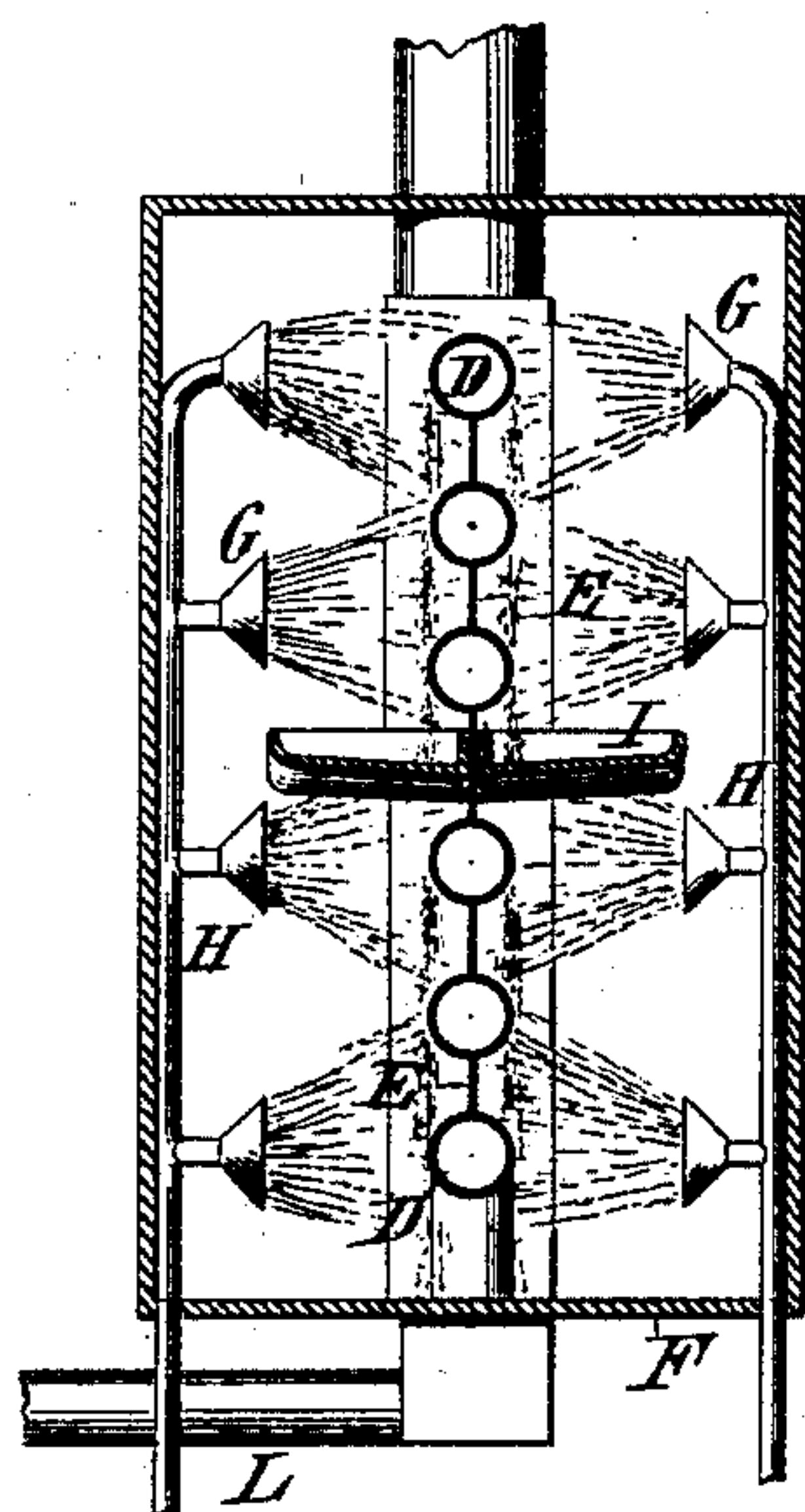


Fig. 2.



WITNESSES:

Gustave Dietrich
C. A. Dietrich

INVENTOR

Henry B. Ford
BY *Barth Benjamin*
his ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY B. FORD, OF NEW YORK, N. Y., ASSIGNOR TO PERKINS & WELSH, OF SAME PLACE.

CONDENSER FOR ICE-MACHINES.

SPECIFICATION forming part of Letters Patent No. 363,455, dated May 24, 1887.

Application filed October 13, 1886. Serial No. 216,108. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. FORD, of the city, county, and State of New York, have invented a new and useful Improvement in Condensers for Ice-Machines, of which the following is a specification.

My invention relates to an apparatus for condensing the gas which has been produced from a volatile liquid during the process of refrigeration in an ice-machine back into liquid form. Such a gas, for example, is obtained by the evaporation of liquid sulphurous oxide.

My invention consists more particularly in the construction and arrangement of the apparatus hereinafter set forth.

In the drawings, Figure 1 is a vertical longitudinal section of my condenser. Fig. 2 is a transverse section on the line *x x* of Fig. 1.

Similar letters of reference indicate like parts.

A represents the casing of the apparatus, which may be of any desired size or shape. The incoming gas to be condensed enters by the pipe B, thence passes to a chamber, C, and from said chamber proceeds through the system of return-tubes D. Said tubes are placed in a vertical plane, and between them are vertical partitions E. I here show three return-tubes D; but the number of said tubes is not material, and may be increased or diminished in accordance with the desired capacity of the apparatus. The tubes may be of copper or other suitable metal, and the intervening partitions E are also of metal. The tubes may terminate in a chamber, F, with which communicates an outflow-pipe, L, for the liquid resulting from the condensation.

Within the casing A, and on each side of the system of tubes D, is arranged apparatus for projecting upon said tubes sprays or jets of a refrigerated liquid—such, for example, as cold water. I show here a series of roses, G, communicating with supply-pipes H, from which roses the liquid is thrown upon the tubes D, suitable pressure being applied to the liquid by a force-pump or any other known device. (Not represented.) I do not limit myself to this means or mode of projecting the sprays of cold liquid, because various other forms of apparatus for the purpose are well known and may be substituted for the contrivance here shown. Thus I may employ jets of liquid produced by atomizers, using an air-blast.

On each side of the tube system is supported an inclined trough or gutter, I; but one pair

of gutters is here represented, the same being disposed below the three upper tubes of the system. The object of this gutter is to catch the liquid which has been thrown upon the three upper tubes, and which has become warmed by absorption of heat from said tubes and the gas therein contained, and to conduct it away to an outflow pipe or gutter, J. In this way the aforesaid warmed liquid is prevented from reaching the lower three tubes of the series. The cold liquid which meets said lower three tubes is received upon the floor of the casing, and thence runs off by the outflow pipe or gutter K. The advantage of the aforesaid construction is, that each division or section of the condenser-tube system (a division here consisting of three tubes) is cooled independently of the other divisions or sections. I show here but two divisions; but of course if the tubes forming the system are more numerous there may be more divisions, and hence more gutters I, a gutter being provided for each division. So, also, a division may contain a greater or less number of tubes than three.

The operation of my condenser is as follows: The gas, as above stated, enters by the conduit B and circulates through the tubes D. While traversing said tubes it is refrigerated, and hence its heat is abstracted by the sprays of cold liquid which meet the exterior of the tubes, and in this way the gas becomes condensed into liquid form. This liquid escapes from the tubes into the chamber F, and finally is removed by the pipe L. The presence of the chambers C and F is not material, because the gas may be led directly into the tubes D and from said tubes directly into the outflow-pipe L.

I claim—

In a condenser for ice machines, the combination of a casing, an inlet, a receiving-chamber and an outflow-chamber, and a series of return-tubes connecting the said chambers, vertical partitions between said tubes, means—such as roses and pipes conducting liquid thereto under pressure—for projecting the liquid upon each side of said return-tubes, the inclined troughs or gutters extending lengthwise of the tubes on each side of the vertical partitions, and serving to catch and conduct away the water falling from above, and the discharge-gutters, substantially as set forth.

Witnesses:

HENRY B. FORD.

JAMES S. GREVES,
PARK BENJAMIN.