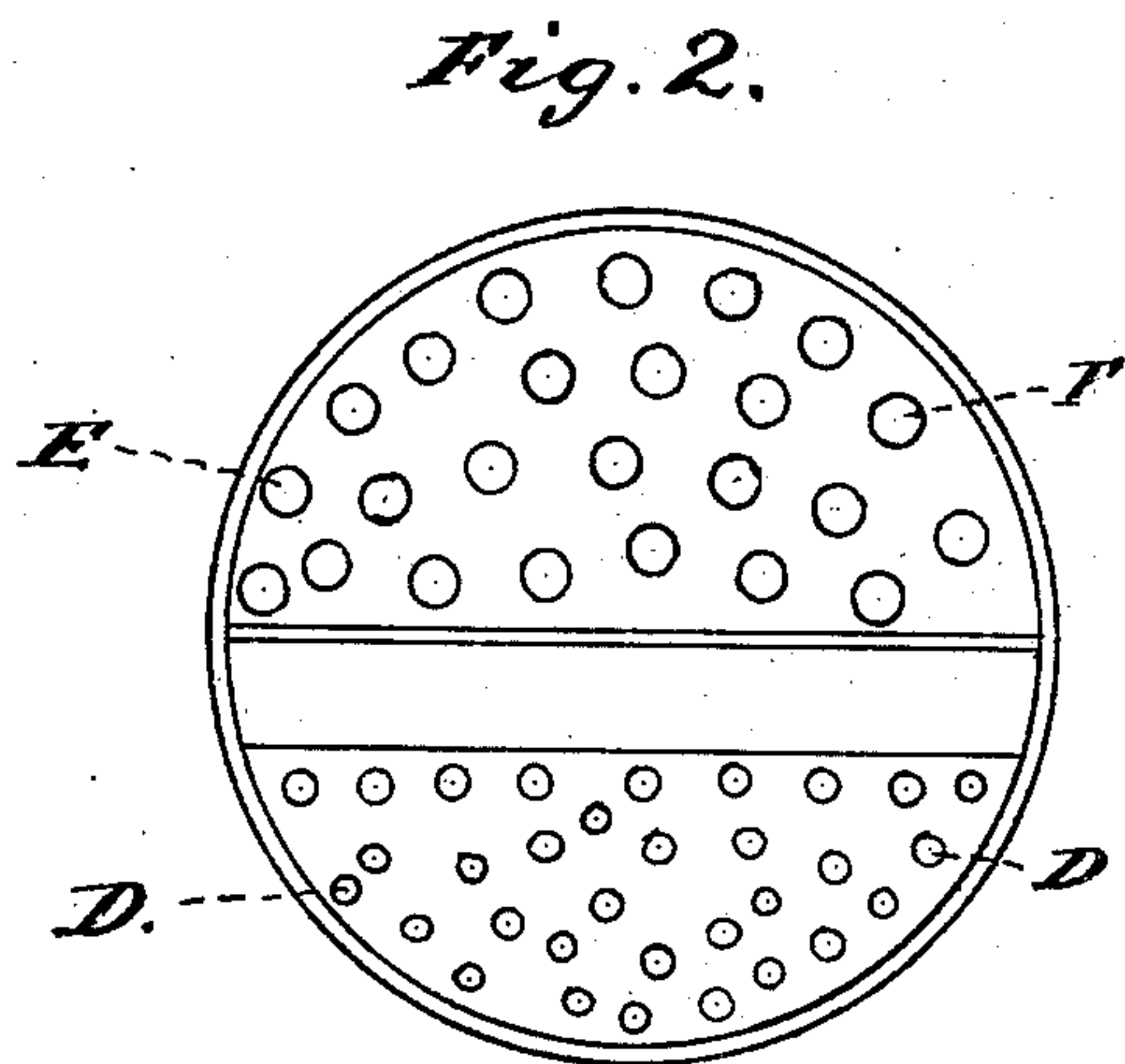
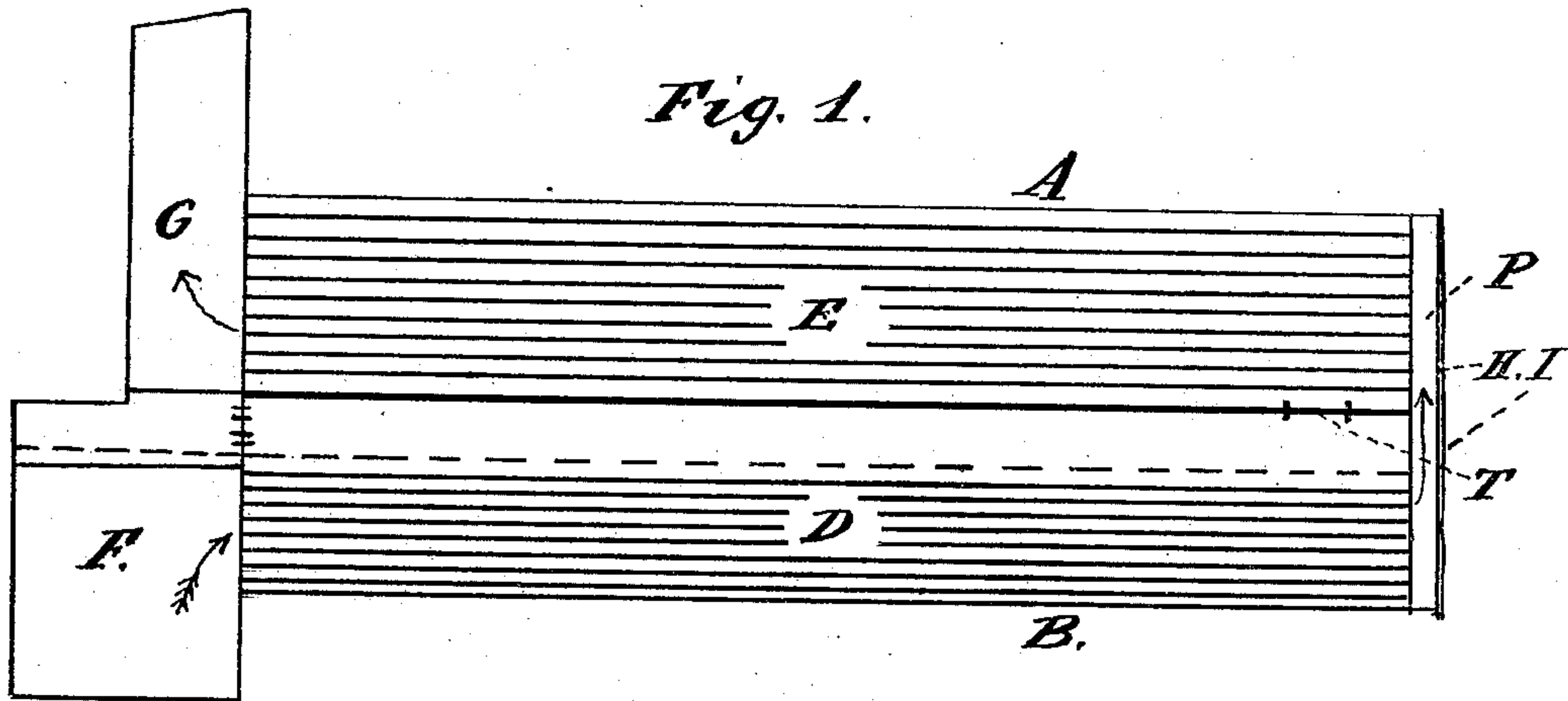


(No Model.)

A. FORD.  
STEAM BOILER.

No. 272,225.

Patented Feb. 13, 1883.



Witnesses;  
Henry J. Greene  
C. C. Linticum.

Inventor;  
Alvin Ford

# UNITED STATES PATENT OFFICE.

ALVIN FORD, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO CHARLES B. COVENTRY, OF SAME PLACE.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 272,225, dated February 13, 1883.

Application filed December 15, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ALVIN FORD, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

The object of my invention is to provide means by which an increase of power will be obtained and economy in the use of steam and fuel secured.

In the accompanying drawings, Figure 1 is a longitudinal vertical sectional view of my improved boiler, showing the internal arrangement of the heating and superheating flues; and Fig. 2 is a cross-vertical sectional view of the same, showing the relative positions of the heating and superheating compartments, partition, and steam-space.

In the drawings, A and B represent the boiler in which the heating and superheating flues are located; D, the heating-flues in the lower part of the boiler; E, the superheating-flues in the upper part of the boiler; F, the fire-chamber; G, the smoke-stack; P, the chamber or space at the front end of the boiler, into which the heating and superheating flues open through the crown-sheet, and T the opening from the steam-space over the heating-flues to the upper compartment of the boiler containing the superheating-flues.

In constructing a boiler containing my improvements I place a series of heating-flues in its lower part, which open through the crown-sheet at the rear end into the furnace or fire-chamber and open through the crown-sheet at the front ends into a chamber, say, a foot in width and extending across the front end of the boiler. Over these heating-flues I provide a steam-space, as in a boiler of the ordinary construction, and at the top of this steam-space I place a partition extending horizontally from one end of the boiler to the other and from side to side. In this way I divide the boiler into two compartments—an upper and a lower one. In the lower apartment are contained the water and the heating-flues for converting the same into wet steam. In the upper compartment I place a series of superheating-flues, opening through the crown-sheet at their front ends into the chamber above

mentioned and through the crown-sheet at their rear ends into the space leading to the smoke-stack. In the partition I provide large openings, preferably near its front end, through which the wet steam passes freely into the upper or superheating apartment of the boiler and circulates around the superheating-flues. These openings are made large and provided with no valve or other hinderance to the free ingress of the steam as it is produced from the boiling water in the lower compartment and rises into the steam-space. For the object for which these openings are provided it is not necessary nor desirable that they should be smaller than the steam-port through which the superheated steam is conveyed to the cylinders, as it is intended that they shall permit the perfectly free and unobstructed passage of the wet steam from the lower to the upper compartment. The heat and flame are drawn forward through the heating-flues in the lower compartment, and, turning, are drawn by the draft in the smoke-stack back through the superheating-flues in the upper compartment, and thence into the smoke-stack and out into the open air, as indicated by the arrows in Fig. 1. In this way the steam is superheated before it is applied to use. The smoke-stack, as shown in the drawings, is located adjacent to the cab of the locomotive. It may, however, be located at the middle or other convenient point on the boiler; but this of course shortens the length of the superheating-flues.

In order to prevent the superheating-flues in the superheating-compartment from becoming too hot and burning out, I provide a stationary perforated plate, I, at the front end of superheating boiler or compartment, so that the perforations extend through into the chamber P, above described, against which I place an adjustable perforated plate, H, which may be adjusted up and down or from side to side, so as to bring its perforations over the perforations in the stationary piece or away from them, as desired. I connect the movable perforated plate H with a rod or lever extending back to the cab, and by means of which the engineer may adjust the same so as to make its perforations correspond with the perforations in the stationary plate or otherwise, as



desired. When the superheating-flues are in danger of becoming overheated the movable plate may be adjusted and a blast of cold air admitted into the superheating-flues, by which  
5 their temperature may be reduced from time to time, as required. This arrangement of perforated plates for admitting cold air to the superheating-flues is old, and is shown, for instance, in Vanclain's Patent No. 33,057, of  
10 August 13, 1861, and I do not therefore claim it.

What I consider as new, and desire to secure by Letters Patent, is—

A locomotive or other boiler provided with a series of heating-flues, a steam-space above such flues, a partition having large and unob- 15 structed openings, and a superheating-compartment into which the steam is conveyed through the openings and superheated, all arranged in one boiler or shell, substantially as described.

ALVIN FORD.

Witnesses:

CHARLES C. LINTHICUM,  
EPHRAIM BANNING.