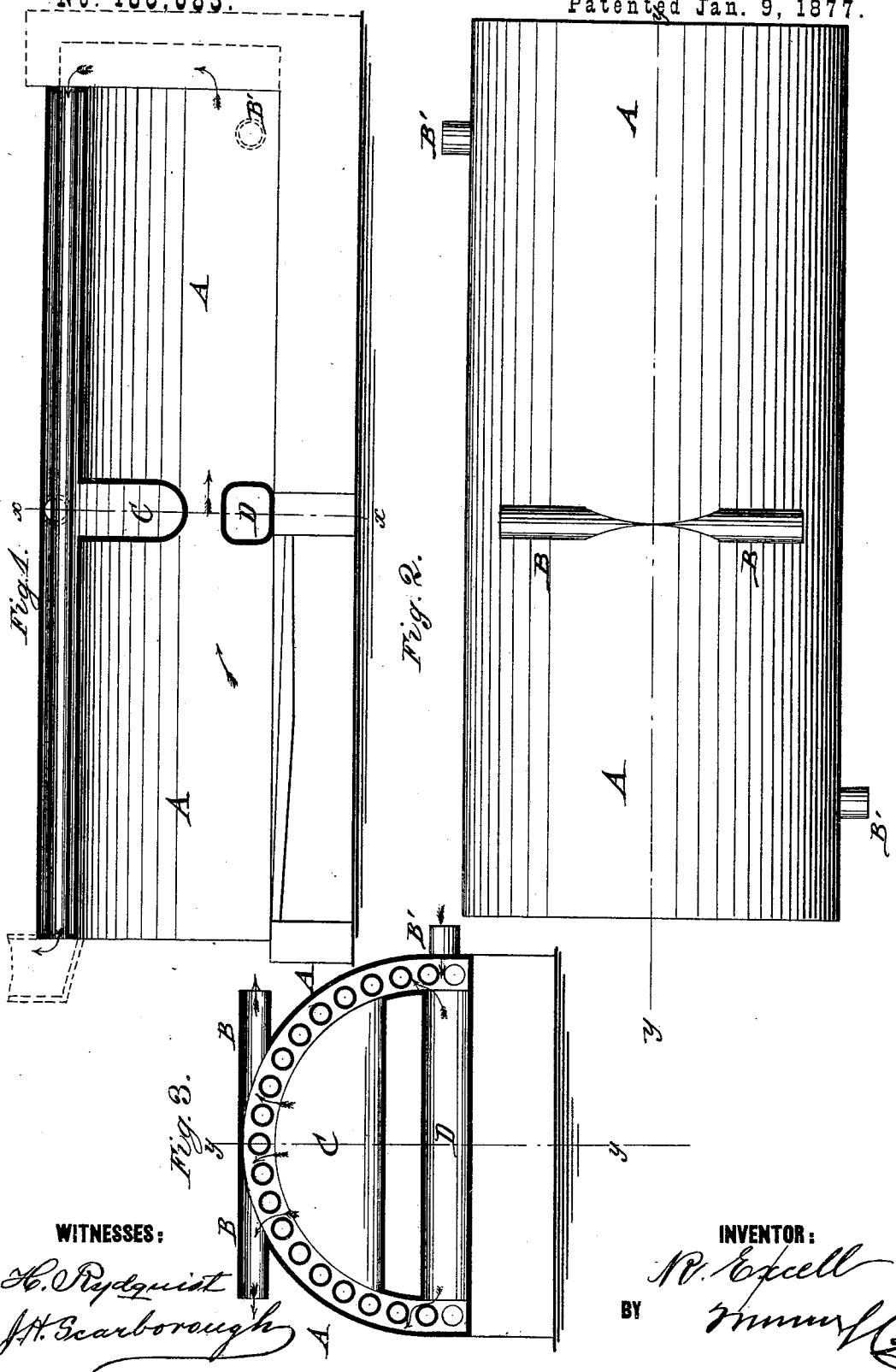
R. EXCELL.

BOILER.

No. 186,083. Patented Jan. 9, 1877.



WITNESSES:

H. Rydquist

J. H. Scarborough

INVENTOR:

R. Excell

BY

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROBERT EXCELL, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN BOILERS.

Specification forming part of Letters Patent No. **186,083**, dated January 9, 1877; application filed November 11, 1876.

To all whom it may concern:

Be it known that I, ROBERT EXCELL, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Boiler, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a vertical longitudinal section of my improved boiler on line *y y*, Fig. 2. Fig. 2 is a top view, and Fig. 3 a vertical transverse section of the same on line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The invention has reference to an improved tubular saddle-boiler for heating green-houses and for other purposes; and it consists of a semicircular boiler with longitudinal flues arranged therein, in connection with a lateral fire-back at the bottom, and a lateral circulator at the top part of the boiler, between which the fire passes from the fire-place back to the flues. The boiler communicates by top-flow tubes above the circulator and return tubes at diagonal ends with the heating-tubes.

In the drawing, a represents a semicircular or saddle-shaped boiler which is supported on suitable side walls, and a lateral wall at the end of the fire-place. The boiler is of such thickness that a single row of heating-flues passes longitudinally through the same to conduct the fire-gases through to the chimney.

The shell of the boiler is made so close to the flues that not more than a space of about three-fourths of an inch is left between the sides of the boiler and the flues, so that the boiler-shell contains as little water as possible, and a large heating-surface which promotes a rapid circulation of the water for heating purposes.

The water flows out of the boiler to the system of heating-pipes by top tubes B that communicate with a lateral bridge or circulator, C, at the inner top part of the boiler. The water returns in cooled-off state through the pipes B′ at diagonal ends of the boiler after having passed through the heating-pipes.

Below the bridge or circulator C is arranged generator D, that leaves a contracted space between the same and the top bridge C above for the passage of the fire. The water is heated up rapidly in the bridge and fire-back, so as to impart a certain impetus to the water and force it into the top pipe with considerable power. The fire-back, as well as the bridge, is rounded off to admit the ready passage of the fire. The fire-back serves in similar manner as the bridge for heating up and circulating the cooler water at the lower part of the boiler, so as to drive it up to the upper circulator, where it is exposed to the greatest degree of heat, and then forced to circulate through the system of pipes.

Suitable pockets at the lower part of the boiler serve to clean the same from time to time of the sediment deposited by the water at the bottom parts.

As the fire-place is below the front part of the boiler, in front of the bridge and generator, the heat of the fire is first exerted on the front section of the boiler, next on the circulator and generator, then on the rear part of the boiler, and finally by the passage through the flues, utilizing thereby completely the heating capacity of the fire, so that an economical and effective boiler for hot-water circulation and heating purposes is obtained.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The boiler A, having an arched series of fire-places at the top and sides, the circulator C and generator D near the middle, and pipes B B′ connecting with heater, all substantially as shown and described.

ROBERT EXCELL.

Witnesses:

JEREH. DENNING,

JOHN T. BARROW.