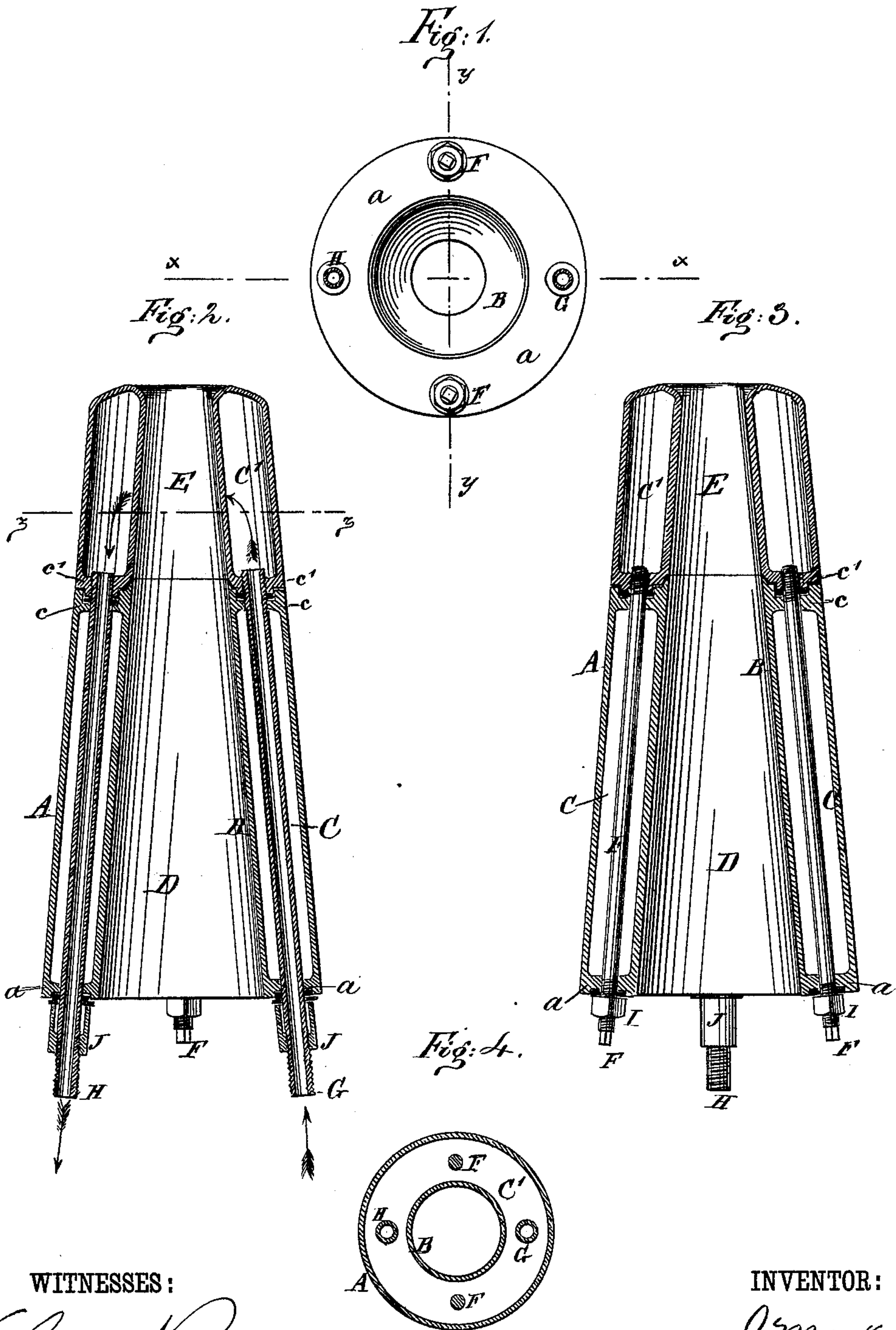


J. MACKEY.
Tuyere.

No. 203,056.

Patented April 30, 1878.



WITNESSES:

Chas. Nida.
C. Seagwick

INVENTOR:

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Mumford
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JACOB MACKEY, OF STEUBENVILLE, OHIO, ASSIGNOR TO HIMSELF, JOHN MACKEY, WILLIAM R. E. ELLIOTT, AND HENRY OPPERMAN, OF SAME PLACE.

IMPROVEMENT IN TUYERES.

Specification forming part of Letters Patent No. **203,056**, dated April 30, 1878; application filed March 18, 1878.

To all whom it may concern:

Be it known that I, JACOB MACKEY, of Steubenville, in the county of Jefferson and State of Ohio, have invented a new and useful Improvement in Tuyeres, of which the following is a specification:

The object of my invention is to so improve the construction of tuyeres for blast-furnaces that they will be more durable than those heretofore used, and, when worn out, may be repaired with less expense.

In the accompanying drawing, Figure 1 represents an end view of my improve tuyere. Fig. 2 is a longitudinal section of the same, taken on the line *xx* of Fig. 1. Fig. 3 is a longitudinal section of the same, taken on the line *yy* of Fig. 1. Fig. 4 is a cross-section of the nozzle taken on the line *zz* of Fig. 2.

Similar letters of reference indicate corresponding parts.

The tuyere is made of an outer hollow truncated cone, A, and an inner hollow truncated cone, B, forming between them an annular chamber, C C', closed at both ends of the tuyere. The tuyere is made in two parts, D E, the nozzle E being detachable from the body D, and both being provided with closed bottoms *c c'*, thus dividing the annular chamber between the outer and inner shells A B in the two chambers C and C'. The nozzle E is secured to the body D by the two screw-bolts F and the water-pipes G H. The bolts F have square heads, and are threaded at both ends, and inserted through diametrically-opposite holes in the outer bottom *a* of the annular chamber of the tuyere, then through holes in the partition *c*, and are screwed into threaded holes in the bottom *c'* of the nozzle E, the nuts I being screwed on their outer ends to tighten the body D and the nozzle E together. The

water-pipes G H are threaded at both ends, and inserted and secured to the body D and the nozzle E in the same manner as the bolts F, being provided also with nuts J, for the same purpose as the nuts I. Suitable packings are provided at each connection to prevent leakage.

By connecting the pipe G with a water-supply pipe and the pipe H with the corresponding discharge-pipe, a constant circulation of water may be kept up in the direction of the arrows through the inlet-pipe G, the chamber C, surrounding the nozzle, and out through the outlet-pipe H.

I am aware that water has been introduced in a chamber surrounding a tuyere; but in the absence of a separate return-pipe for the water they have not proved efficient in cooling the nozzle. The body of the tuyere, being inclosed and protected by clay, wears longer than the nozzle, whose end is exposed directly to the fire, and therefore is burned out, and frequently needs to be replaced. Therefore, by making the nozzle detachable, the tuyere can be repaired by attaching a new nozzle, thus saving the expense of also replacing the body D.

I am aware that tuyeres of the kind described have been made in sections, bolted together; but

What I claim is—

A two-part tuyere, A B D E, provided with the closed bottoms *c c'*, as shown and described, to obviate the necessity of joints and prevent leakage.

JACOB MACKEY.

Witnesses:

CHAS. M. ELLIOTT,
GEO. W. MYERS.