

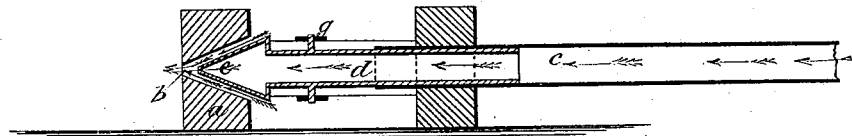
*B. G. Noble,*

*Tuyere,*

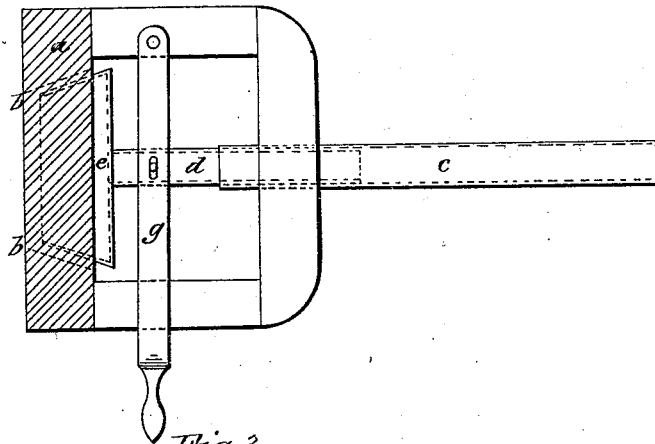
*N<sup>o</sup> 48,974.*

*Patented July 25, 1865.*

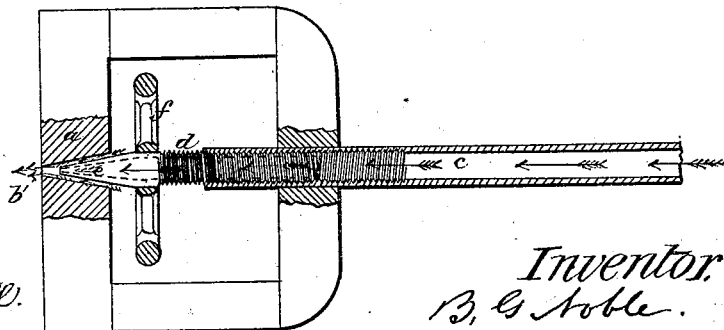
*Fig. 2.*



*Fig. 1.*



*Fig. 3.*



*Witnesses.*  
*Lemuel M. Serrell.*  
*Chas. H. Smith.*

*Inventor.*  
*B. G. Noble.*

# UNITED STATES PATENT OFFICE.

BUTLER G. NOBLE, OF NEW YORK, N. Y.

## IMPROVED ADJUSTABLE TUYERE.

Specification forming part of Letters Patent No. **48,974**, dated July 25, 1865.

### *To all whom it may concern:*

Be it known that I, BUTLER G. NOBLE, of the city and State of New York, have invented, made, and applied to use a certain new and useful Improvement in Tuyeres; and I do hereby declare the following to be a full, clear, and exact description of the said invention, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a plan of my improved tuyere. Fig. 2 is a vertical section of the same, lengthwise of the steam-pipe; and Fig. 3 is a similar section, representing a variation in the said tuyere.

Similar marks of reference denote the same parts.

Tuyeres and steam-blowers for furnaces have heretofore been made in which the blast is produced by a jet of steam, either superheated or not, passing through an opening and drawing air in with it to supply the oxygen required for a perfect combustion of the fuel, as may be seen in Letters Patent granted in Great Britain, June 23, 1845, to William Pollard. In all these instances no device has been provided for regulating the relative proportion of steam and air.

The nature of my said invention consists in adjusting the position of the steam-nozzle relatively to the air-openings surrounding it, whereby I am enabled to regulate the fire in the speed of its combustion by the relative proportion of steam and air admitted.

In distilling, dyeing, and many metallurgical and chemical operations the temperature has to be regulated with great care, and sometimes suddenly reduced. My improvement enables me to effect this with great facility, because the fire can be almost immediately extinguished by moving the nozzle so as to ex-

clude the atmosphere and only allow steam to pass in.

In the drawings, *a* represents a portion of the furnace-wall, through which is a tapering opening, *b*, which may be round and conical, as in Fig. 3, or the said opening may be elongated in a pyramidal or wedge form, as seen in Figs. 1 and 2.

*c* is a steam-pipe from any desired generator, and the steam may be superheated or not, and under any desired pressure.

*d* is a pipe extending from *c* to the tuyere *e*, from which the steam issues in a small jet, as in Fig. 3, or in a thin sheet, as in Figs. 1 and 2, and passing through the tapering or inclined opening *b* draws in the atmospheric air in the required portion. The pipe *d* and tuyere *e* being movable the tuyere *e* can be made to close the opening *b* and deaden the fire by the action of the steam, or be drawn away to allow a large proportion of air to pass in with the steam, so as to cause the fire to burn intensely.

The adjustment of the tuyere may be effected by competent means. I have shown a screw and hand-wheel, *f*, in Fig. 3, and a lever, *g*, in Figs. 1 and 2, to effect this movement.

What I claim, and desire to secure by Letters Patent, is—

The method of regulating the quantity of air relative to steam by adjusting the steam-jet or tuyere within the opening for the air, substantially as and for the purposes specified.

In witness whereof I have hereunto set my signature this 19th day of May, 1865.

B. G. NOBLE.

Witnesses:

SAMUEL W. SERRELL,  
CHAS. H. SMITH.