

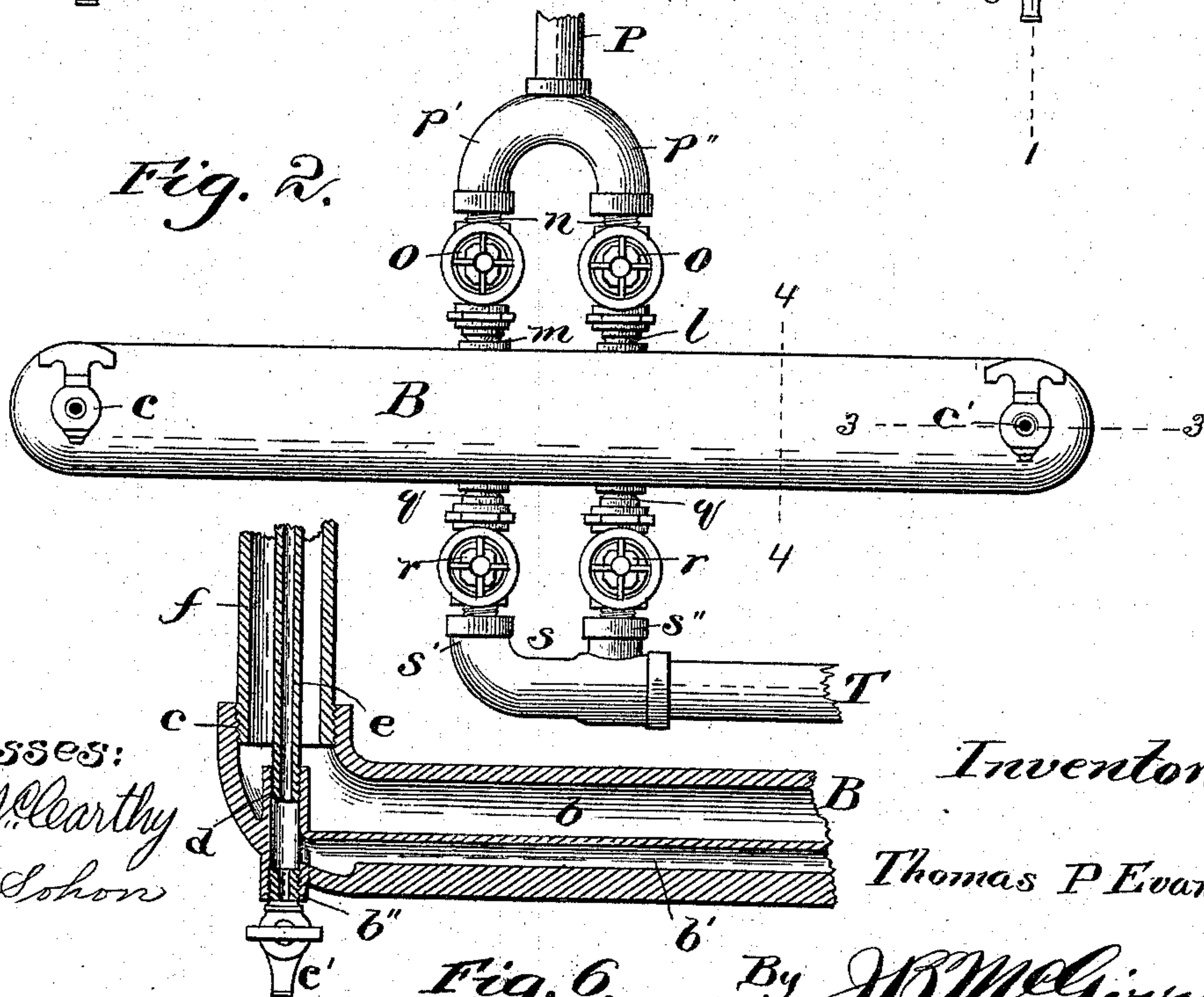
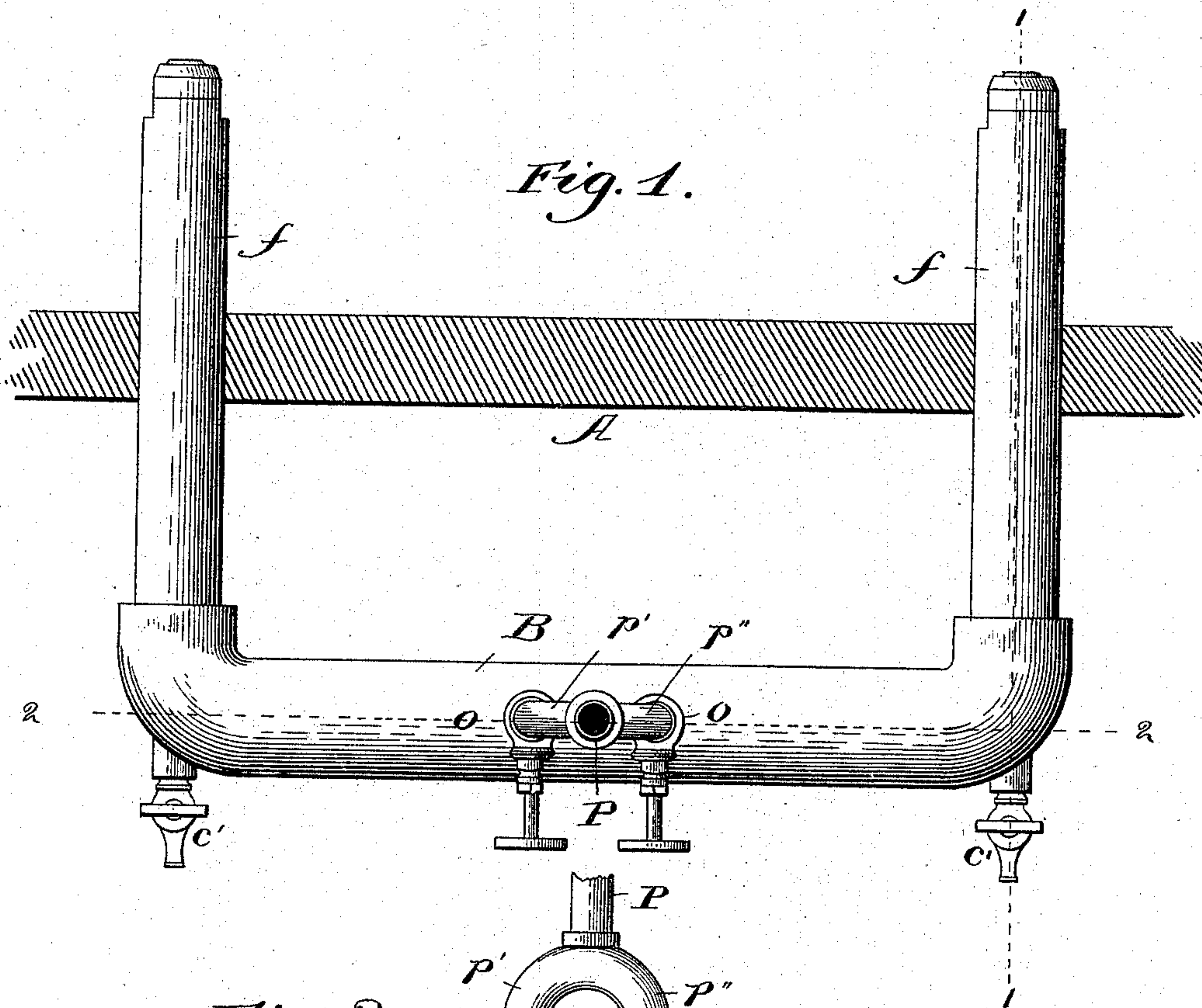
(No Model.)

2 Sheets—Sheet 1.

T. P. EVANS.
DUPLEX BURNER.

No. 527,957.

Patented Oct. 23, 1894.



Witnesses:
Wm. M. McCarthy
A. L. Lohon

Inventor:

Thomas P. Evans.

Fig. 6.

By J. B. McGivern
Attorneys

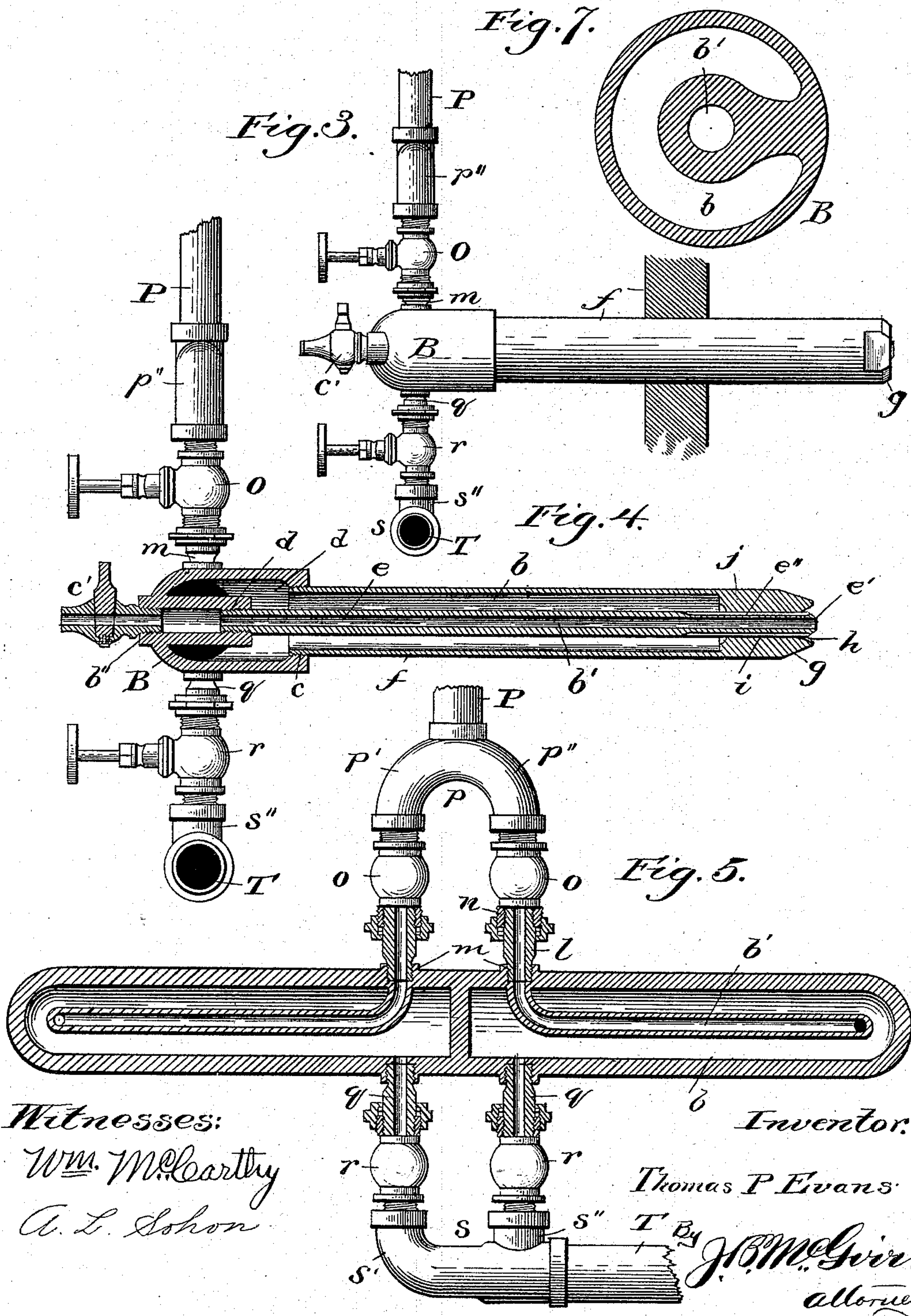
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UNITED STATES PATENT OFFICE.

THOMAS PENRYN EVANS, OF NATIONAL MILITARY HOME, OHIO.

DUPLEX BURNER.

SPECIFICATION forming part of Letters Patent No. 527,957, dated October 23, 1894.

Application filed December 7, 1893. Serial No. 493,024. (No model.)

To all whom it may concern:

Be it known that I, THOMAS PENRYN EVANS, a citizen of the United States, residing at National Military Home, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Duplex Burners; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to burners known as the duplex burners, for use in factories, mills and such places, where there are many furnaces, and where it is required to have a great heat.

I have so constructed my duplex burner, that a forcible jet of steam, coming in contact with oil, introduced through the pipe from the supply main, atomizes and vaporizes the oil, and at the same time causes a strong induction of air, which mingling with the oil and steam produces an explosive mixture at the end of the nozzle, ready to flash into a flame instantly on emerging therefrom.

Referring to the accompanying drawings, which form a part of this application, Figure 1 is a plan view of my duplex burner. Fig. 2 is a rear view of same. Fig. 3 is a side view. Fig. 4 is a sectional view on the lines 1—1 of Fig. 1. Fig. 5 is a sectional view on the lines 2—2 of Fig. 2. Fig. 6 is a sectional detail view on the lines 3—3 of Fig. 2. Fig. 7 is a cross section taken on the lines 4—4 of Fig. 2.

Similar letters of reference designate the same figures throughout the drawings.

A designates the front of a fire box of any ordinary steam boiler with the nozzle *f, f*, of the burner extending through the same.

B is the body of the burner which is so constructed that within the same are four separate and distinct conduits, the larger or main portion *b*, being for steam. This compartment between its extreme ends has a partition *B'*, which forms the steam space into two spaces, the same having connections to their respective supply pipes, which will be hereinafter described.

Referring to Figs. 5, 6, and 7, it will be seen that the body B, of my burner is provided with a steam space *b*, and in close proximity to the same is the space *b'*, which can be made integral as I have shown, or it may be provided for, by separate conduits for the introduction of the oil to the burner. As was said the conduit *b'*, extends close to the rear wall, and has a steam space very nearly around the same, so that the steam may heat the oil and cause the same to flow more easily together with the gas that issues from the same, where they co-mingle at the outer end of the nozzle. In line with the pipe *e*, there is bored a hole *b''*, and inserted into this is a cock *c'*, the object of which will be set forth hereinafter.

The extreme ends of the main body portion B, of my burner I turn as shown, and provide the same with threads *c*. So also is the conduit *b*, which also has threads *d*, for the introduction of a pipe *e*, which extends to the extreme end of the burner proper. This pipe *e*, at its extreme end is beveled at an angle of about thirty degrees, as shown by *e'*. Into this bevel and extending rearwardly for about one third of its length are corrugations or grooves *e''*, which blend in their depth from one eighth of an inch at its deepest, to the forward end, to the diameter of the pipe at its shallowest end. The pipe *e*, is surrounded by a tubular arm *f*, which at its extreme end is beveled at an angle of about forty-five degrees as shown in Fig. 4, at *g*, and *h*; then extending toward the rear a flat portion *i*, which is just sufficient to allow the pipe *e*, to fit snugly into the same. From the enlargement *j*, there is a space *k*, of much greater diameter and allows a much larger space between the pipe *e*, and the arm *f*, for the circulation of steam, which surrounds the pipe *e*, on all sides thereby heating the oil, and forcing its exit through the corrugations or grooves *e''*, in the pipe *e*. When the steam reaches the extreme end of the nozzle it reflects at many angles, and accomplishes the result much more satisfactorily than any burner heretofore that has been used.

Referring to Figs. 1 to 5 inclusive, it will be seen that to the upper side of the body B, I secure hollow plugs *l*, which are screwed into the body B, at *m*. These plugs have

threaded ends *n*, and to these ends are secured cocks *o*, *o*, and above these cocks and made secure to them, is a curved pipe *P*, having branches *p*, *p*, which supplies the oil 5 to the burner. This curved pipe is coupled to a pipe *q*, which leads to the main source of supply, which can be in any convenient place.

To the lower side of the main body *B*, is 10 arranged plugs *q*, cocks *r*, &c., such as has been described for the upper portion. To the ends of the cocks is attached a pipe *s*, having two openings *s'*, *s''*, for the reception of the two cocks, and to this pipe *s*, is coupled 15 another supply pipe *T*, which leads to the steam source of supply.

Having now fully described the construction preferred, I will proceed to describe the operation of the same, which is as follows:

20 When it is desired to heat a furnace the cocks *o*, are turned on to allow the oil to flow through the pipe *P'*, thence through the branch pipe *p'*, *p''*, through the cocks, to the conduit *b'*, to the pipe *e*, thence to the burner, 25 and at the same time the cocks *r*, are turned on and the steam is caused to pass through the branches *s'*, *s''*, thence through the cocks, to the main body *B*, thence through the tubular arm *f*, to the end of the nozzle. While 30 the steam is on its way to the nozzle, it causes the conduit to be heated, also the pipe *e*, while the steam at the nozzle is expanding and causing a suction of the oil. When the same is ignited, it causes the flame to be 35 spread over a vast amount of space within the fire box. To obtain a better result I then turn the cock *c'*, which admits air from the exterior of the furnace, which is of a low

temperature, and which then mingles with the steam on its way to the nozzle of the 40 burner. The steam after escaping through the corrugations or grooves in the pipe *e*, causes the same to expand, and by reason of the beveled faces on the pipe *e*, and the bevel 45 *h*, on the hollow tubular arm *f*, causes the steam to be deflected into many different angles, and causes the flame to cover a large part of the fire box.

I am aware that burners of this style have been known before, but what I claim, is the 50 novel construction and arrangements of the different parts, together with having double burners controlled singly or together.

What I claim is—

The herein described duplex injector burner, 55 composed of the *U* shaped hollow casting, having the central internal partition forming the two steam chambers terminating at the burners in the inner ends of the casting, the branch steam supply pipes to said chambers, 60 the oil chambers formed longitudinally in said steam chambers on opposite sides of said partition, and having the intruding ends opposite said burner openings, the branch oil supply pipes leading into said oil chambers 65 the oil pipes extending from said ends of the oil chambers into the burner openings, and the air inlets through the rear sides of said castings into the sides of the said oil chamber, as set forth and shown. 70

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS PENRYN EVANS.

Witnesses:

CARL BERLIN,
MICHAEL JOYCE.