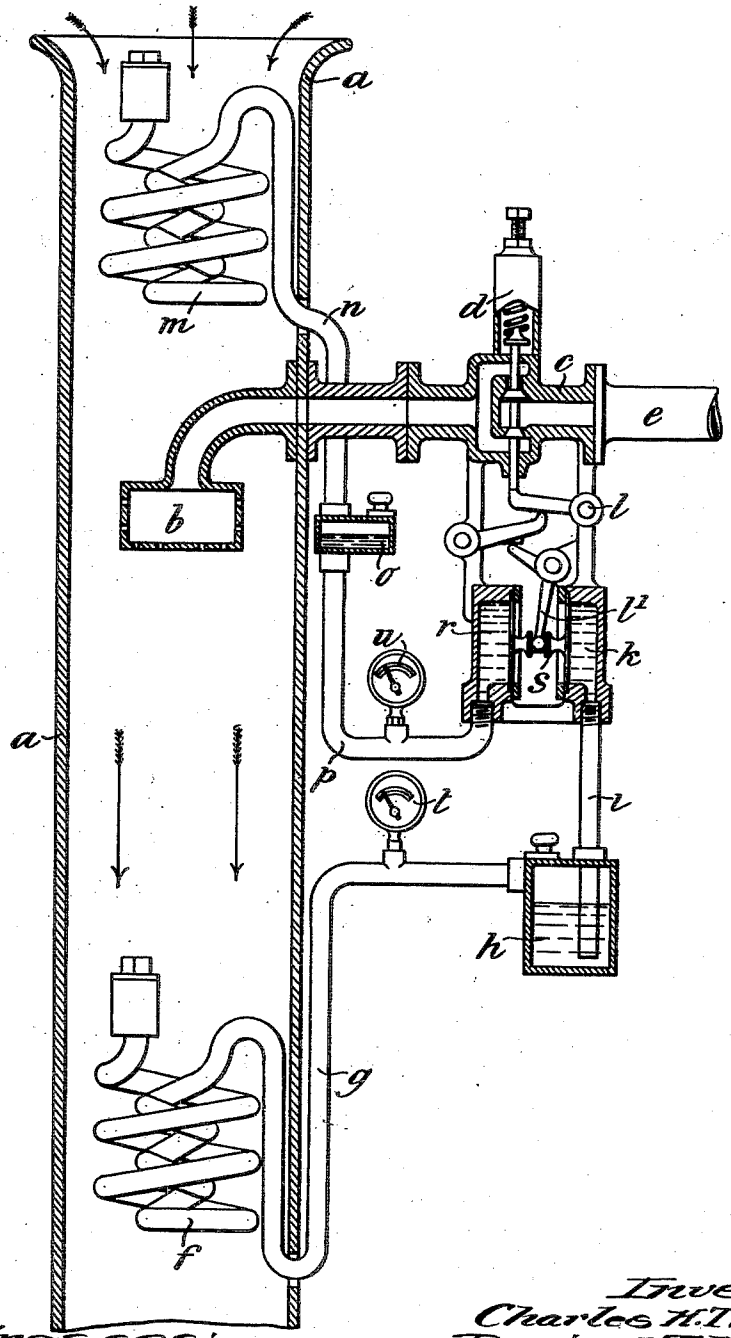
C. H. T. ALSTON & P. T. HOUSTON.

APPARATUS FOR REGULATING THE SUPPLY OF STEAM TO GAS PRODUCERS.

APPLICATION FILED JUNE 28, 1913.

1,078,480. **Patented Nov. 11, 1913.**



Witnesses:
M. E. McNade.

Inventors
Charles H. T. Alston
Percival T. Houston
by James L. Norris,
attorney

UNITED STATES PATENT OFFICE.

CHARLES HENRY THOMAS ALSTON, OF COUNTY OF CHESTER, AND PERCIVAL TURNER HOUSTON, OF LONDON, ENGLAND.

APPARATUS FOR REGULATING THE SUPPLY OF STEAM TO GAS-PRODUCERS.

1,078,480. Specification of Letters Patent. Patented Nov. 11, 1913.

Application filed June 28, 1913. Serial No. 776,414.

To all whom it may concern:

Be it known that we, CHARLES HENRY THOMAS ALSTON and PERCIVAL TURNER HOUSTON, both subjects of the King of Great Britain, residing, respectively, in Cheshire, England, and London, England, and whose post-office addresses are, respectively, 34 Prussia road, Hoylake, in the county of Cheshire, England, and 4 Lloyds avenue, in the city of London, England, have jointly invented certain new and useful Improvements in Apparatus for Regulating the Supply of Steam to Gas-Producers, of which the following is a specification.

This invention relates to the apparatus described and claimed in our British specification No. 3114 of 1911 and has for its object improvements therein whereby the apparatus compensates automatically for variations of temperature of the air entering the draft tube.

In the apparatus described in our prior British specification No. 3114 of February 7, 1911 any variation of temperature of the air entering the draft tube made no difference to the temperature at the main coil controlling the steam valve, as more or less steam would be admitted till the temperature arranged for had been attained. Variation therefore, in the temperature of the incoming air would cause variation in the proportions of steam and air.

According to this invention, an auxiliary coil of pipe containing a volatile fluid is located in the mouth of the draft tube in front of or above the steam jet or nozzle, so that it is exposed to the temperature of the air as it enters the tube, the coil being connected to a diaphragm chamber the diaphragm of which opposes the movements of the diaphragm of the main thermostatic apparatus which controls the supply of steam. Thus a rise in temperature of the incoming air will produce through the auxiliary coil and diaphragm chamber a corresponding opening of the steam valve, subject to the closing tendency derived from the pressure in the main coil. The auxiliary coil, by resisting the closing of the steam valve causes a higher temperature to be reached at the main coil when the temperature of the incoming air is higher, thus maintaining the proportions of steam to air approximately constant.

An apparatus according to the invention is illustrated in the accompanying drawing.

a is the draft tube; *b* is the steam nozzle; *c* is the balanced steam valve with adjustable spring-control *d*; *e* is the steam supply pipe; *f* is the main coil which is connected by a pipe *g* to the oil vessel *h* from which a pipe *i* connects with the diaphragm chamber *k*.

l represents a multiplying system of levers interposed between the diaphragm and the valve *c*.

m is an auxiliary coil connected by a pipe *n* with an oil vessel *o* from which another pipe *p* passes to a diaphragm chamber *r*. Preferably, the diaphragm chambers *k* and *r* are arranged opposite each other and the diaphragms are united by a connecting piece *s* with which an arm *l'* of the levers *l* engages or is connected to transmit the motion of the united diaphragms. Pressure gages *t*, *u* may be fitted to the pipes *g* or *i* and *p*. Oil is preferably used to transmit the pressure created in the coils to the diaphragms, a volatile fluid, such as methyl alcohol, being located in the coils. It will thus be seen that the steam valve is governed by the combined action of the two diaphragms, the pressure created in one coil opposing the pressure created in the other coil, so that any variation of temperature of the air entering the draft tube affects the coil *m* and consequently varies the pressure in the diaphragm chamber *r* thereby rendering the apparatus very sensitive. For example, an increase in temperature of the coil *f* which is subject to the thermal influence of the steam discharged into the tube by the steam nozzle *b* causes movement of the diaphragm for the chamber *k* in a direction to close the steam supply valve *c*, while an increase in temperature of the coil *m* which is subject to the thermal influence of the air entering the draft tube will tend to move the diaphragm for the chamber *r* in an opposite direction or in a direction to open the steam supply valve. Conversely, a reduction in temperature of the coil *m* will diminish the force tending to move the diaphragm for the chamber *r* in a direction to open the steam supply valve, and a reduction in temperature of the coil *f* will diminish the force tending to move the diaphragm for the chamber *k* in a direction to close the steam supply valve. The result is that the supply

of steam to the nozzle *b* is governed according to the temperature of the incoming air as well as the temperature of the steam in the draft tube, thus maintaining the proportion of steam to air substantially constant.

Having thus described the nature of this invention and the best means we know of carrying the same into practical effect, we claim:—

1. In apparatus for regulating the supply of steam to gas producers, the combination with a draft tube having an air inlet, a steam nozzle arranged to discharge steam into said tube, and a single valve controlling the supply of steam to said nozzle, of a pair of thermostats, one operative to close said steam supply valve and influenced by the steam discharged into said tube by the steam nozzle, and the other operative to open the steam supply valve and influenced by the temperature of said air entering said tube.

2. In apparatus of the character described, the combination with a draft tube having an air inlet, a steam nozzle discharging into said tube, and a valve controlling the supply of steam to said nozzle, of a pair of coils, one subject to the thermal influence of the steam from said nozzle, and the other coil subject to the thermal influence of the air entering said tube, said coils containing expansible fluids responsive to temperature variations of said coils, and means for opening and closing the steam supply valve governed by the fluids for the respective coils acting is opposition thereon.

3. In apparatus of the character described, the combination with a draft tube having an air inlet, a steam nozzle discharging into said tube, and a valve controlling the supply of steam to said nozzle, of a pair of coils arranged in said tube at opposite sides of the steam supply nozzle, said coils containing expansible fluids, a pair of diaphragm chambers connected to the respective coils, diaphragms in said chambers arranged in opposed relation, means rigidly connecting said diaphragms, and mechanism attached to the diaphragm connecting means and operative to govern the steam supply valve.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES HENRY THOMAS ALSTON.
PERCIVAL TURNER HOUSTON.

Witnesses:
JOSEPH WILLARD,
W. ISKERTEN.