Specification of James Fraser : boilers of steam engines.

Contributors

Fraser, James.

Publication/Creation

London : Queen's Printing Office, 1854 (London : George E. Eyre and William Spottiswoode)

Persistent URL

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A.D. 1827 . . . . . N° 5447.

SPECIFICATION

OF

JAMES FRASER.

BOILERS OF STEAM ENGINES.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:
PUBLISHED AT THE QUEEN'S PRINTING OFFICE, EAST HARDING STREET,
NEAR FLEET STREET.

Price 3d.

1854.

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Boilers of Steam Engines.

FRASER'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, James Fraser, of Hounsditch, in the City of London, Engineer, send greeting.

WHEREAS His present Majesty King George the Fourth, in and by His Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Eleventh day of January last, for Himself, His heirs and successors, did give and grant unto me, the said James Fraser, His special licence, full power, sole privilege and authority, that I, the said James Fraser, my executors, administrators, and assigns, and every of them, by myself and themselves, or by my and their deputy or deputies, servants or agents, or such others as I, the said James Fraser, my executors, administrators, or assigns should at any time agree with, and no others, from time to time and at all times thereafter, during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick upon Tweed, my Invention of "**An Improved Method of Constructing Boilers for Steam Engines**;" in which said Letters Patent there is contained a proviso obliging me, the said James Fraser, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, and to cause the same to be inrolled in His Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said recited Letters Patent, as in and by the same, reference being thereunto had, will more fully appear.

Fraser's Improvements in Constructing Boilers for Steam Engines.

NOW KNOW YE, that in compliance with the said proviso, I, the said James Fraser, do hereby proceed to describe the nature of my said Invention, the principal feature of which is to surround a steam boiler or boilers altogether or in part with a hollow case to contain water, which case should have an internal space of the width of three inches or more, in proportion to the size of the boiler. The line of water inside the main boiler to be line of water in the case; sufficient room is to be left between the said case and the said boiler or boilers for heat to pass between them. By this arrangement the whole heat of the fires which issue from the flues in the interior of the boiler or boilers, instead of passing direct into the shaft, as at present, is brought to act on the external surface of the boiler, without injuring the timbers of the vessel, ship, or boat, as will appear by the following description:—Place three flues in the interior of a boiler, two of which are for fires, and these fires are to be made so near the sides of the boiler as just to admit of space for cleaning; these flues proceed through the interior of the boiler from front to back or nearly so, as the maker may incline; in either case the flame and heat is compelled to descend under the bottom of the boiler, which is to be curved upwards like a waggon boiler bottom to make room for the flue between the case and the said boiler. It is understood that the case is below the boiler bottom as well as at the sides and end. This boiler, with its bottom curved upwards, is to be made to rest with its leg on the case, to cut off all communications between the external sides and bottom flues, so that the descending heat from the internal flues comes forward under the boiler nearly to the front under the fire-places, at which place a part of the boiler is rounded off, or the leg cut at each side, and a gore made to form a lateral flue to allow the flame and heat to pass from the bottom to the sides, or, in other words, to pass to the flues between the case and the sides of the boiler; the flues then proceed to the back of the boiler by the sides, and these side flues are again bounded by the case, and both flues are thereby diverted at the back into the third or centre flue in the interior of the boiler, and again return nearly to the front through that flue, and then ascend into the shaft for the purpose of draught. When the fires are first lit, a small fire is to be made in the front of the third or last flue; to effect that end, the bottom and sides of the boiler or boilers are to be curved inwards, like the common waggon boiler, for the express purpose of giving room for the flues, both at sides and at bottom; this lessens the water in the boiler, and the case is also more compact. There is such variety in the method of constructing flues that no claim is attempted to be made for any, though there is considerable novelty in making the side flues re-enter the boiler by the centre flue. In land engines the flues may be made to pass under the case as well as under

the boiler, and thus occasion much additional surface of flue, and consequently power, and a saving of fuel. Any mechanic accustomed to make steam boilers will easily conceive the necessary stoppage or check where the internal flues disgorge on the external surface of the boiler, whether these flues descend under the bottom to pass to the front where the lateral flues are, or whether the internal flues are brought to act first on the external sides of the boiler, and made to pass by the sides forward to the lateral flues and back under the bottom, for without this stoppage the whole contents of the internal flues would at once pass into the centre flue, if not compelled by the check to press to the lateral flues placed nearly under the main fires; but as none of these can sweep the external surface of the boiler without the assistance of the case to shield the ship from fire, it is not necessary to describe numerous other arrangements, nor is it requisite to point out the secondary uses of the case, such as heating water prior to entering the main boiler, or the uses for which the steam of the said case could be appropriated. Every engineer is capable of appreciating these matters, nor will he forget that if a boiler were to be the entire extent of the engine room, and be about three feet square, with a flue in the middle, sufficient room would be thus left for the engines in the centre, whilst one third more surface of heat could be procured, and this again doubled by the assistance of the case; it is evident also that the steam of the main boiler will force the salt out of the case as easily as out of the main boiler. To prevent the swag of water in the case, a partition in the middle will be of great use, and it can be so contrived as to join the said case in two separate parts at the said partition, and thus facilitating its entrance on board of ship, when there fitted to the boiler. I therefore proceed to declare that my Invention consists of a case to contain water being applied to surround the external surface of boilers, altogether if required, or in part, leaving room between for flues for the purpose of bringing heat at a high temperature to act on the external surfaces of marine boilers without endangering the ship timbers, thus economising fuel by an immense enlargement of the surface of flue, and preventing the premature escape of heat into the funnel or shaft; the said case ought to have an internal space of the width of three inches, and should be fitted up to the line of water in the inside of the internal boiler, leaving space above that for the steam; but although I have specified three inches as the width of the internal space of the case, less might answer; three inches, however, seem to me to be ample width for ordinary purpose of security and for cleaning out. Room is to be left in the case above the said line of water, both at the sides and the end, so that the steam of the case may be used for any required purpose. Should high pressure engines prevail at sea, the case surrounding the entire boiler,

except the front, would materially weaken the force of explosion, and increase power by making heat sweep the upper surface or top of the boiler by an upper turn of the flue between the inner surface of case and the upper surface of boiler.

In witness whereof, I, the said James Fraser, have hereunto set my hand and seal, this Eleventh day of July, in the year of our Lord One thousand eight hundred and twenty-seven.

JAMES (L.S.) FRASER.

J. S. HARVEY.

AND BE IT REMEMBERED, that on the same Eleventh day of July, in the year above mentioned, the aforesaid James Fraser came before our Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute in that case made and provided.

Inrolled the same Eleventh day of July, in the year above written.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1854.