

(No Model.)

E. CHESHIRE.
STEAM ENGINE.

No. 540,853.

Patented June 11, 1895.

Fig. 1.

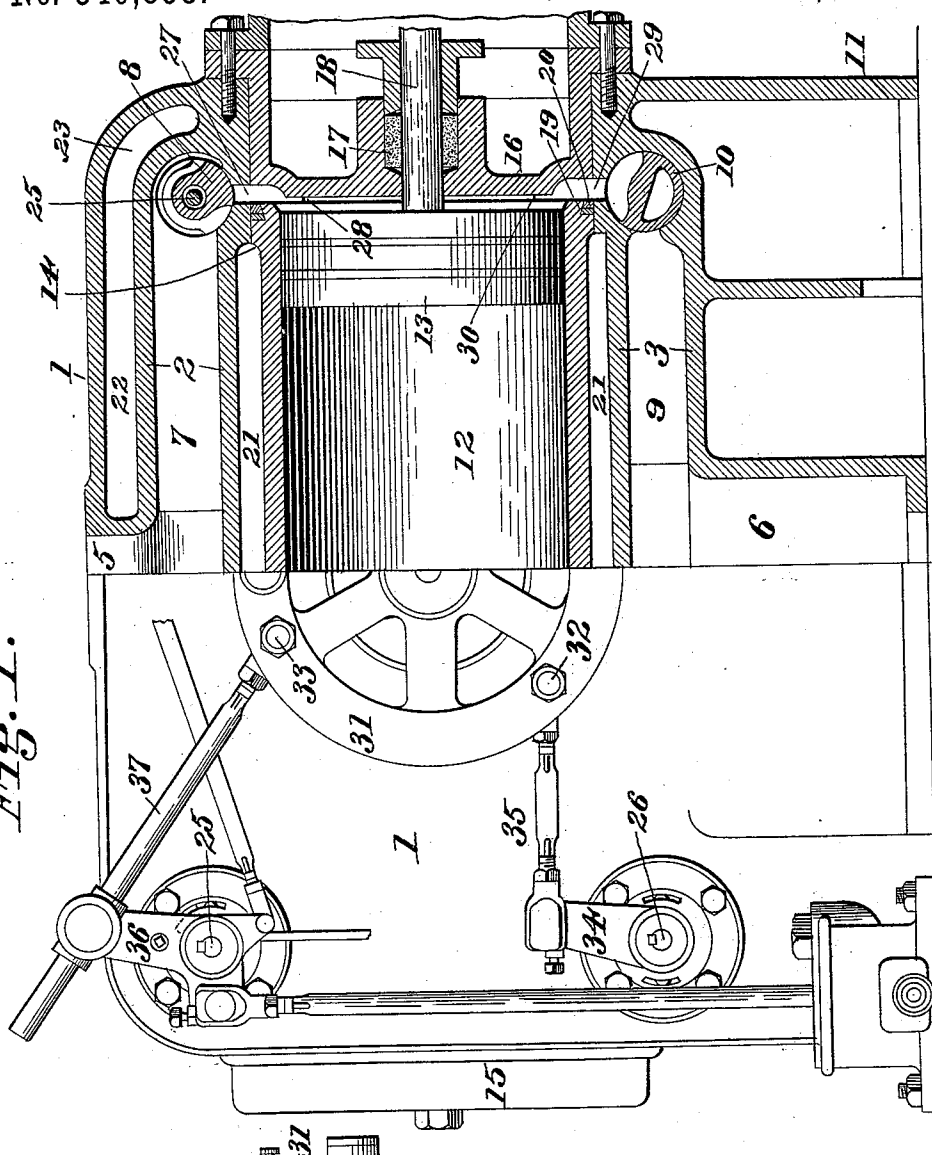
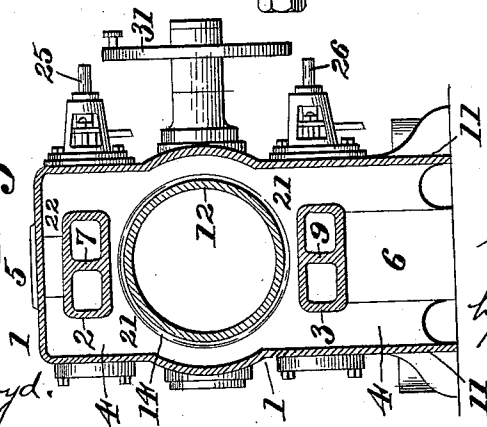


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 540,853, dated June 11, 1895.

Application filed December 3, 1894. Serial No. 530,716. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CHESHIRE, a citizen of the United States, residing at Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Steam-Engines, of which the following is a description.

My invention relates to steam engines, and it consists in the novel construction of the cylinder and surrounding chest or shell, as will be hereinafter more particularly set forth.

Referring to the accompanying drawings, in which the same reference-numeral indicates corresponding parts in each of the views, Figure 1 is a longitudinal elevation, partly broken and in section, of an engine embodying my invention; and Fig. 2 is a transverse sectional elevation of the cylinder and its surrounding chest.

In each of the figures, 1 indicates the outer shell or chest of the engine which is preferably formed integral in the shape of an inverted box and within which are constructed longitudinal tubes or conduits 2 and 3, respectively, the conduit 2, being suitably supported by webs 4, cast within the upper part of the chest and having a central steam inlet-orifice 5, and the conduit 3 being similarly formed within the lower or intermediate portion of the shell and provided with a central exit-orifice 6. Conduit 2 has within it at either side of its inlet-orifice 5, a central, longitudinal reinforcing partition 7, and forms the inlet or live-steam passage leading to the two upper transverse induction-valves 8; and conduit 3 has a similar partition 9, and forms the outlet or exhaust passage leading from the two lower, transverse eduction-valves 10.

11 indicates the lower supporting walls or legs of the chest or shell 1.

12 indicates the steam-cylinder, constructed separate and apart from said shell, and mounted within the latter, between the said upper and lower steam conduits 2 and 3, and in the preferred manner I shall now describe.

The internal bore of the cylinder is the same from end to end, as usual, for the proper fitting and working of the piston 13, but its outer surface is provided with single encircling ridges or elevations 14 at either end, which elevations are of suitable width, and, together,

constitute the only portions of said outer surface necessary to be planed or dressed for snugly fitting within the bore of the circular openings in the opposite end-walls of said chest. Said end-walls of the chest or shell are of suitable depth to contain the flanged-heads 15 and 16, the latter having an ordinary central stuffing box 17, for accommodating the piston-rod 18, as customary. A semi-dovetail groove or shoulder 19 is preferably made around the peripheral corners of said ridged ends of the cylinder, and a pair of soft copper rings 20 are properly driven or seated into each groove, to form the desired steam packing or gasket. It will be readily observed that the receding bottom of each of these grooves firmly seats the several gaskets against outward movement or dislodgment in use. This independent cylinder may be very readily finished, and inserted into position within the shell by driving or pressing force, and the said gaskets depended upon to make the proper air and steam tight joints at both its ends. This cylinder may, therefore, be readily removed and replaced without affecting the surrounding shell in the least, and the expense attached thereto, including any separate repairs, is materially less, compared to that attending the replacing of an entire new chest, valve-chambers and cylinder, in case the latter should be defective and all were cast integral, as heretofore made. Being constructed independent of said shell, as stated, it can be cast on end, perpendicularly, and a better distribution of the material can thus be had therein over that of a cylinder cast integral with its shell and valve-chambers, and in a horizontal manner or position, as hitherto practiced.

The bulk and weight of my cylinder, independent of its shell and valve-chambers, are evidently such that it can be readily dressed and bored, and the shell with its valve-chambers being also independent of the cylinder, any dressing thereof or boring therein, especially to said valve-chambers, can be more readily accomplished than if the presence and weight of said cylinder were added, if cast integral, as is clearly obvious. Thus, time, labor, and expense are saved to a marked degree in this construction, while on a bulky or

very heavy combined-piece, as heretofore made, the work has been difficult and tedious, and therefore much more expensive.

Spaces 21, filled with confined air, are provided between the cylinder and the respective upper and lower steam-conduits 2 and 3, and the side of the steam-chest 1, whereby a non-conducting air-jacket entirely surrounds the cylinder and properly insulates it and the steam inlet-conduit, thus effectually obviating any undue cooling of the steam in said cylinder and its induction-passage, and preventing radiation of heat or condensation of the steam.

22 indicates an upper air-chamber formed in the shell 1 above the inlet-conduit 2 and fully extending over and rounding the corners above the induction valve-chambers, as shown at 23, and also extending downward at both sides of the conduit 2, to meet and unite with the said air-chamber surrounding the cylinder, whereby a complete insulator or non-conducting jacket, filled with confined warm-air, entirely surrounds said conduit 2 for the proper protection of the live-steam within, and effectually prevents condensation of steam and radiation of heat, as described.

The rounding of the corners at 23, as stated, forms warm-air chambers at both ends, completely over said induction steam valve-chambers, and provides ample air-jacket protection against radiation and condensation in said steam valve-chambers. These air chambers may, if desired, be filled with any suitable non-conducting material, to further effect the said advantageous economical results, by way of preventing radiation of heat and condensation of steam. The bottom of the shell 1 is provided with confined-air chambers 24, for further insulation. The acting-portions of both sets of valves, 8 and 10, are of the usual segment-of-a-circle form, and are mounted on stems or spindles 25 and 26, respectively.

27 indicates the inlet-port leading directly from each of the two induction-valves to the cylinder, each being provided with strengthening cross bars or ribs 28, and having no long passages intervening to be filled with live-steam, and 29 indicates the exhaust-ports leading directly from the cylinder to the induction-valves, and thence to and through the exhaust conduit or passages, as usual, and each is also provided with strengthening cross bars or ribs 30.

31 indicates an ordinary oscillating disk or wrist-plate journaled centrally on the face of the cylinder-shell 1, and provided with four pins, 32 and 33, (half of the disk and two of the pins only being shown.) The pins 32, are permanently connected with the crank-arms 34 of the exhaust-valves by means of rods 35, as usual, and the pins 33 are detachably connected with the crank-arms 36, of the inlet-valves by the rods 37.

It will be seen that my construction of shell with supporting sides or legs and its inner steam and exhaust passages and air-cham-

bers, particularly the latter, and also its independent, internal cylinder, enables me to dispense with the customary lagging or cleading, which latter has been unavoidably and necessarily resorted to heretofore for covering the cylinder and valve-chambers, and, in a very poor and inefficient manner, only, preventing the radiation of heat and condensation of the steam.

My construction is simple, economical and effective, and is, also, very readily produced, and properly maintained in order and appearance, without great labor or expense.

I claim—

1. In a steam engine, the combination, with a shell, substantially in the form of an inverted box, each end of which is provided with a large opening and the upper portion is provided with an opening, the shell being provided with an inlet and an outlet valve chamber adjacent to and communicating with the openings in the ends thereof, a longitudinal conduit communicating with the opening in the upper portion of the shell and with the inlet chambers, a conduit communicating with the outlet chambers and provided with an exhaust, a steam cylinder within the shell having its ends fitting within the openings in the ends thereof, a head in each opening in the ends of the shell, one of which is provided with the usual piston rod opening, a piston within the cylinder and a valve in each chamber, substantially as set forth.

2. In a steam engine, the combination, with a shell having an opening at each end and an inlet and an outlet opening in its sides, of an open ended cylinder in the openings in the ends of the shell, conduits between the cylinder and the shell, and communicating with the openings in the sides of the shell, a valve chamber at the outer end of each conduit, the shell extending beyond and around the chambers of the inlet conduit, whereby an air-chamber surrounds the same, a valve in each chamber, a cap in each opening in the ends of the shell, one of which is provided with a piston rod opening, a rod through the opening, and a piston within the cylinder, substantially as set forth.

3. In a steam engine, the combination, with a shell, substantially in the form of an inverted box, each end of which is provided with a large opening and the upper portion is provided with an opening, the shell being provided with an inlet and an outlet valve chamber adjacent to and communicating with the openings in the ends of the shell, a longitudinal conduit communicating with the opening in the upper portion of the shell and with the inlet chambers, a conduit communicating with the outlet chambers and being provided with an exhaust, each of said conduits being provided with a longitudinal strengthening rib, a steam cylinder within the shell having its ends fitted within the openings in the ends thereof, a head in each of the openings in the ends of the shell, one of which is provided

with the usual piston rod opening, a piston within the cylinder, and a valve in each chamber, substantially as set forth.

4. In a steam engine, the combination, with
5 a shell, substantially in the form of an inverted box, each end of which is provided with a large opening and the upper portion is provided with an opening, the shell being
10 provided with an inlet and an outlet valve chamber adjacent to and communicating with the openings in the ends of the shell, a longitudinal conduit communicating with the opening in the upper portion of the shell and with the inlet chambers, a conduit communicating
15 with the outlet chambers and being provided

with an exhaust, each of said conduits being provided with a longitudinal strengthening rib, a steam cylinder within the shell having each end provided with a dovetailed recess and fitting within the opening in the end of 20 the shell, a packing in each recess, a head in each opening in the end of the shell, one of which is provided with the usual piston rod opening, a piston in the cylinder, and a valve in each chamber, substantially as set forth.

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Witnesses:

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