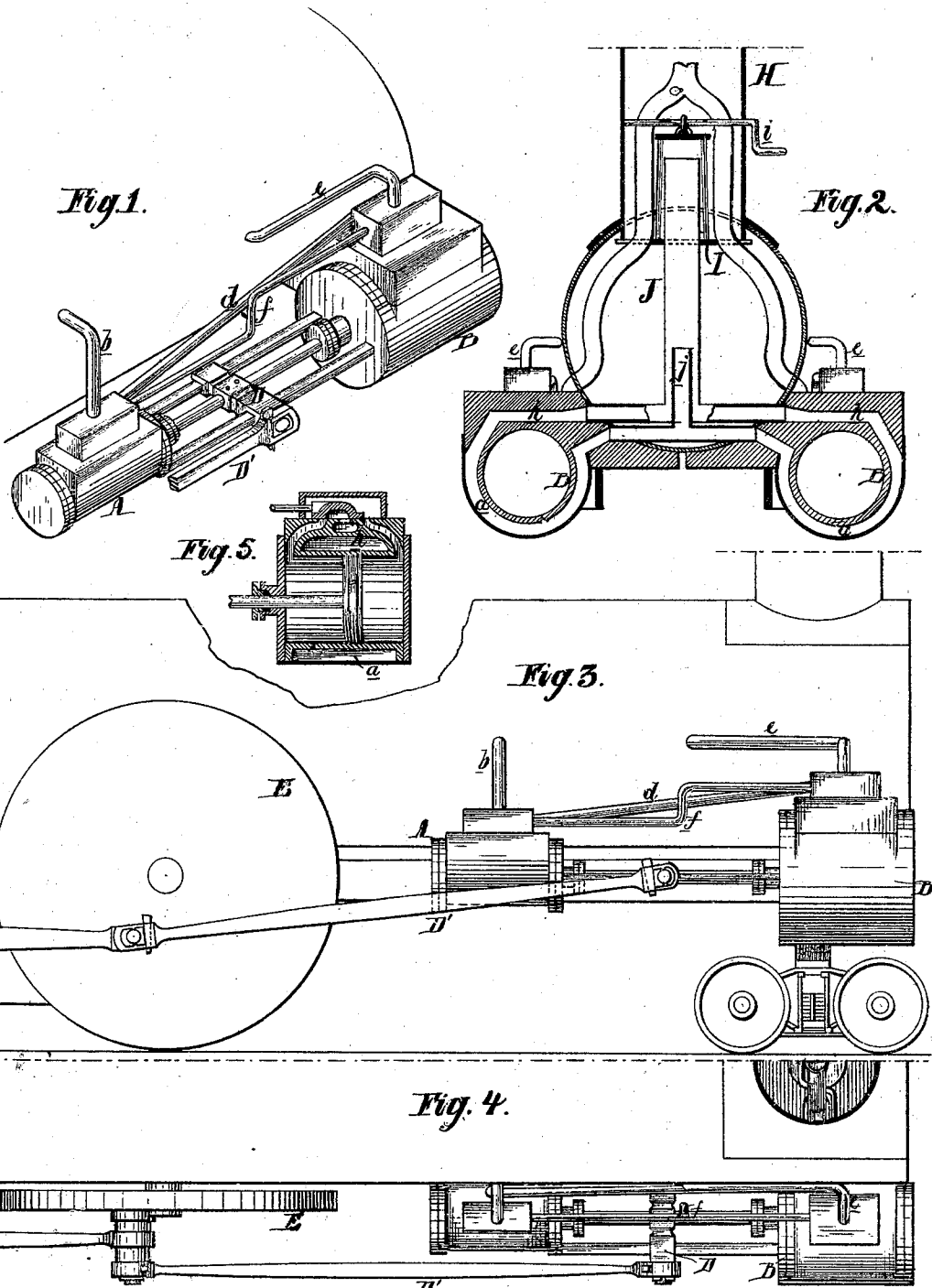


H. W. ADAMS.

Improvement in Locomotive-Engines.

No. 130,685.

Patented Aug. 20, 1872.



Witnesses. { Harry Smith
John K. Rupertus

Henry W. Adams
by his Attor.
Horsman and Son

UNITED STATES PATENT OFFICE.

HENRY W. ADAMS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN LOCOMOTIVE-ENGINES.

Specification forming part of Letters Patent No. 130,685, dated August 20, 1872.

Specification describing certain Improvements in Locomotive-Engines, invented by HENRY W. ADAMS, of the city and county of Philadelphia, State of Pennsylvania.

Improvements in Locomotive-Engines.

My invention has for its object the simple and economical application of double-cylinder engine to locomotives, and the reheating of steam in the cylinders.

The first object is attained in the manner best observed in the perspective view, Figure 1, illustrating one of the engines, which consists of a small cylinder, A, the steam from which is exhausted into the larger cylinder B, the pistons of the two cylinders being connected to one cross-head, D, and the latter to the driving-wheels by the usual connecting-rods. The second object of my invention is attained in the manner shown in Fig. 2, which is a vertical section of the smoke-box end of a locomotive, and in which it will be seen that the products of combustion are permitted to traverse a passage, *a*, round the larger cylinder B, the steam in which is consequently reheated. A double-cylinder engine, like that shown in Fig. 1, is secured to each side of the boiler at the smoke-box end of the same, high-pressure steam being admitted through a pipe, *b*, to the steam-chest of the smaller cylinder A, and the steam being exhausted from the latter cylinder into the steam-chest of the larger cylinder through a pipe, *d*. Live steam, however, can, when circumstances require it, as when the locomotive is first started, or in ascending steep grades, be admitted through a pipe, *e*, to the steam-chest of the larger cylinder. The valves may be of the usual construction, those of both cylinders being attached to one rod, *f*, which can be operated by the eccentrics and reversing-gear common to the single-cylinder engines of locomotives. The cross-head D is arranged to slide in suitable guides extending from one cylinder to the other, and this cross-head is connected by the ordinary rod D to the crank-pin of the driving-wheel E, as shown in the side view, Fig. 3, and plan view, Fig. 4. It will be evident that this mode of applying double-cylinder engines to locomotives is simple and economical. The exhaust-steam from the large

cylinders is permitted to escape into the chimney H for the purpose of creating a draft in the latter, and at the end of this chimney, within the smoke-box, is a damper, I, which can be raised or lowered, at pleasure, by means of a cranked rod, *i*, or other equivalent device. On elevating this damper the passage of the products of combustion from the smoke-box to the chimney will be impeded, and they will consequently pass downward through a pipe, *j*; thence in both directions to the chamber *a* formed round each of the larger cylinders; thence through passages *h* formed in the cylinders below the exhaust, (see Fig. 5;) and thence through a vertical pipe, J, into the chimney. The cylinders are thus maintained in a heated condition by the constant current of products of combustion in contact with them, and the exhaust-steam admitted to these cylinders is consequently reheated. On depressing the damper I the products of combustion will take a direct course to the chimney, and more or less of these products may be directed to the course round the cylinders in proportion to the adjustment of the damper.

I prefer that each cylinder B should be surrounded, or partially surrounded, as above described, by a passage or passages, through which products of combustion are caused to circulate, owing to the draft created by a steam jet or blast; but these passages are not absolutely necessary in carrying out my invention, as the exhaust-steam in the said cylinders could be effectually reheated by arranging the cylinders within, or partly within, the smoke-box, so as to be in direct contact with the heated products of combustion circulating therein.

I claim as my invention—

1. The high and low pressure cylinder, the pistons of which are connected to a cross-head situated between the said cylinders, and connected to the driving-gear of a locomotive, all substantially as set forth.
2. The combination, with a steam-cylinder, of a passage or chamber communicating with the flues of a steam-boiler so that the products of combustion may re-enforce the heat of the said cylinders.
3. The combination of the said passage or chamber, around or partly around the cylin-

der, with a steam jet or blast for inducing the products of combustion to traverse the said passage or chamber.

4. The combination of the said passage or chamber, around or partly around the cylinder, with the pipe *j* or its equivalent, for admitting the products of combustion to the said passage and the draft-pipe J, substantially as set forth.

5. The combination of the pipe J and the

inlet-pipe *j* with the adjustable damper I and the chimney H, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY W. ADAMS.

Witnesses:

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HARRY W. DOUTY.