

(No Model.)

W. M. RUSSELL.
LOCOMOTIVE.

No. 604,481.

Patented May 24, 1898.

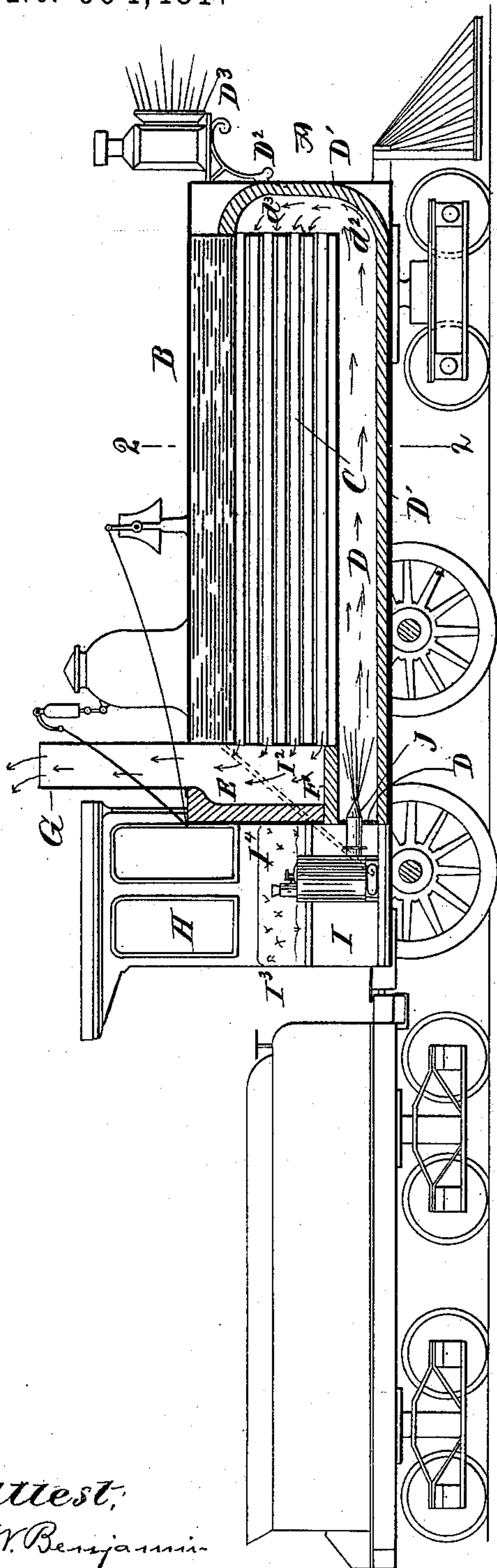
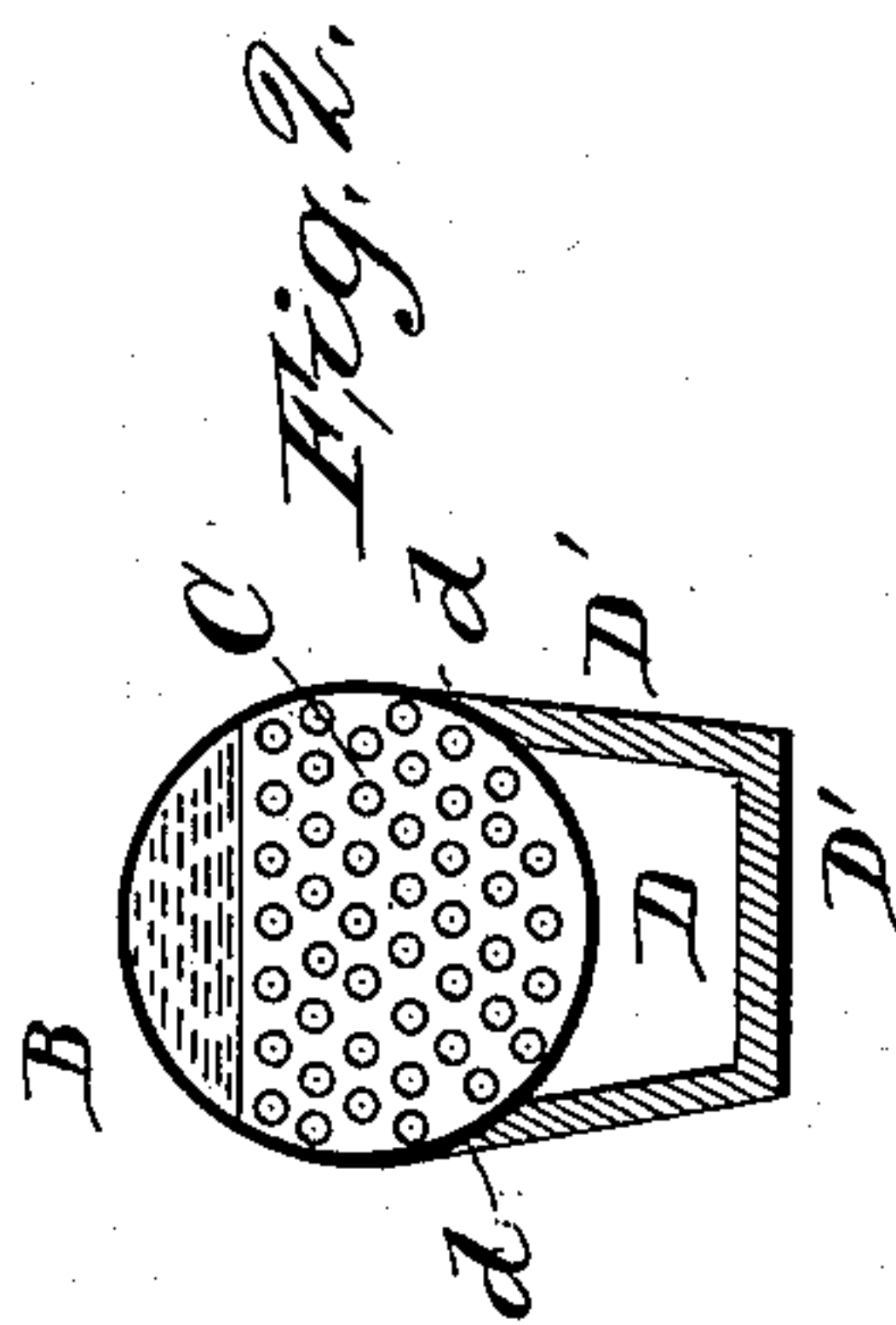


Fig 1



Attest:
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LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 604,481, dated May 24, 1898.

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To all whom it may concern:

Be it known that I, WILLIAM M. RUSSELL, a citizen of the United States, residing in New York city, county and State of New York, have invented certain new and useful Improvements in Locomotives, of which the following is a specification.

In all locomotives heretofore constructed, so far as I am aware, the heat and products of combustion were carried from the fire box or chamber directly through the flues of the boiler to the smoke stack or outlet and none of the heat or products of combustion were carried beneath and in contact with the under surface of the boiler.

The object of my invention is to so arrange the combustion-chamber and passages for heat and products of combustion that said heat and products of combustion will pass beneath the boiler and in contact therewith as well as through the flues of the boiler of the locomotive.

The invention consists in a locomotive having a boiler provided with flues, a combustion-chamber located beneath the boiler and leading to the flues at one end thereof, an outlet chamber or space in connection with the flues at the opposite end of the boiler, and a smoke-stack connected with said outlet chamber or space. By this means the water in the boiler is exposed to a greater heating-surface than where the heat and products of combustion merely pass through the boiler-flues.

The invention further consists in the novel details of improvement and the combinations of parts, that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a side elevation, partly in longitudinal section, of a locomotive embodying my improvements; and Fig. 2 is a cross-section on the line 2 2 in Fig. 1.

In the accompanying drawings, in which similar letters of reference indicate corresponding parts in the two views, the letter A indicates generally a locomotive, the arrangement of whose parts, other than those to which my invention relates, may be of

ordinary or other desired or proper construction.

B is a boiler provided with flues C in well-known manner. Beneath the boiler B and extending longitudinally thereof is a combustion-chamber D, formed by suitable walls D', which inclose the lower part or belly of the boiler, leaving the space D, within which combustion of fuel can take place. The walls D' may be made of brick or other suitable fireproof material. As shown in Fig. 2, the walls D' engage the outer wall of boiler B at d . The chamber D is shown extending the full length of the boiler B and leading to the forward open ends of the flues C, forming a connection with a space D² at the forward end of the locomotive. The walls D' are properly arranged in front and at the sides to form the space D². By preference the forward wall D³ is curved upwardly at d^2 and over rearwardly at d^3 , so as to direct the heat and products of combustion over rearwardly into the open ends of flues C. (See Fig. 1.)

At the rear of the boiler B is a chamber or space E, which communicates with the rear open ends of flues C, and is separated from the chamber D by a fireproof-wall F. The walls at the back and sides of chamber or space E are also of fireproof material. The chamber or space E communicates with a stack G, which, as shown, is located near the rearward end of the locomotive and adjacent to a cab H.

With the arrangement of boiler, flues, and chambers above described it is designed to utilize a flame produced by burning fine or comminuted fuel, such as pulverized coal, forced into combustion-chamber D by and with a blast of air. For this purpose I provide a suitable pulverizer and blower I, which is shown located in the cab H and suitably connected with a nozzle J, that leads to combustion-chamber D through a wall D⁴ thereof at the rear. The pulverizer and blower I may be operated by a suitable steam turbine or rotary engine, which may be connected with the steam-space of boiler B by a pipe I², (shown in dotted lines,) or any other suitable device, engine, or motor may be used to operate the pulverizer and blower I. The pul-

verizer and blower will be provided with a fuel-hopper I³ and suitable feeding devices I⁴ to direct the fuel properly into the machine.

A pulverizer and blower suitable for the purpose is shown in the United States Patent No. 551,097, issued to me on December 10, 1895.

In operation a mixture of pulverized fuel and air is forced by the pulverizer and blower I into combustion-chamber D and there ignited and burned in the form of a long flame. The flame passes longitudinally within said chamber and has direct access to the bottom or belly of the boiler, and if the fuel mixture is thrown with sufficient force the flame will extend the full length of the boiler and turn back into the forward ends of flues C. The heat and heated products of combustion travel thence through space D² and backwardly through flues C, emerging into chamber or space E, and thence escape through stack G. It will thus be seen that the whole under surface or belly of the boiler and the larger part of both ends thereof and the interior of the flues are all exposed to the direct action of the heat. By this means a large area of the water in the boiler is submitted to the direct action of the heat, and thus an economy is effected over the old style of heating locomotive-boilers by passing the heat from a bed of coals merely through the boiler-flues from the rear to the front. Another advantage is that no hot coals are liable to fall from the locomotive upon cross-ties and bridges, as no coals are used in the combustion-chamber, the pulverized coal being consumed wholly within the chambers and flues.

The economy resulting from using pulverized coal is well known. Hence by my arrangements where the chamber D provides a long space for a flame without obstruction I am enabled to avail myself, in a locomotive, of all the advantages incident to using pulverized fuel.

It will be understood that the walls forming the chambers or spaces D and D² may be supported by the axles K in any desired manner either by a direct connection therewith through springs and journal-boxes or by being suspended from the boiler, which in turn will be connected with the axles K in any well-known manner.

Having now described my invention, what I claim is—

1. A locomotive having a boiler provided with flues, a combustion-chamber beneath the boiler and communicating with the flues at one end thereof, the under wall of the combustion-chamber being unbroken throughout its length, an outlet chamber or space in connection with the flues at the opposite end of

the boiler, and a stack connected with said outlet chamber or space, substantially as set forth.

2. A locomotive having a boiler provided with flues, walls inclosing the lower portion of the boiler and extending beneath the same throughout its entire length unbroken and on a single plane and forming a combustion-chamber beneath the boiler, walls at the forward part of the boiler forming a space that communicates with said combustion-chamber and with the boiler-flues, walls at the opposite end of the boiler forming a space that communicates with the adjacent ends of the flues, one of said walls separating the last-mentioned space from the combustion-chamber, and a stack connecting with said last-mentioned space, substantially as described.

3. A locomotive having a boiler provided with flues, a combustion-chamber extending beneath the boiler and communicating with the flues thereof at one end under the wall of the combustion-chamber being unbroken throughout its length, a stack communicating with the opposite ends of said flues, and means connected with said combustion-chamber, at the end that is opposite its connection with the flues, for forcing pulverized or comminuted fuel into said combustion-chamber, substantially as set forth.

4. A locomotive having a boiler provided with flues, a combustion-chamber extending beneath the boiler and communicating with the flues thereof at one end, the under wall of the combustion-chamber being unbroken throughout its length, a stack communicating with the opposite ends of said flues, and a pulverizer and blower connected with said combustion-chamber, at the end that is opposite its connection with the flues, for forcing pulverized fuel into said combustion-chamber, substantially as set forth.

5. A locomotive having a boiler provided with flues, walls extending beneath the boiler forming a combustion-chamber inclosing the open ends of said flues at one end of the boiler and a space that connects said combustion-chamber with said flues, the outer of said last-mentioned walls being curved upwardly and over rearwardly, the under wall of the combustion-chamber being unbroken throughout its length, a stack connected with the opposite ends of said tubes, and means for forcing pulverized or comminuted fuel into said combustion-chamber at the end opposite its connection with said flues, substantially as set forth.

WILLIAM M. RUSSELL.

Witnesses:

T. F. BOURNE,
JAS. G. SMITH.