

No. 617,564.

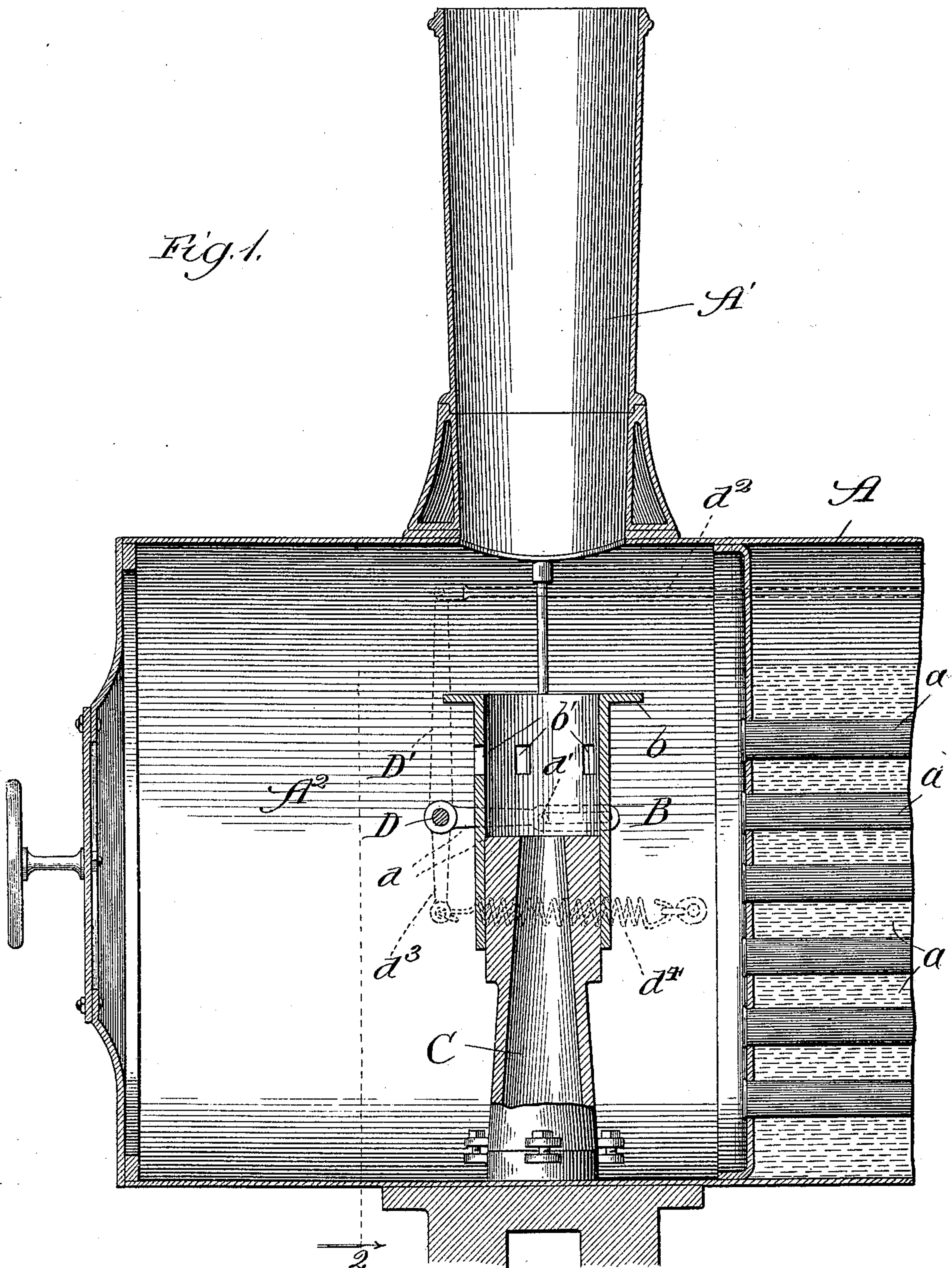
Patented Jan. 10, 1899.

C. A. COUCH.
LOCOMOTIVE.

(Application filed Nov. 17, 1897. Renewed Dec. 7, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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UNITED STATES PATENT OFFICE.

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LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 617,564, dated January 10, 1899.

Application filed November 17, 1897. Renewed December 7, 1898. Serial No. 698,581. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. COUCH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Locomotives, of which the following is a specification.

The object of my invention is to provide a locomotive with a simple, economical, and efficient heat-deflector arranged in line with the outlet of the smoke-stack; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of the front end of a locomotive-boiler, taken on line 1 of Fig. 2, looking in the direction of the arrow; and Fig. 2, a transverse sectional view taken on line 2 of Fig. 1, looking in the direction of the arrow.

In the art to which this invention relates it is well known that the exhaust of the steam through the smoke-stack and the puffing caused thereby create such an artificial draft as to lift the smaller particles of coal from the fire-box and carry them through the flues into the smoke-box and out through the smoke-stack to the danger of the country adjacent to the lines of railroad-track, as well as thereby causing a large waste of fuel. It is further well known that during the run of an engine considerable heat passes through the smoke-box; but when the locomotive comes to a stop a partial vacuum is formed in the smoke-box, due to the stoppage of the highly-heated steam from passing there-through. This causes an inward rush of cool air, which acts to contract different portions of the mechanism, as well as dampen the fire and lower the temperature of the steam. My invention is intended to overcome these objections, and has for its principal object the fitting of a locomotive with mechanism by which the draft may be regulated, a large portion of the heat which usually passes out through the smoke-stack retained, and to prevent the passing out of sparks, cinders, or coal, as well as to burn or consume the same.

In constructing a locomotive in accordance with my improvements I use a boiler A of the

desired size, shape, and strength to meet the ordinary requirements. This locomotive is provided with the usual flues *a* and smoke-stack A'. As is usual in such cases, the products of combustion pass through the boiler-flue into the smoke-box A² and out through the smoke-stack. In order to regulate the opening or what might be properly termed the "size of channel" between the smoke-box and the smoke-stack, I provide what I term a "heat-deflector" B, arranged on the exhaust-pipe C, which is in alinement with and immediately under the opening of the smoke-stack, and all arranged in the smoke-box. This heat-deflector is preferably made in the shape of a hollow cylinder and has a flange *b* at the upper portion thereof. This flange is preferably made of larger diameter than the inner opening of the smoke-stack, so that when such cylindrical deflector is at its upper limit the flange will complete the closing of the opening between the smoke-stack and the fire-box, and thereby practically retain all the heated gases and products of combustion in the smoke-box. When the engine is running at the desired speed, the deflector is at its lower limit, so as to interfere as little as may be necessary with the draft, but at the same time the products of combustion, heated gases, cinders, and the like first strike the cylindrical portion B of the deflector and then rise toward the stack. The flange *b*, however, intervenes and compels the gases, products of combustion, cinders, and the like to curve outward before going upward. A reactionary current is thereby induced, and the heavier particles fall to the bottom of the box, while the gases pass around and over the flange and thence out through the stack. The draft, however, during the running of the locomotive may be regulated by the position of the deflector—that is, the small unburned particles of coal are prevented from leaving the fire-box—and thereby causes considerable saving in fuel.

When the locomotive is brought to a standstill, it is desirable to keep as much as possible of the heated products in the boiler and prevent an inward rush of cool air. To accomplish this, the cylindrical deflector is raised as much as seems desirable—that is,

to leave just enough of an opening out of the smoke-box to allow of a slight draft. The cylindrical deflector then acts as a heat-reservoir—that is, during the run of the engine
 5 it has become highly heated and a large amount of heat thereby absorbed which would otherwise pass out through the stack, so that when the locomotive is at standstill this heat is radiated and helps or materially assists to
 10 maintain the desired temperature within the locomotive.

To raise and lower the deflector when necessary or desirable, a rock-shaft D is provided and mounted in suitable bearings in the walls
 15 or shell of the boiler. This rock-shaft has arms d , slotted at their free ends and engaging with pins d' on the cylindrical portion of the deflector. The outer end of this shaft is provided with a lever-arm D' , which may be
 20 operated from the cab of the locomotive by means of the operating-rod d^2 . A lever d^3 and helical spring d^4 act to hold the deflector in its open position or against the movement of the operating lever and rod—that is, it acts to re-
 25 tain the parts in a normal open position.

Gases expand very much under high temperatures, and as the draft of the locomotive increases, and consequently raises the temperature in the fire-box, the gases naturally
 30 expand, so that if the opening from the smoke-box into the stack is too small they would naturally act to choke the draft. In order to prevent this, I provide the deflector with several radial openings b' , so that as the gases
 35 expand they may force themselves or be forced out through this opening and thus prevent the choking which might otherwise occur.

I claim—

1. In a locomotive, the combination of an exhaust-flue arranged in line with the smoke-
 40 stack, a hollow cylindrical deflector formed in one piece provided with a flanged upper portion arranged in the smoke-box in line with the smoke-stack and closely fitting the exhaust-flue, and means for vertically mov-
 45 ing the deflector, substantially as described.

2. In a locomotive, the combination of an exhaust-flue arranged in the smoke-box and in line with the smoke-stack, a hollow cylindrical deflector formed in one piece provided
 50 with an upper flanged portion of a diameter larger than the opening of the smoke-stack and closely fitting the exhaust-flue, and means for vertically moving the deflector so as to practically complete the opening and closing
 55 of the opening between the smoke-box and the smoke-stack, substantially as described.

3. In a locomotive, the combination of an exhaust-flue arranged in the smoke-box and in line with the smoke-stack, a hollow cylindrical deflector formed in one piece movably
 60 mounted on and closely fitting the exhaust-flue and provided with radial openings and with an upper flanged portion adapted to practically complete the opening and closing
 65 of the opening between the stack and the smoke-box, and means for moving the deflector so as to practically complete the opening and closing of the opening in the smoke-stack, substantially as described.

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