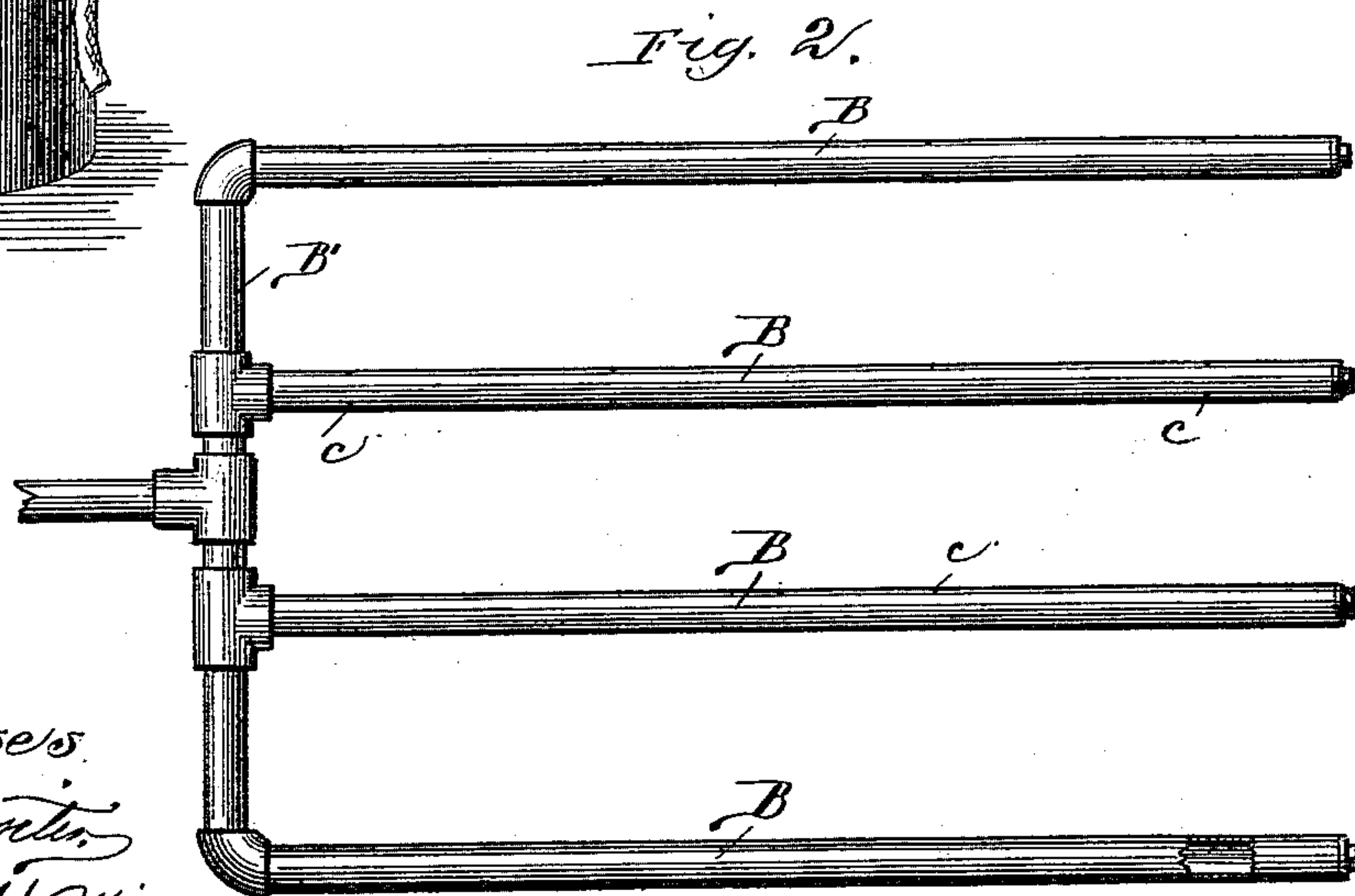
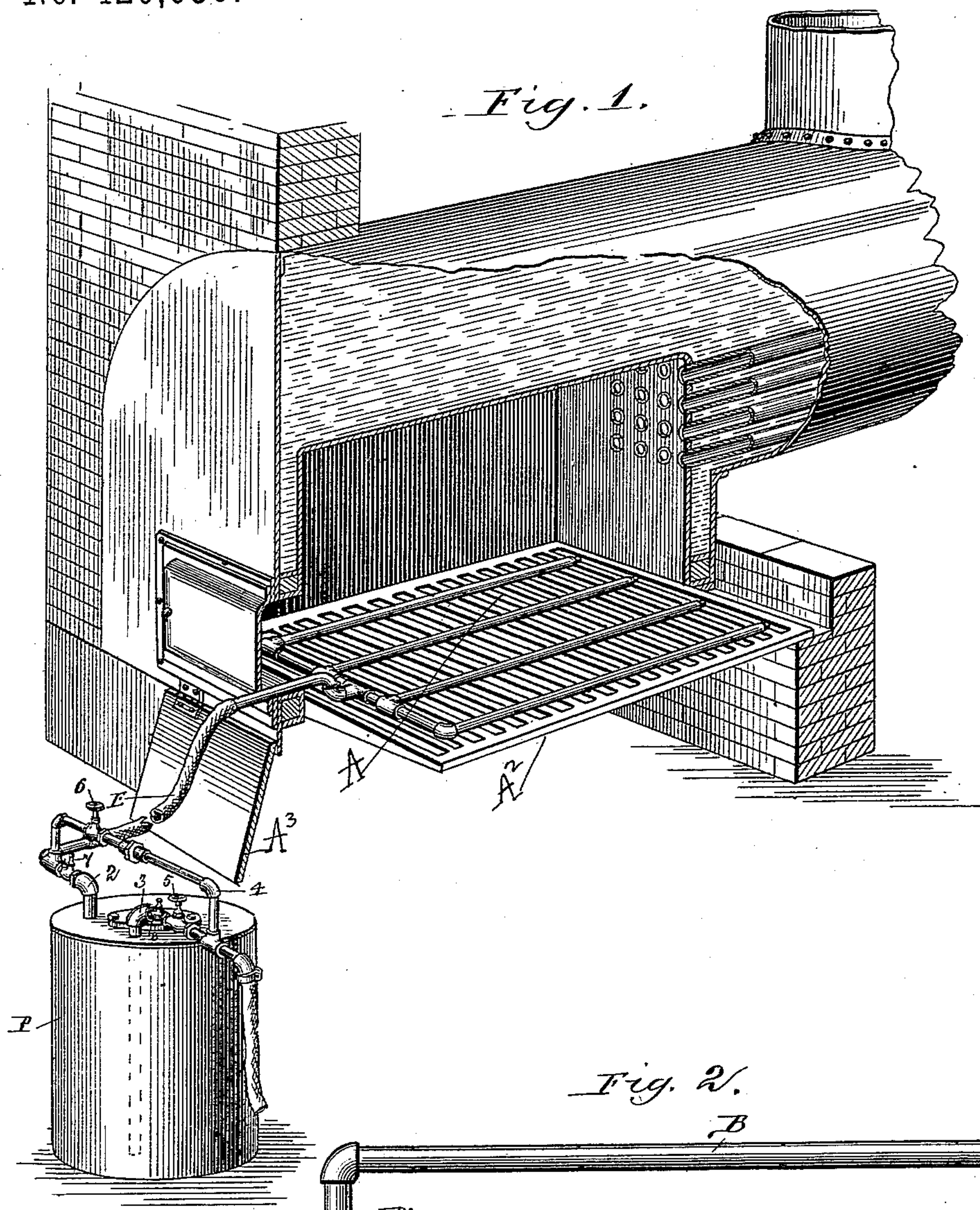


(No Model.)

H. HACKNEY.
METHOD OF KINDLING FIRE IN FURNACES.

No. 420,056.

Patented Jan. 28, 1890.



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METHOD OF KINDLING FIRE IN FURNACES.

SPECIFICATION forming part of Letters Patent No. 420,056, dated January 28, 1890.

Application filed April 29, 1889. Serial No. 308,966. (No model.)

To all whom it may concern:

Be it known that I, HERBERT HACKNEY, a citizen of the United States, residing at Chicago, in the State of Illinois, have invented certain new and useful Improvements in the Method of Kindling Fire in Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

In boilers and other furnaces in which coal is used as a fuel it is customary in kindling fires to first place upon the grate-bars a mass of wood or other easily-inflammable material, and upon this mass to heap the coal, the burning of the wood being relied upon to produce the incipient combustion of the coal. In a variety of situations this common method of kindling fires is objectionable and expensive. For example, in kindling the fires of locomotive-furnaces the use of wood necessitates storage at a point adjacent the engine-house of large quantities of wood, which, in cities especially, occupies valuable ground. Moreover, the handling of this wood in transporting it to and from the yard and in laying it in the furnaces is expensive and consumes much time, so that it has been estimated that the kindling of fires by the use of wood in locomotive-engines entails a cost of between thirty and fifty cents a fire, and in some sections of the country, where there is a scarcity of wood, the cost is even much greater.

The object of my present invention is to provide an improved method whereby the fires in locomotive and other furnaces may be quickly and economically kindled; and to this end my present invention consists in injecting into the mass of raw fuel a gas (preferably carbureted air) until incipient combustion of the fuel is effected, then checking the blast of gas and injecting an air-blast to perfect the ignition of the fuel.

In the accompanying drawings I have illustrated one form of apparatus whereby my invention may be practiced, although it will be understood that other forms of apparatus may be employed for this purpose.

In the drawings, Figure 1 is a perspective view (parts being shown in vertical section) of a steam-boiler furnace provided with ap-

paratus for the practice of my invention. Fig. 2 is an enlarged plan view of the burner-pipes through which the gas and air will be injected into the fuel.

A designates the fire-box of the boiler; and A' denotes the grate-bar, A² the fire-box door, and A³ the ash-pit door, of the furnace.

The burner apparatus illustrated in the drawings comprises a series of pipes B, suitably united to a transverse pipe B', which transverse pipe is connected by a pipe E with an eduction-pipe 2, that leads from a suitable carbureting-chamber P. Into this carbureting-chamber dips the end of a pipe 3, that is suitably connected with an air-compressor, the portion of the pipe 3 within the carburetor being extended to a point near its bottom. Within this carbureting-chamber will be placed some suitable absorbent material—such, for example, as sponge, excelsior, or the like—which will be saturated by liquid hydrocarbon, so that as the air is forced through the carbureting-chamber it will be thoroughly carbureted before it passes into the pipe 2 at the top of the chamber. Between the pipes 2 and 3 extends the branch pipe 4, and the pipe 3 will be provided with a suitable stop-cock 5, and the pipe 4 will be provided with a suitable stop-cock 6. A check-valve 7, of ordinary construction, may also be placed in the pipe 2 to prevent the backflow of ignited gas into the carbureting-chamber, and a similar check-valve 8 may be placed in the pipe 3 to prevent the backflow of carbureted air or of hydrocarbon liquid through the pipe 3 in case the pressure of air within the air-compressor should suddenly fall below the pressure in the carbureting-chamber.

In the drawings I have shown the pipes B as placed directly upon the grate-bars of the furnaces, and upon these pipes the raw coal will be heaped.

When it is desired to start a fire in the furnace, the stop-cock 5 will be opened and a portion of the air-supply from the compressor will pass through the pipe 3 into the carbureting-chamber, and thence, after becoming thoroughly carbureted, will pass through the pipe 2 and the delivery-pipe E into the burner-pipes B within the furnace. At the same time the stop-cock 6 may be opened more or

less to admit a sufficient quantity of air to mingle with the carbureted air that passes from the carbureting-chamber, in order to effect a proper combustion. The carbureted
5 air or gas thus delivered through the pipes B into the mass of fuel will be ignited and will continue to burn until an incipient ignition of the fuel has been effected, after which, by turning the stop-cock, the supply of carbureted
10 air or gas will be checked and the supply of air will be forced directly through pipes 3, 4, and 2 and delivery E and perforated pipes B into the mass of fuel at the same point at which the incipient combustion of
15 the fuel has been effected. This forcing of the air-blast into the mass of fuel at the same point at which the incipient combustion has occurred will have the effect of urging the combustion at this precise point in much the
20 same manner as a blast of air through a blow-pipe or forge would act upon a small ignited portion of fuel, tending to intensify the heat at such point and causing combustion to rapidly spread to all parts of the fuel. This feature of injecting air at the same point at
25 which the burning of the gas has effected the ignition of the fuel avoids all danger of chilling the main portion of the fuel by a more general air-blast.
30 It will be readily understood that by the operation of the stop-cocks 6 and 7 the supply of gas can be checked at the proper instant, the supply of gas being shut off immediately or being gradually reduced in volume
35 as the supply of air is increased. It will be understood, of course, that any suitable form of air-compressor may be employed for forc-

ing the air through the carbureting-chamber and directly into the pipes B.

When my invention is used for the purpose
40 of kindling fires in locomotives at engine-houses, I prefer to utilize the waste steam from the locomotives, as they are "blowing off," in order to effect the proper compression
45 of the air, it being simply necessary to provide suitable pipes for connecting the air-hose of the locomotives with a suitable air-storage tank. For this purpose a pipe leading from the storage-tank will be extended
50 across the various pits of the engine-house, so that a ready connection between such pipe and the air-hose of the locomotive can be effected.

Having thus described my invention, what I claim as new, and desire to secure by Letters
55 Patent, is—

1. The method of kindling fires in furnaces which consists in injecting into the mass of raw fuel a blast of gas until the incipient combustion of the fuel is produced, then checking
60 the blast of gas and injecting an air-blast to perfect the ignition, substantially as described.

2. The method of kindling fires in furnaces which consists in injecting into the mass of
65 raw fuel a blast of hydrocarbon gas until the incipient combustion of the fuel is effected, then checking the blast of gas and injecting at the same point an air-blast to perfect the ignition, substantially as described.

HERBERT HACKNEY.

Witnesses:

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