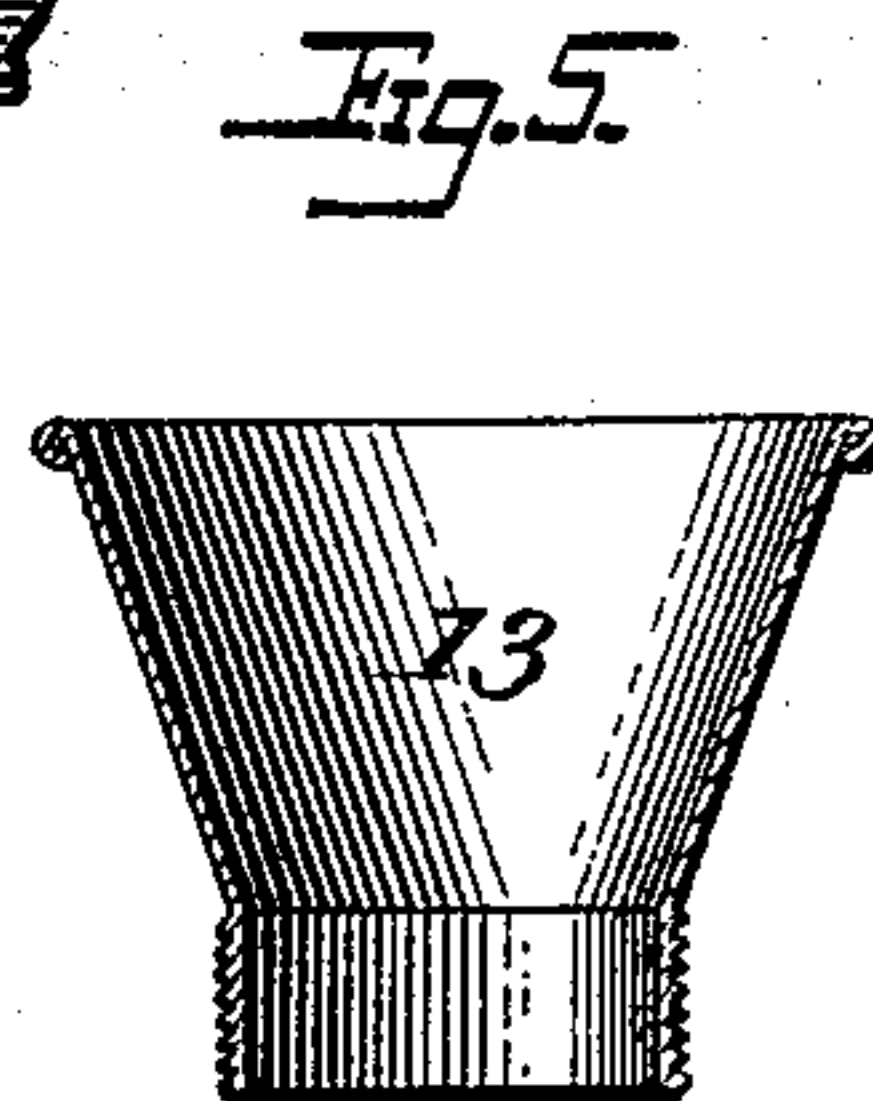
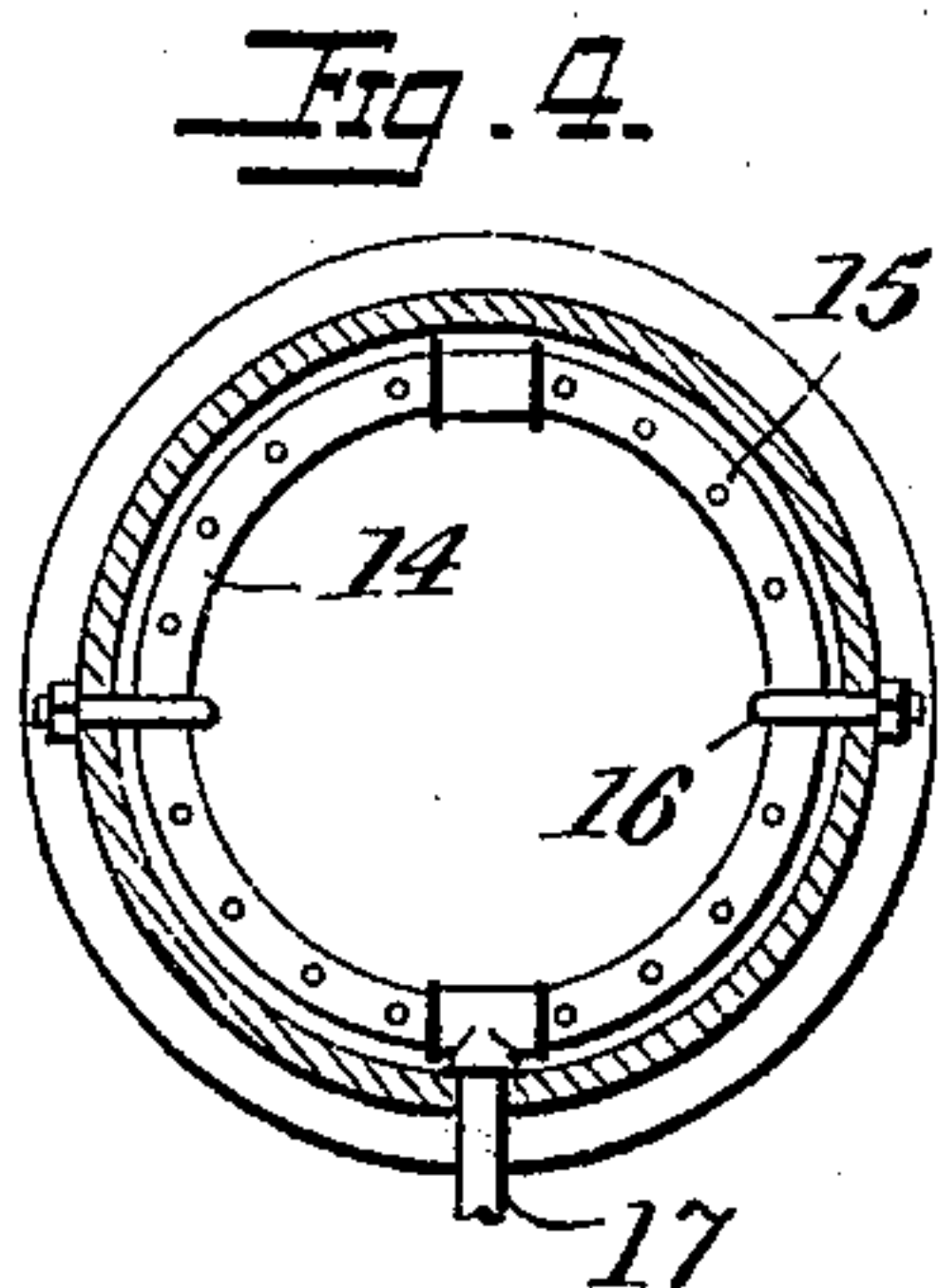
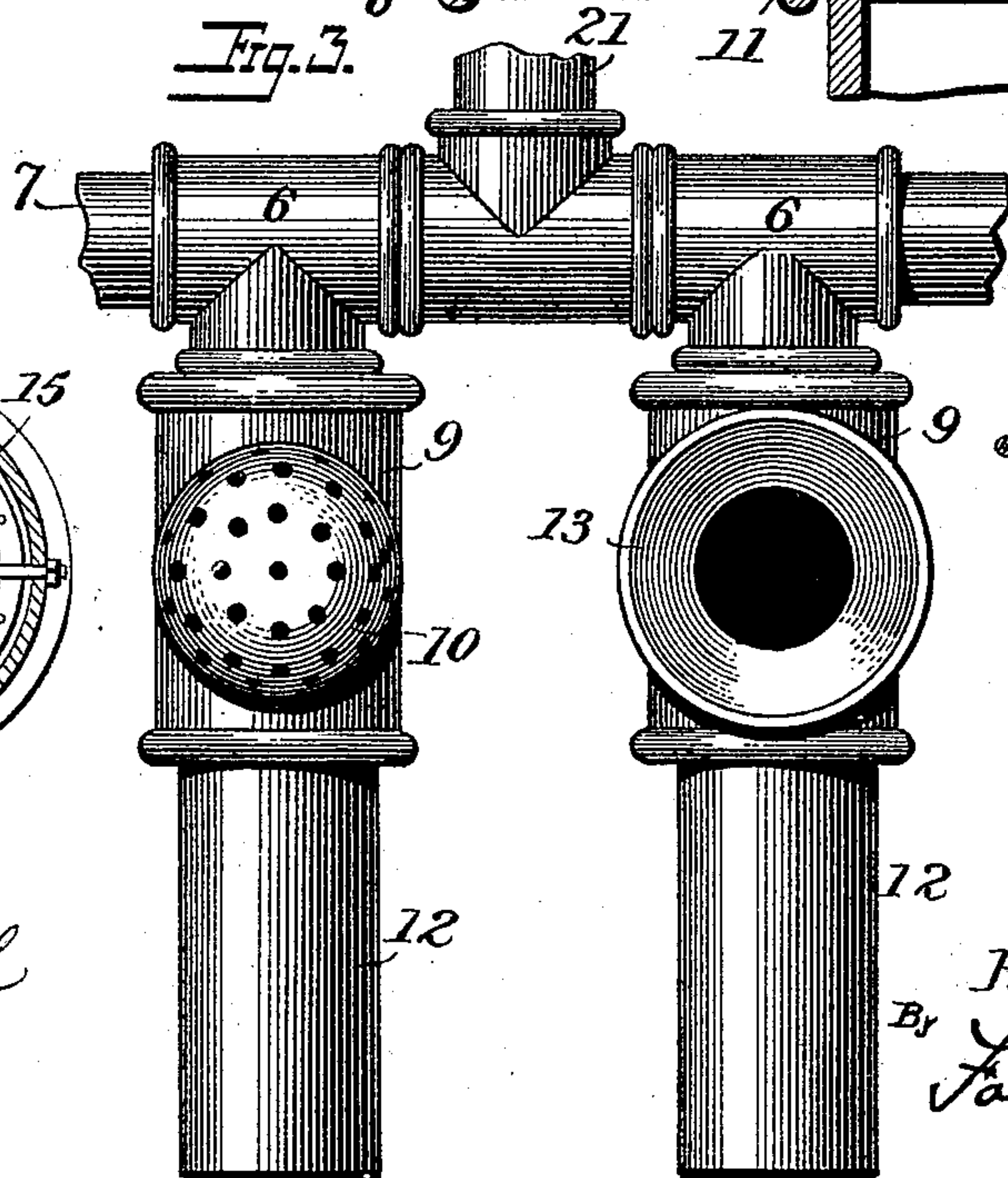
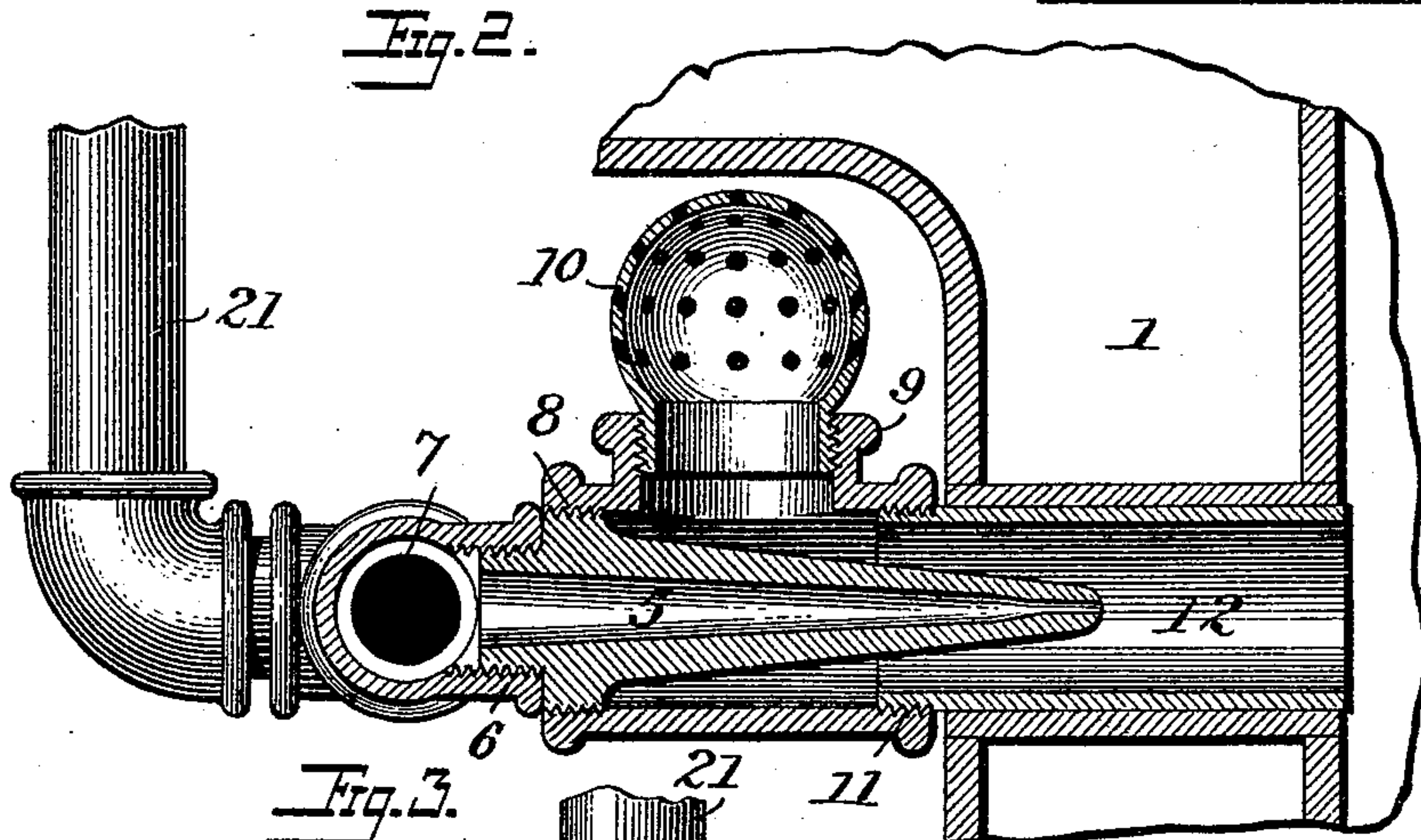
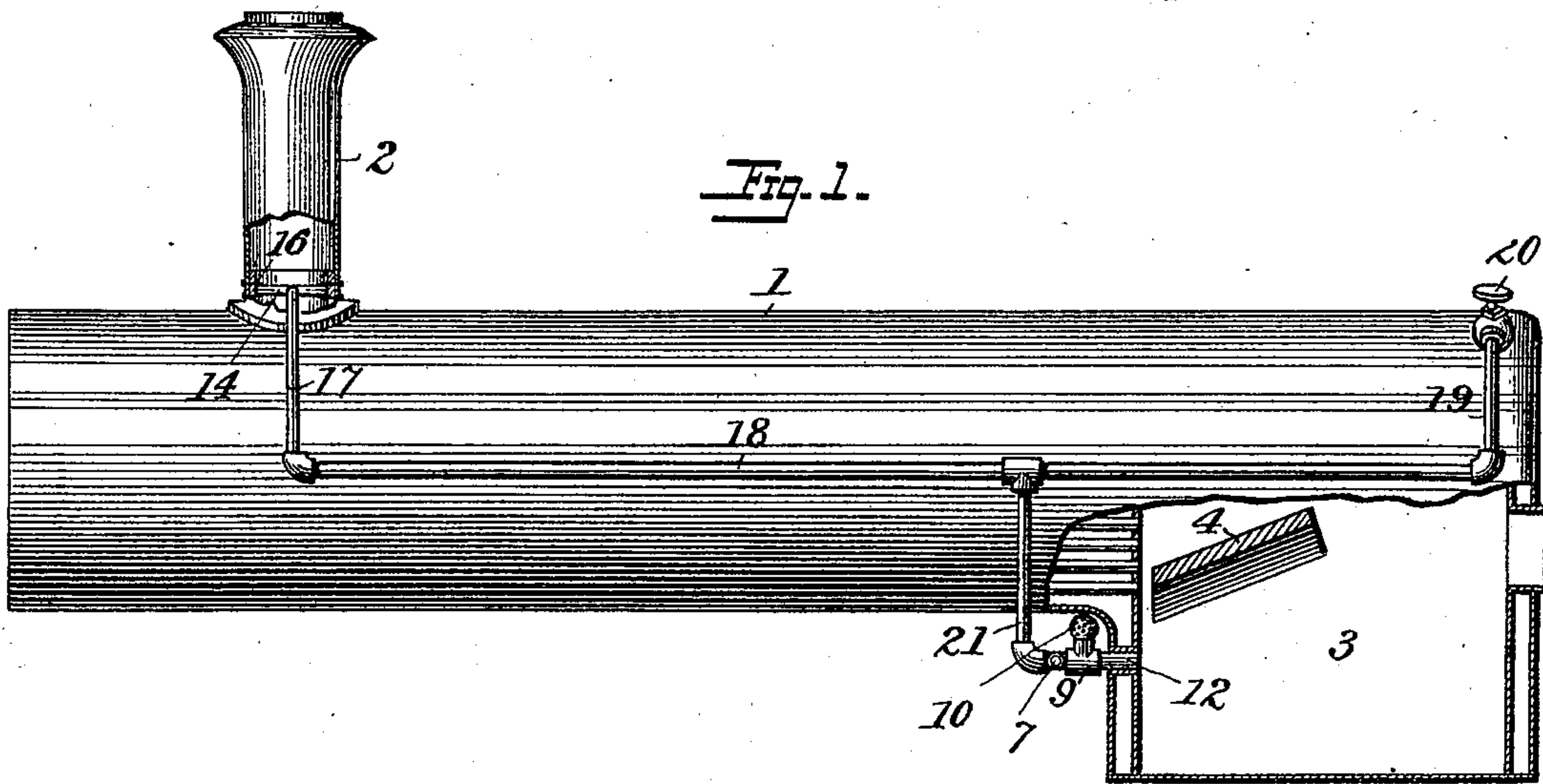


(No Model.)

H. DELANEY.
SMOKE CONSUMER.

No. 517,917.

Patented Apr. 10, 1894.



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UNITED STATES PATENT OFFICE.

HARRY DELANEY, OF NEW ALBANY, INDIANA.

SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 517,917, dated April 10, 1894.

Application filed September 12, 1893. Serial No. 485,356. (No model.)

To all whom it may concern:

Be it known that I, HARRY DELANEY, a citizen of the United States, residing at New Albany, Floyd county, State of Indiana, have
5 invented certain new and useful Improvements in Smoke-Consumers, of which the following is a specification.

This invention relates to certain new and useful improvements in smoke consuming devices for locomotive or stationary steam boilers; and it consists substantially in such features of construction, arrangement, and combinations of parts as will hereinafter be more particularly described.

15 The invention has for its object to provide simplified and effective devices of the character referred to which shall render combustion in the fire-box of the locomotive much more complete than with many devices for a
20 similar purpose at present in use.

The invention also has for its object to burn the products of combustion at the front of the fire-box beneath the arch or shield where they are consumed before an opportunity is
25 had for them to enter the flues which pass to the smoke stack.

These objects I attain by the means illustrated in the accompanying drawings, in which—

30 Figure 1 is a side elevation of an ordinary locomotive partly broken away at the rear so as to show the interior of the fire-box, the said figure having my improvements embodied therewith. Fig. 2 is an enlarged sectional
35 elevation of a part of the fire-box, together with my improved injector devices also in section. Fig. 3 is a plan view of a portion of the steam and air injector devices. Fig. 4 is an enlarged detail plan of the interior of the
40 saddle beneath the smoke stack. Fig. 5 is a sectional view of the air funnel sometimes employed instead of the air chambers.

It has been proposed heretofore to provide for the more thorough consumption of the
45 products of combustion in the fire box of a locomotive by locating peculiarly constructed operating doors in both the front and back of the fire box, one of which doors being to admit steam to the box and the other, air, the
50 opening of one door operating to close the other, and vice versa, so that a small quantity of steam could first be made to enter and

then as much air as was thought necessary to effect the desired consumption of the products. This form of device is open to serious
55 objection since it requires constant attention on the part of the fireman or engineer, and, besides, the construction of the doors is both expensive, as well as their operative devices, and a greater or less quantity of smoke is al-
60 ways liable to pass through the smoke stack. It has been further proposed to inject steam or air in both the front and back of the fire box, as well as both above and beneath the
65 grates therein, the steam being made to pass from the steam space of the boiler by suitable connections and the air being in the nature of induced currents caused by the in-
70 jected steam through the nozzles into the box. In this instance as well as the previous instance referred to, the draft is produced by a
75 pipe leading to the smoke stack; but, on account of the various directions taken by the several branch pipes leading to the injectors, it is evident that the discharge of steam up
80 through the stack is apt to encounter more or less interruption, which of course is communicated to the injectors, and the result therefore is not as complete as desired. It has still fur-
85 ther been proposed to lead a pipe from the base of the stack to the rear of the boiler, thence connect a branch which leads to a series of combined steam and air injectors entering the fire-box at the rear of the box, or at the part thereof directly opposed to the force of the
90 external air during the travel of the locomotive. This form of device is also combined with a peculiar form of saddle and stack, and is only adapted to certain classes of locomotives without considerable cutting and fitting.
95 In this instance, also, owing to the injection of air and steam being at the rear of the box, the operation is not at all reliable or complete since the products are induced to take a direction contrary to the natural tendency
100 thereof, and they are therefore made to be consumed at a point more directly in line with the ends of the boiler flues, and the result is that smoke is liable to escape through the stack in considerable quantity at times. Another objection to the form in question is that by reason of the injectors being arranged or located to the "rear" of the fire-box there is a tendency to an outward suction during

the movement of the locomotive which causes a very disagreeable noise, which, of course, is very annoying to the engineer as well as others.

5 My invention is distinguished from the types recited in that I am enabled to attach my improvements to any form of locomotive in use without any cutting or fitting beyond the formation of a few holes. Further, I do
10 not employ any special form of stack or base; and, furthermore, by the construction and arrangement of the devices as hereinafter described it will be seen that the solid or heavier products are burned or consumed at a point
15 where they are most likely to pass in going toward the flues, that is to say, at the front of the fire box and beneath the arch. By the use of my devices also the very disagreeable noise occasioned by the use of some of the
20 former devices referred to is almost if not entirely overcome.

In the annexed drawings, 1, designates an ordinary locomotive; 2, the smoke stack; 3, the fire box, and 4 a curved arch or shield located interiorly of the fire box and slightly
25 inclining toward the forward end of the locomotive, or as I have designated herein, the "front" of the fire box. It has been demonstrated by actual experience that before proceeding to the boiler tubes or flues, the products of combustion will pass first up over the lower end of the arch as indicated by the arrow, and if any considerable quantity thereof gets past such point, there is always
30 a large percentage of escape to the stack with nearly all forms of consuming devices at present in use. I, therefore, arrange across that end of the fire box toward the stack and beneath the arch, a series of steam injectors 5,
40 which are screwed steam tight into corresponding collars 6, which are formed on or attached to a steam chamber 7, with which all of said injectors 5 communicate. The said steam chamber 7 is of course closed at
45 its ends while secured onto each injector at 8 is a collar or sleeve 9 in each of which is secured a hollow perforated hood 10, which hoods, together with the sleeves 9 constitute separate air chambers or passages which surround the injectors in such manner that jets
50 of steam passing through the injectors into the fire box will cause induced currents of air to enter the fire box together therewith, the air entering the perforations of the hoods from
55 without. It will of course be understood that as my injector devices are arranged ahead of the wind a very strong and powerful induced current will be had.

The free ends of the sleeves or collars 9 are
60 interiorly threaded for a short distance as at 11, into which are screwed the ends of small

tubes 12, which are securely fitted in suitable openings formed in the fire box.

The steam chamber 7 may be constituted of only a single piece or a number of separate
65 sections suitably joined together, as desired. I prefer to employ the hoods or cap or caps 10, as shown, for the reason that dirt is prevented from being carried in to a large extent, but I have also found that the use of a
70 funnel 13, such as shown in Fig. 5, gives very good results.

Located in the base of the smoke stack is a circular or ring pipe 14, provided with a series of perforations 15, which ring is suitably
75 held in place by two or more clamps 16. Connecting with said ring is a short pipe 17 which is coupled to a longer pipe 18, that extends back to the rear end of the boiler and connects with the steam space thereof by means
80 of a pipe 19, the latter having the usual valve 20. Connecting also with said pipe 18 is a branch pipe 21, which extends around to a position about centrally of the steam chamber
85 7, to which latter it is connected in any suitable manner. Suitable additional valves may be provided if desired, wherever needed.

From the foregoing construction and arrangement, it will be seen that by the passage of steam through pipe 18 and its branch
90 21, a forced draft will be created at the base of the stack through the perforated ring, which draft will carry off all the gaseous products, and will induce the heavier or solid products to follow the course indicated by the
95 arrow, Fig. 1, that is to say, beneath the arch forwardly of the locomotive. Such products being met by the incoming blasts of air and steam will be immediately consumed. Thus it
100 will be seen that the products of combustion are assisted in taking the course they would naturally follow instead of being drawn from such course and carried up in line with the flues before being burned.

Without limiting myself to the precise construction and arrangement of parts shown, I
105 claim—

In a smoke consumer for locomotives, the injector devices consisting of the steam chamber 7 formed or provided with the collars 6,
110 steam injectors fitted to such collars, the sleeves or collars 9 fitted to the injectors, and the air receiving hoods provided with openings, substantially as described.

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

HARRY DELANEY.

Witnesses:

FRANK J. WINKELS,
WARREN PLOWMAN.