

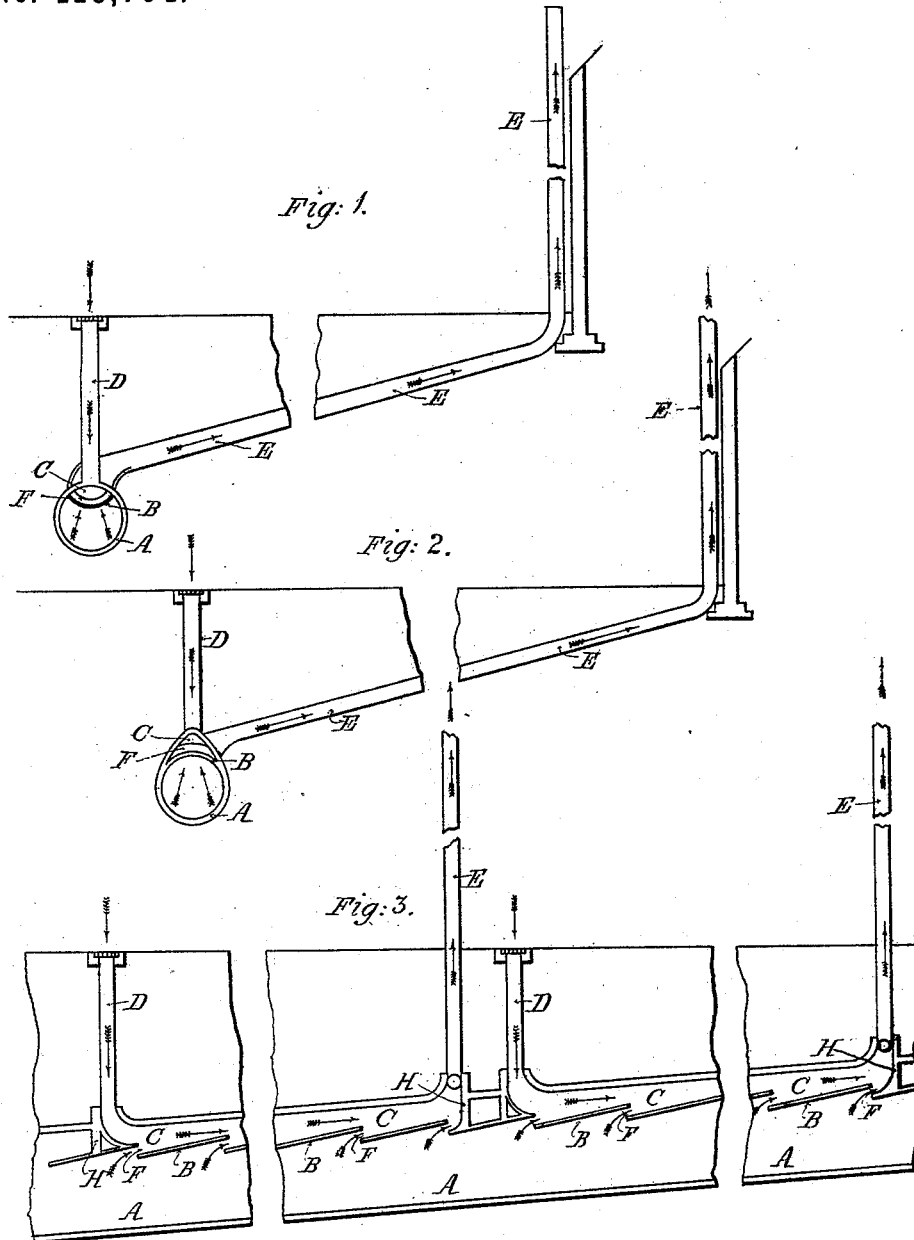
(No Model.)

3 Sheets—Sheet 1.

A. H. FORD & E. G. WRIGHT.
VENTILATION FOR SEWERS.

No. 419,764.

Patented Jan. 21, 1890.



Witnesses.

Edgar King

Benjamin King

Inventors.

Archibald Henry Ford
Elias George Wright

per James Stevenson

Attorney.

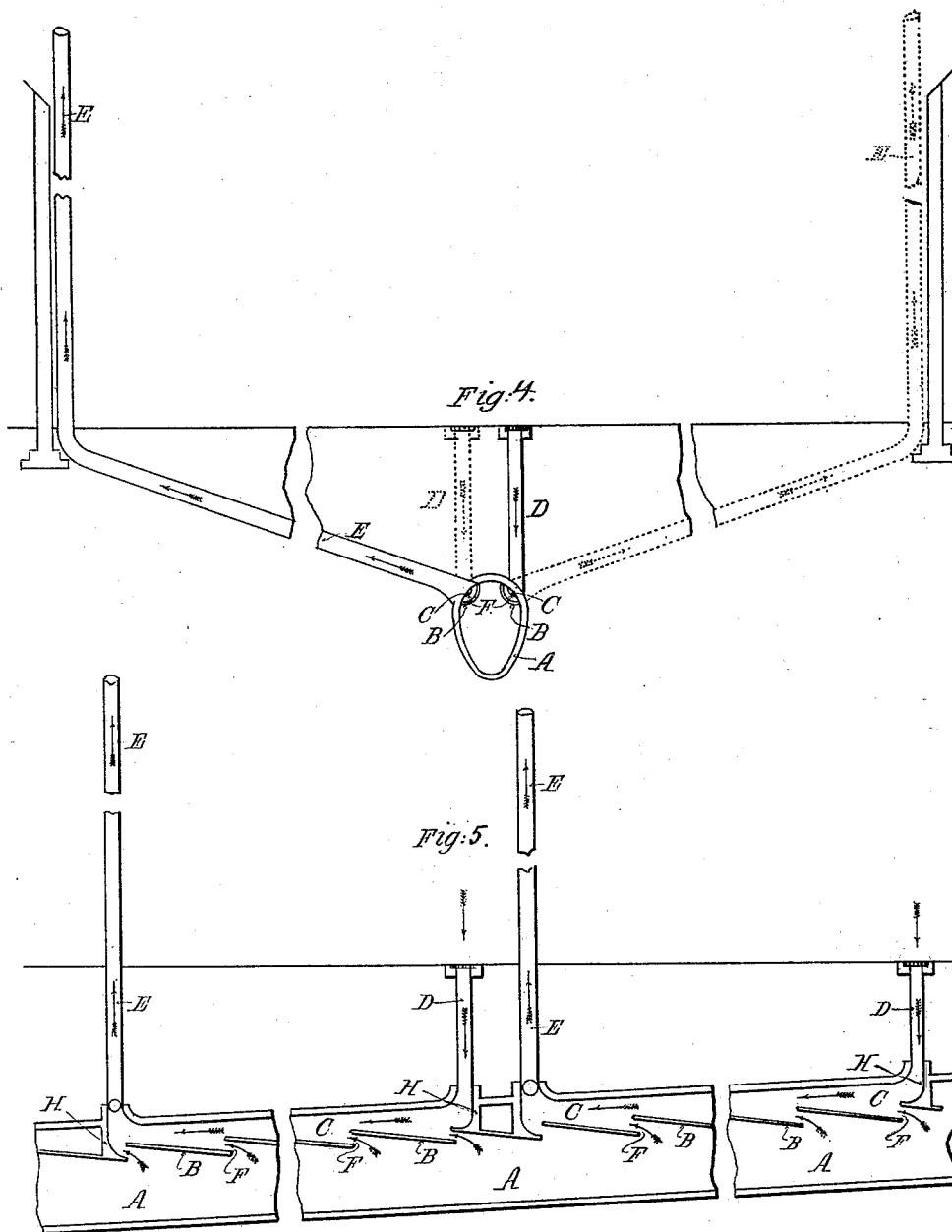
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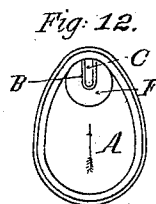
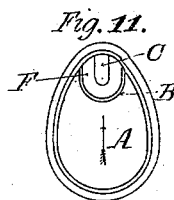
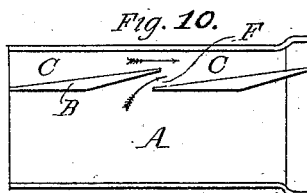
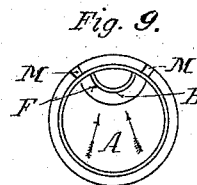
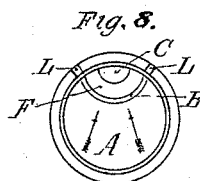
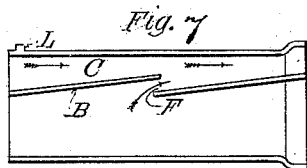
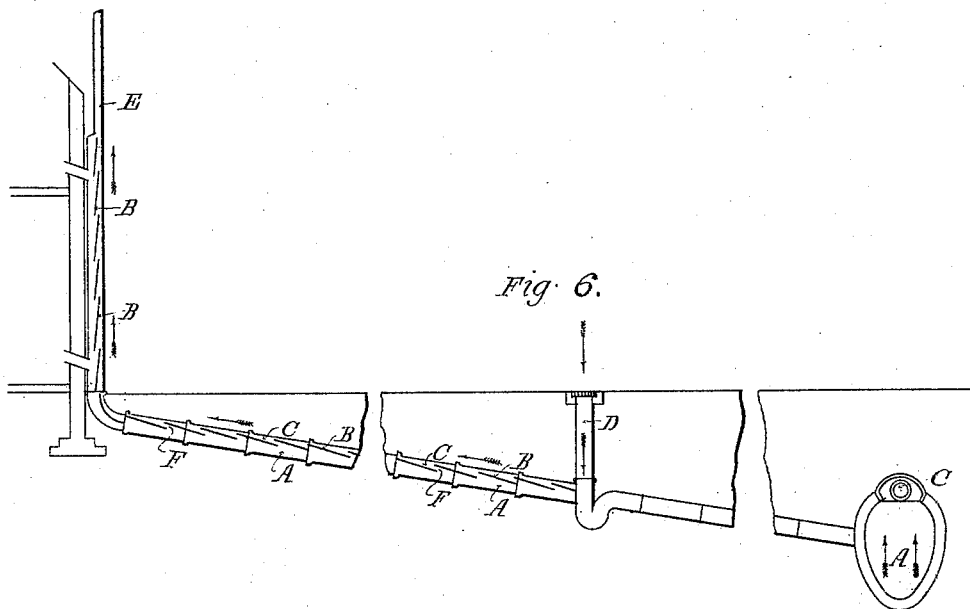
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Benjamin King

Inventors,
Archibald Henry Ford
Chas George Wright
per *James Stevenson*
Attorney,

UNITED STATES PATENT OFFICE.

ARCHIBALD HENRY FORD AND ELIAS GEORGE WRIGHT, OF PORTSMOUTH,
COUNTY OF HANTS, ENGLAND.

VENTILATION FOR SEWERS.

SPECIFICATION forming part of Letters Patent No. 419,764, dated January 21, 1890.

Application filed January 29, 1889. Serial No. 298,138. (No model.) Patented in England February 28, 1888, No. 2,955; in France November 5, 1888; in Belgium November 7, 1888, and in Italy November 24, 1888.

To all whom it may concern:

Be it known that we, ARCHIBALD HENRY FORD, a civil engineer, a resident of 11 High Street, and ELIAS GEORGE WRIGHT, ventilating engineer, a resident of 343 Commercial Road, both of Portsmouth, in the county of Hants, England, and subjects of the Queen of Great Britain, have invented an Improved Self-Ventilating Sewer-Pipe and System of Ventilation for Sewers and every description of subterranean ways; (for which Letters Patent have been granted in the following countries—namely, Great Britain, No. 2,955, dated February 28, 1888; France, dated November 5, 1888; Belgium, dated November 7, 1888, and Italy, dated November 24, 1888,) of which the following is a specification.

Our invention relates to improvements in the form of sewers and sewer and drain pipes.

It consists in the provision at or near the top, and, in the case of a curved or circular top, either on the concave or convex of the convex-concave part, of a special air-passage or of special air-passages formed or built with a series of straight or curved blades or divisions, of any suitable length, with lowered openings between or in the blades thereof, and an improved system of ventilation to sewers, drains, and other subterranean passages or channels by means of a current of fresh external air induced by a downcast pipe, in conjunction with an upcast pipe, the air thus introduced traveling along the passage formed at or near the top of said sewers or drains or subterranean ways or passages, thereby attracting the ascending sewer-gases and foul or vitiated air at each opening or "break" formed between or in each of the blades or divisions of the air passage or passages aforesaid.

In order that our invention may be the better understood, we have appended the accompanying three sheets of drawings, in which our improvements are shown in their application to the ventilation of sewers and drains, like letters of reference denoting corresponding parts throughout the several views.

Figure 1 represents in cross-section an ordinary drain-pipe, having formed therein louvers, blades, or divisions, so arranged as to

allow of the passage therethrough of a current of fresh air by means of downcast and upcast ducts or channels. Fig. 2 is a similar view showing the louvers, blades, or divisions disposed exteriorly to the sewer or drain pipe; and Figs. 3 and 5 illustrate the method we adopt of subdividing the air-passages into sections. Fig. 4 represents a sewer or drain pipe, in cross-section, provided with two separate air passages or conduits. Fig. 6 illustrates the application of our improvements to the ventilation of house-drains. Figs. 7 to 12, inclusive, show in cross and longitudinal sections some of the forms of sewer or drain pipes to which our improvements may be adapted.

A represents the improved sewer, sewer-pipe, drain, or drain-pipe, (as the case may be,) formed at or near the top thereof with louvers, blades, or divisions B, forming or leading into an air-passage or into air-passages C, along which latter a current of fresh air is caused to travel. Said current of fresh air is admitted from the roadway or other external air-space to C by the downtake pipes or shafts D.

Suitable uptake pipes or shafts E are provided for discharging into the atmosphere the foul gases evolved in the sewer or drain when mixed or diluted with the current of fresh air, which latter, passing into and down the downtake pipe or shaft D, circulates along and through the air-passage C, and ascends the upcast pipe E, inducing or abstracting in its course along C the foul or vitiated air through the openings F, formed between or in each of the louvers, blades, or divisions aforesaid B. The travel of said current of fresh air, as also of the foul emanations arising from the liquids passing along the subterranean conduits, are indicated by arrows throughout the several views.

The effect of the arrangement above described is that the gases evolved in the sewer, drain, or subterranean passage are rapidly separated from the liquids in or passing therealong, bringing such gases under greater control (than is possible without such specially-formed air passage or passages C) by obviating the friction of the liquids on the

gases and the consequent liability to variations in and reversal of the air-current in the sewer.

In the arrangement of a sewer illustrated in longitudinal section, Fig. 3, the current of air through the passage C and the flow of the sewage along the sewer or drain A, respectively, travel in opposite directions. They may, however, be caused to flow in the same direction by reversing the position of the downtake-shaft D and the uptake-shaft E, as also of the louvers, blades, or divisions B, as shown in Fig. 5.

The current of air for small sewers, sewer-pipes, drains, or drain-pipes may be induced by the introduction at frequent intervals of uptake-pipes E and downtake-pipes D, either with or without any of the well-known types of downtake or uptake cowls or shaft terminals, the outlet of the uptake-pipes E being preferably as high as possible above the mouth or grating of the downtake pipes or shafts D. Also, in the case of large sewers, sewer-pipes, or other large subterranean conduits, ways, or passages, two or more air-passages CC may be formed, as shown in transverse sectional view, Fig. 4, the passage of the air-current in such case being promoted either by the uptake-shafts E and downtake-shafts D, as shown, or further assisted when required by the employment of any of the well-known types of air blowing, fanning, or exhausting appliances.

The further objects sought to be accomplished by our improved system of sewer-ventilation are:

(a) To obviate the objectionable and imperfect system which at present obtains of permitting the foul gases from sewers or other subterranean passage-ways or conduits to discharge at road-surfaces or other places without first requiring dilution of the foul gases by a continuous admixture all along the length with a current of fresh air, and to supersede as far as possible road-surface ventilators as uptake-shafts for foul air.

(b) To concentrate the foul air in sewers in a small space or in small spaces, comparatively with the relative size of the sewers, thus securing increased control, velocity, and regularity of the action of the air-currents.

(c) To enable the ventilation of sewers to be dealt with in sections of any requisite lengths without the intervention of traps or like obstructions to the flow of sewage, by simply subdividing the air-passage C into sections corresponding with the section of sewer to be separately ventilated by partitions H, Figs. 3 and 5, and providing downtake shafts or pipes D and uptake shafts or pipes E in conjunction with each of the sections aforesaid.

(d) To prevent the stagnation of air in sewers or other subterranean passages, ways, or conduits, and to secure greater dilution of the foul air through the medium of the air-passage or passages C; and also to effect the

sectional system of ventilation of sewers with fresh air, at the same time extracting or inducing the foul air arising in sewers and its movement along the air passage or passages aforesaid, with the fresh or external air, resulting, consequently, in a material reduction of the foulness of the air discharged at the outlets of the uptake shafts or pipes.

Fig. 6 of the accompanying drawings is illustrative of our improvements as we propose to apply same to the special purpose of the ventilation of house-drains, (these latter, may, however, also be adapted to sewer-ventilation,) said figure representing a longitudinal section of the drain-pipes A and uptake-shaft E, the current of fresh air, together with the foul air, flowing in opposite directions to the direction of travel of the liquids through said drain-pipes A into the main sewer, similarly as hereinbefore described with reference to Fig. 3. Figs. 7 to 12, inclusive, represent, by longitudinal and cross-sections, respectively, some of the forms which our improved self-ventilating drain or sewer pipe A may assume.

In Fig. 6 the downtake-pipe D, air-passage C, louver-blades B, openings F, and uptake-pipes E here act as hereinbefore described in case of the application of our improvements to the ventilation of sewers, with the exception that the uptake-pipe E, in the case of the ventilation of house-drains, may be also formed or built with the blades or louvers B and openings F, as shown. A cross-sectional plan of said uptake E, Fig. 6, might correspond in cross-section with the drain-pipe A. The effect of this arrangement of the louver blade or blades B being continued up or through the uptake shaft or pipe E is to prevent a reversal of the air-current upon a discharge of water or sewage down said uptake-pipe E, where the latter is also acting as a soil-pipe, inasmuch as by means of the louver blade or blades B the liquids passing down such pipe become divided or separated from the ascending gases up to the level of the highest inlet to said pipe E, beyond which point the pipe may be continued as an ordinary ventilating-pipe or uptake-shaft.

In constructing the improved self-ventilating pipe A, (as also the uptake-shaft,) projecting studs L, Fig. 8, may be provided on the spigot end of each length of pipe, corresponding openings or recesses M, Fig. 9, being also formed on the socket end of pipe, into which the studs L would be fitted when the pipes are arranged in position, by which means we are enabled to maintain a true line of air-passage C.

Our improved self-ventilating drain or sewer pipes when of stoneware or like material may be manufactured in a similar way to the ordinary stoneware pipes; or the louver-blades may be separately made and afterward attached to the pipes before burning; or if iron pipes are employed they may be cast in the ordinary manner.

In the application of our improved system of ventilation to large sewers, underground or subterranean passages, ways, or conduits of any description, the air-passages C, louver-blades, or divisions B may be formed or built either of brick, stoneware, fire-clay, concrete, terra-cotta, iron, or other suitable material, or they may assume the form of specially-made blocks of any such materials ready for building in, and in the application of said air-passages C, blades, louvers, or partitions B to small sewers, sewer-pipes, drains, or drain-pipes they may be constructed of the same material as the sewer, sewer-pipe, drain, or drain-pipe, or be formed separately of any other different material.

Our improved system of ventilation by the adaptation of the air-passage C, louvers B, openings, or apertures F, in conjunction with the downtake pipes or shafts D and uptake pipes or shafts E, may be applied to any existing sewer, drain, or other underground or subterranean passage or way of any description.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The improved sewer or drain pipe A, con-

structed with an air-passage or with air-passages C, in combination with blades or divisions B and louver-openings F, to allow of the admixture of a current of pure air in its passage through the duct or ducts C with the foul air or gases emanating from the liquids in or flowing through the sewer or drain, substantially as herein described and shown.

2. The combination, with the sewer or drain pipes A, having an air passage or passages C, blades or divisions B, and louver-openings F, of partitions H, whereby the air passage or passages may be subdivided to allow of the sewer or drain being ventilated in sections, substantially as herein described and shown.

In testimony that we claim the foregoing as our invention we affix our signatures in presence of two witnesses.

ARCHIBALD HENRY FORD.
ELIAS GEORGE WRIGHT.

Witnesses:

RICHARD WILLIAM FORD,
Solicitor and Notary, 31 St. Thomas Street,
Portsmouth.

HAROLD SANDALL,
7 Clive Road, Portsmouth, Hants, Solicitor's
Clerk.