Sept. 17, 1929. L. KESSLER 1,728,493

VENTILATING SYSTEM FOR TUNNELS

Filed Oct. 17, 1927 2 Sheets-Sheet 1

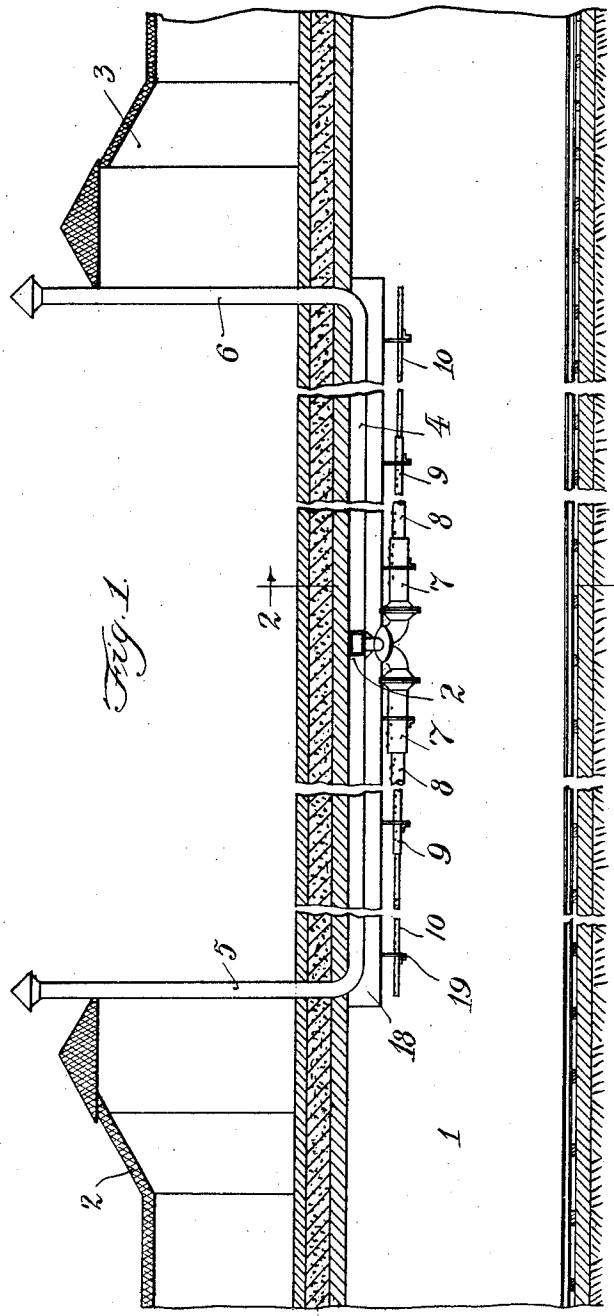



Fig. 1

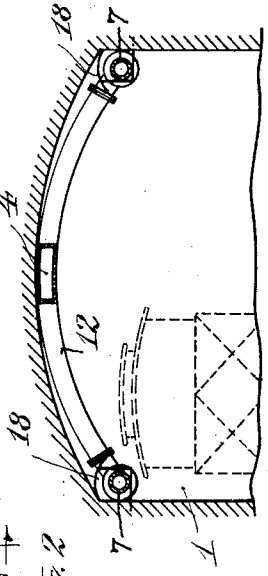



Fig. 2

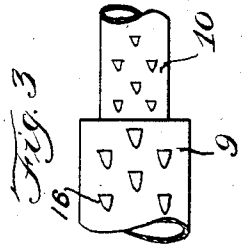



Fig. 3

Inventor
Louis Kessler,
By Wm. F. Frandemeyer Atty.

Sept. 17, 1929. L. KESSLER 1,728,493

VENTILATING SYSTEM FOR TUNNELS

Filed Oct. 17, 1927 2 Sheets-Sheet 2

Fig. 4.

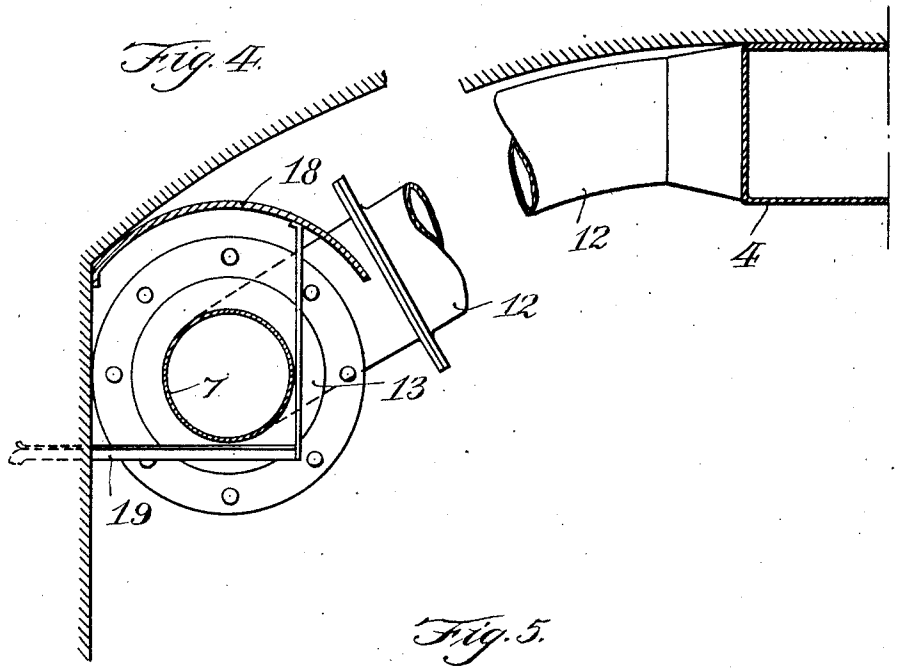
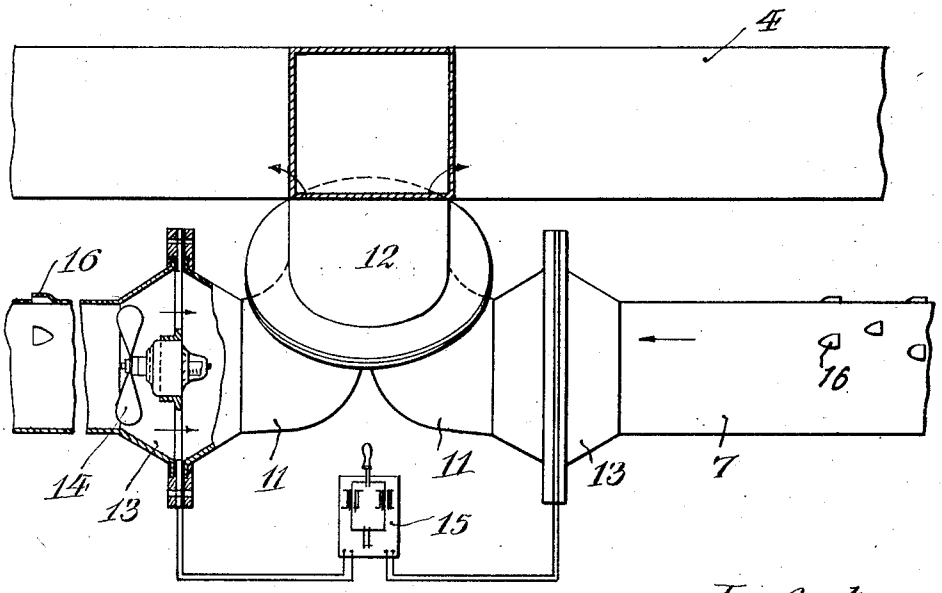



Fig. 5.




Inventor
Louis Kessler,
by Wm. F. Frendenreich,
Atty.

Patented Sept. 17, 1929 1,728,493

# UNITED STATES PATENT OFFICE

LOUIS KESSLER, OF CHICAGO, ILLINOIS

## VENTILATING SYSTEM FOR TUNNELS

Application filed October 17, 1927. Serial No. 226,628.

The present invention relates to the art of ventilating tunnels, particularly of the type through which railway cars are operated; and it has for its object to produce a simple and efficient system for effectively removing foul gases from such tunnels.

In subways or other tunnels through which electric railway cars travel, the gases that must be removed to insure the comfort and safety of the passengers, rise to the top. Therefore, viewed in one of its aspects, my invention may be said to have for its object a simple and novel system for clearing the upper regions of a tunnel of obnoxious gases.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a vertical longitudinal section through an ordinary subway; Fig. 2 is a section taken on line 2—2 of Fig. 1; Fig. 3 is an elevation of a fragment of one of the collecting conduits; Fig. 4 is a section, similar to Fig. 2, on a larger scale, only a fragment of the tunnel being shown; and Fig. 5 is a view partly in elevation and partly in section; showing a fragment of the ventilating system.

For the sake of brevity, I shall confine the detailed description to my invention as applied to a subway, as shown in the drawings; although it will, of course, be understood that my invention is not limited to this particular use.

Referring to the drawing, 1 represents a section of an ordinary subway extending between surface stations 2 and 3. Extending longitudinally of the subway, in each of the two upper corners, is a collecting conduit; while in the middle, just underneath the roof or ceiling, is a longitudinal discharge conduit 4. The discharge conduit may vent to the outside air in any suitable way. In the arrangement shown, the ends of the discharge conduit terminate in vertical flues 5 and 6 rising to the surface adjacent to and extending above the tops of the stations 2 and 3.

Each collecting conduit is divided into two parts of equal length, the meeting ends being joined together and to the discharge conduit. Furthermore, each half of each collecting conduit is made up of a plurality of sections decreasing gradually in size from the inner toward the outer ends. In the arrangement shown, there are four of such sections, indicated at 7, 8, 9 and 10 respectively. Each half of each collecting conduit terminates at its inner end in an elbow 11 that is connected to a short transverse conduit 12 leading to an opening into the discharge conduit midway between the ends of the latter. The collecting conduits are enlarged on opposite sides of and near the connections between the same and the discharge conduit to form blower casings 13. In each of these casings is placed a power driven fan or blower 14. These fans or blowers are preferably driven electrically, so that the two in each collecting conduit may be controlled from a single switch 15. The fans or blowers are so designed that they will draw gases from the collecting conduits and force them out into and through the discharge conduit. The collecting conduits are perforated, preferably by cutting short slits into the same and then punching the metal outwardly adjacent to the slits to form scoop-like elements 16 facing toward the outer ends of the collecting conduits.

When the fans or blowers are in operation, gases are drawn into the collecting conduits throughout the entire lengths of the latter and travel from both ends toward the middle in each of such conduits. The outer end portions of the collecting conduits are required to carry only the gases drawn in at these points; but, as the middle of each collecting conduit is approached, there are additions to the stream of gases; these additions being accumulative. It is for this reason that the collecting conduits are made to increase gradually from the outer ends toward the middle, thereby preventing the incoming gases at any point from creating a

back pressure that will retard the free flow of the gases collected at points further out.

In order to prevent dirt from dropping down into the collecting conduits, I place over each of them a shield 18 extending outwardly from the corresponding side wall of the tunnel entirely across the top of each collecting conduit. These shields lie sufficiently far above the conduits so as not to interfere with the collecting functions of the latter. The same brackets 19 that support the collecting conduits may also support the shields.

Because of the moisture in subways and other tunnels, it is difficult to secure perforated collecting pipes or conduits that will be lasting. The discharge conduit with its branches may be made of galvanized iron, if desired, but galvanized iron collecting conduits cannot be used. I prefer to construct the collecting conduits of Monel metal, since such metal will not deteriorate under the influence of moisture and the gases in the tunnel or subway.

While I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:—

1. The combination with a tunnel, of two long perforated collecting conduits extending along the upper portion of the tunnel at opposite sides thereof, a discharge conduit at the center and near the top of the tunnel and connected to both collecting conduits about midway between the ends of the latter, and suction devices in each collecting conduit on opposite sides of and near the connection between the same and the discharge conduit to draw gases into the collecting conduit and force the gases through the discharge conduit.

2. The combination with a subway, of two long perforated collecting conduits extending lengthwise thereof in the upper corners, shields extending outwardly from the sides of the subway a short distance above the aforesaid conduit, a discharge conduit connected to the collecting conduits at about the middle of the latter, and power devices in each collecting conduit on opposite sides of and near the juncture of the same with the discharge conduit to draw gases into said collecting conduits and force the same through the discharge conduit.

3. The combination with a subway, of two long perforated collecting conduits extending lengthwise thereof in the upper corners, a discharge conduit extending along the longitudinal center of the subway, just underneath the roof, a connection between said discharge conduit and each of said collecting conduits near the middle of the latter, and blowers in each collecting conduit on opposite sides of and near the connection with the discharge conduit to draw gases into the collecting conduits and force them through the discharge conduit.

In testimony whereof, I sign this specification.

LOUIS KESSLER.