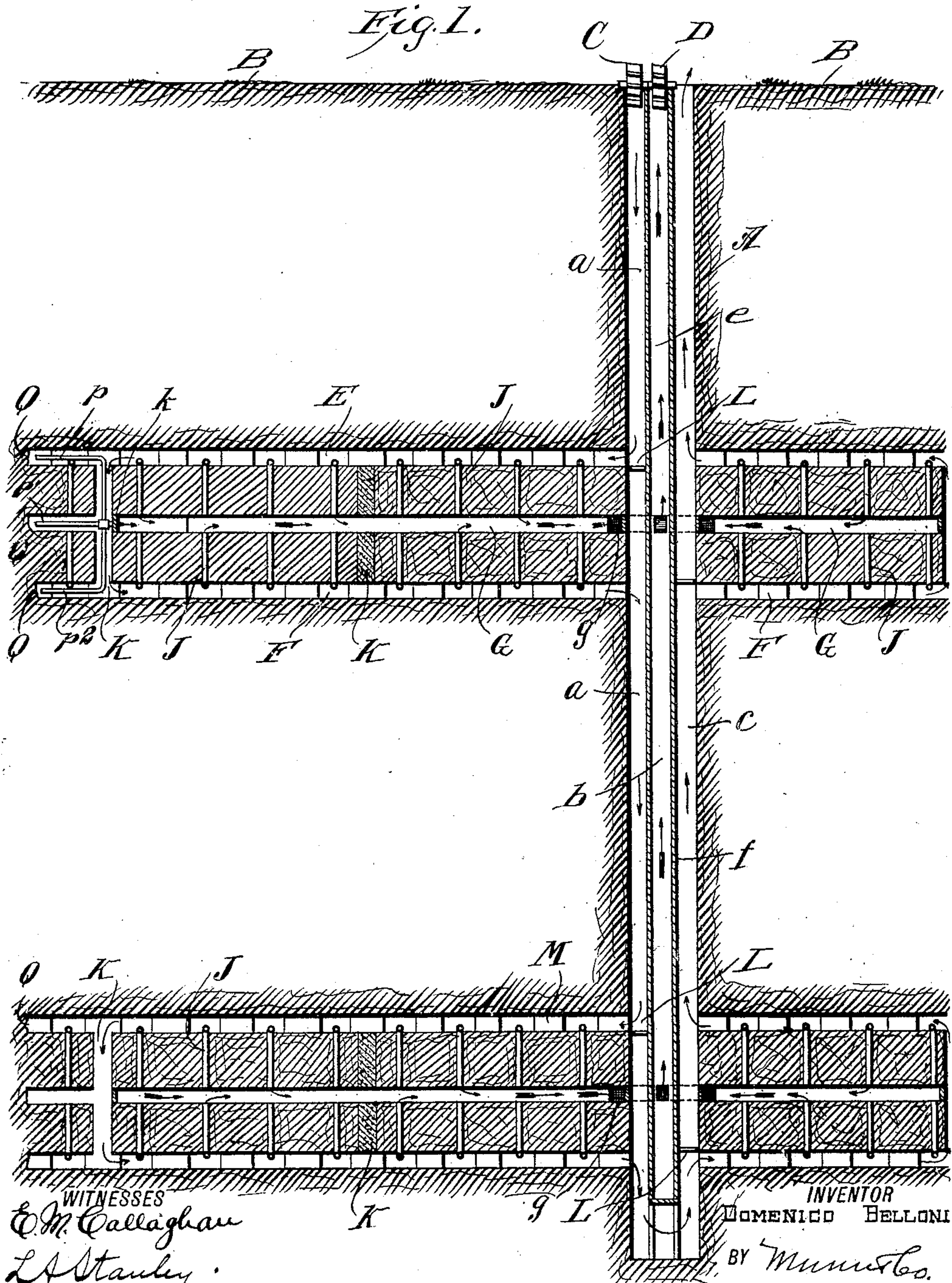


D. BELLONI.
SYSTEM OF MINE VENTILATION.
APPLICATION FILED JAN. 29, 1909.

925,274.

Patented June 15, 1909.

2 SHEETS—SHEET 1.



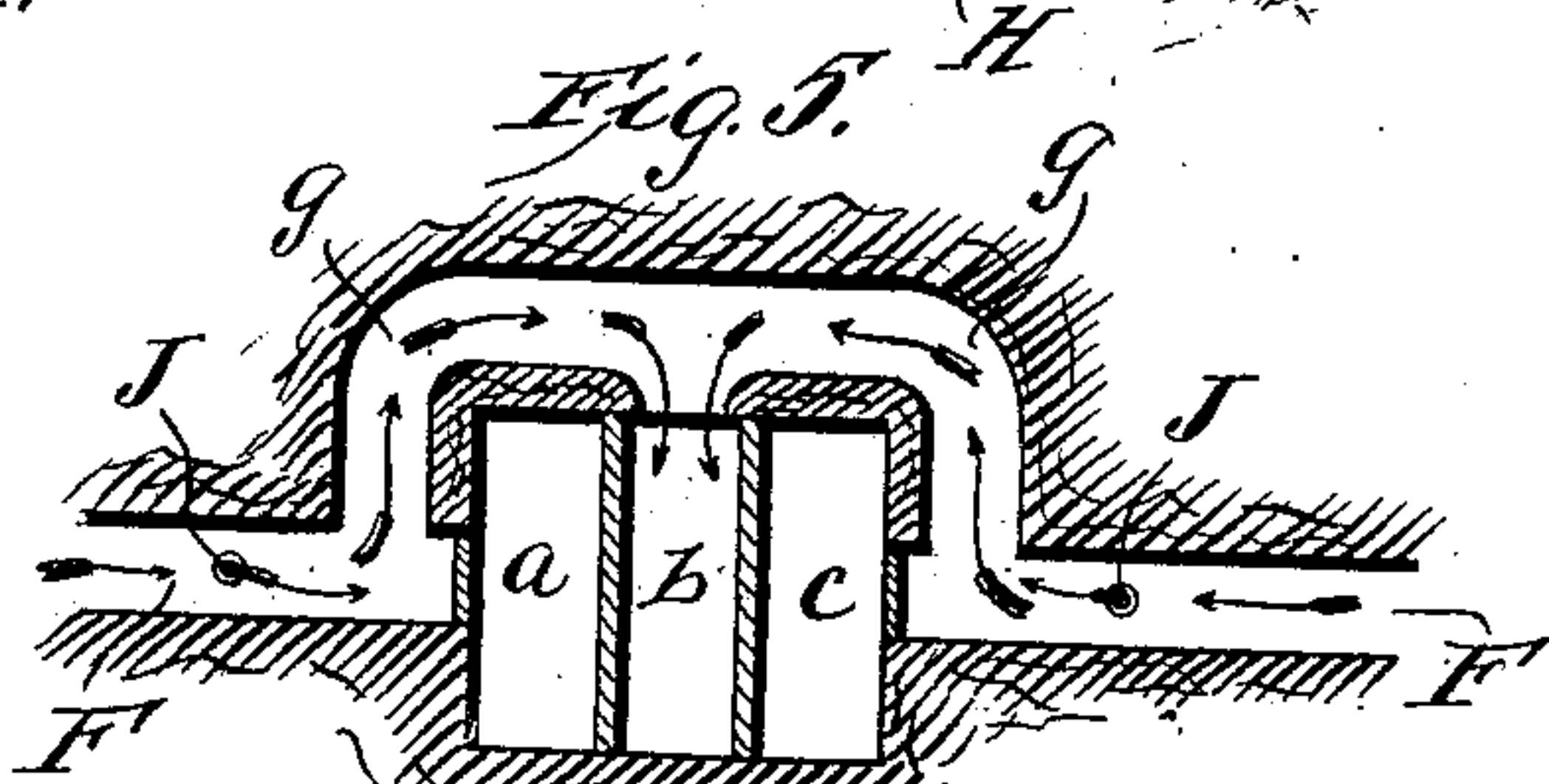
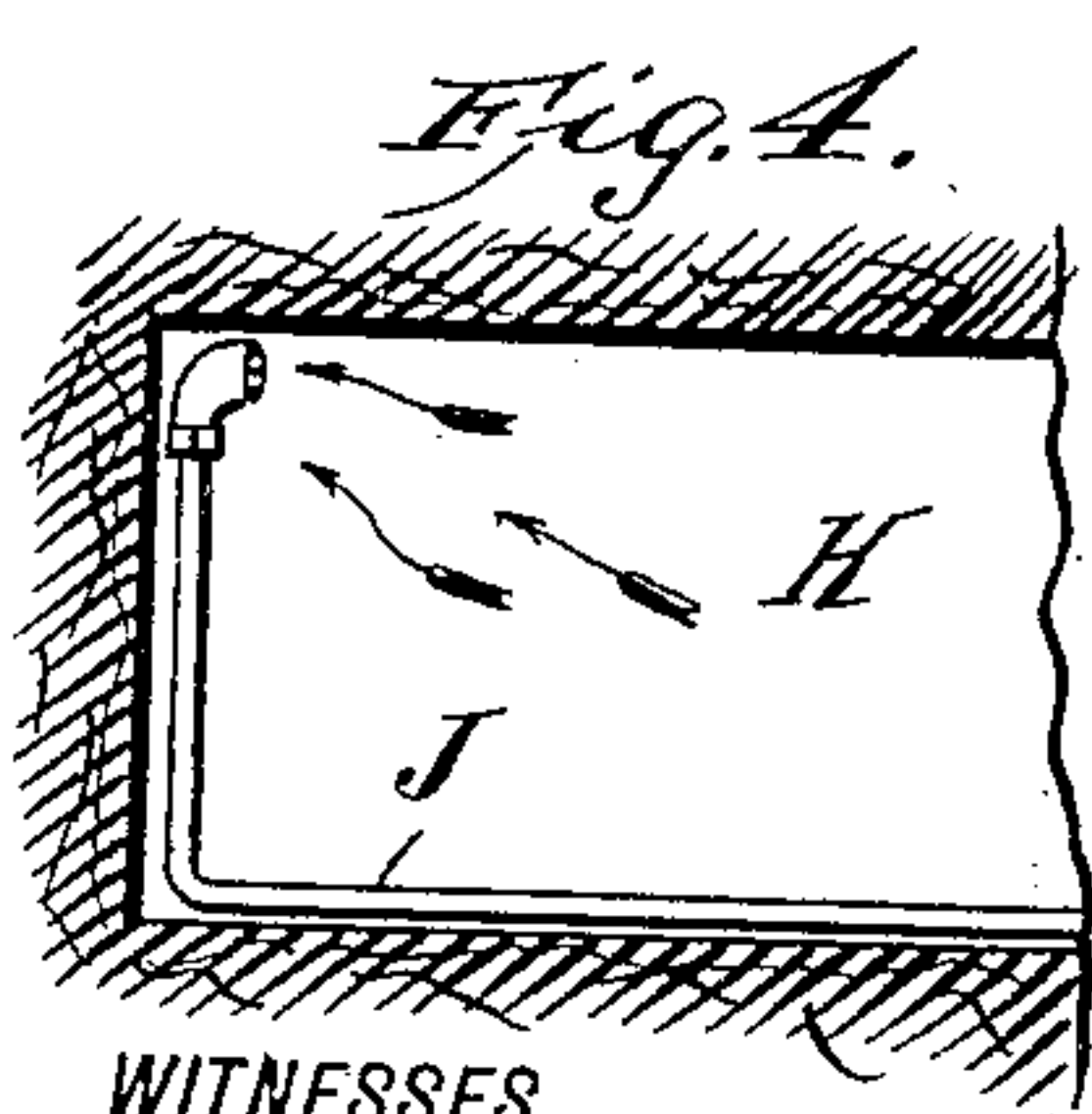
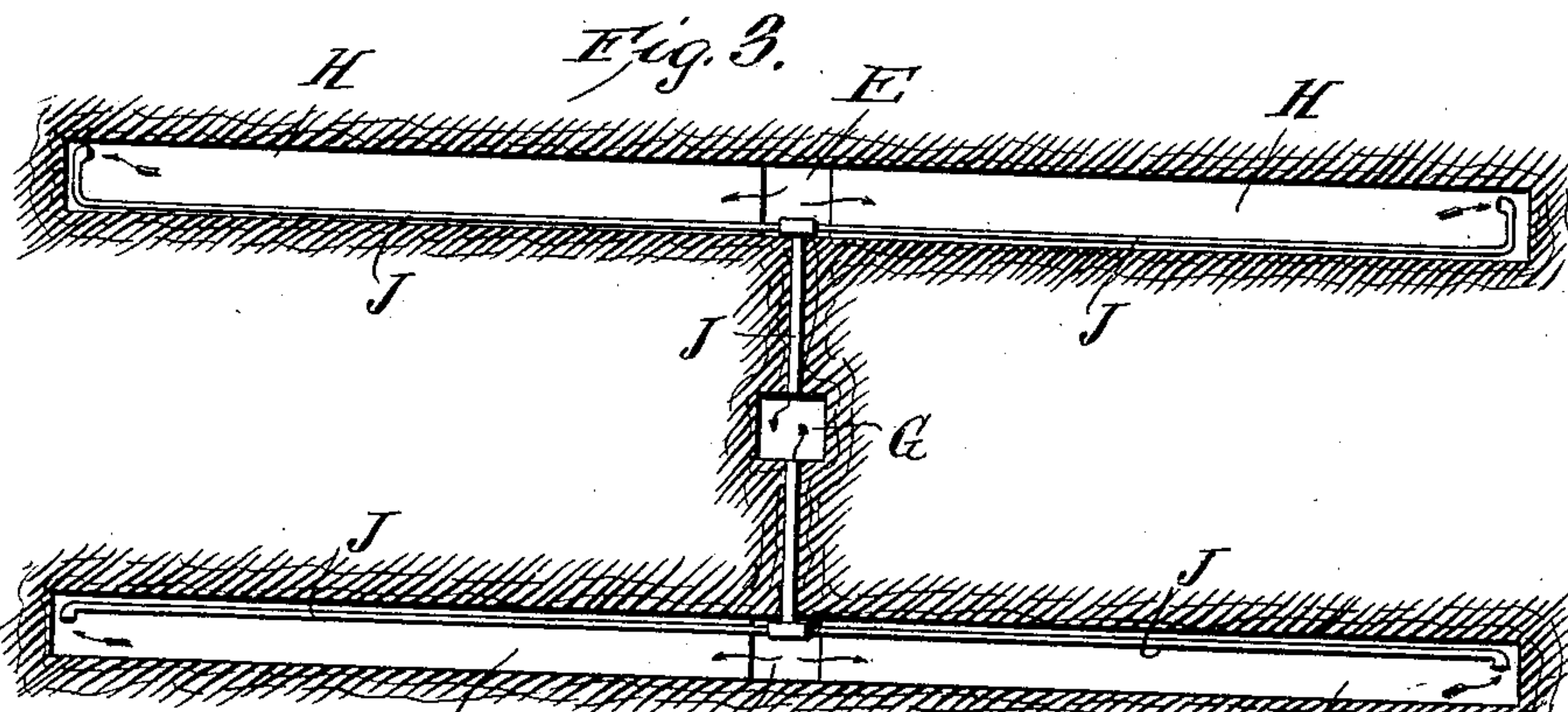
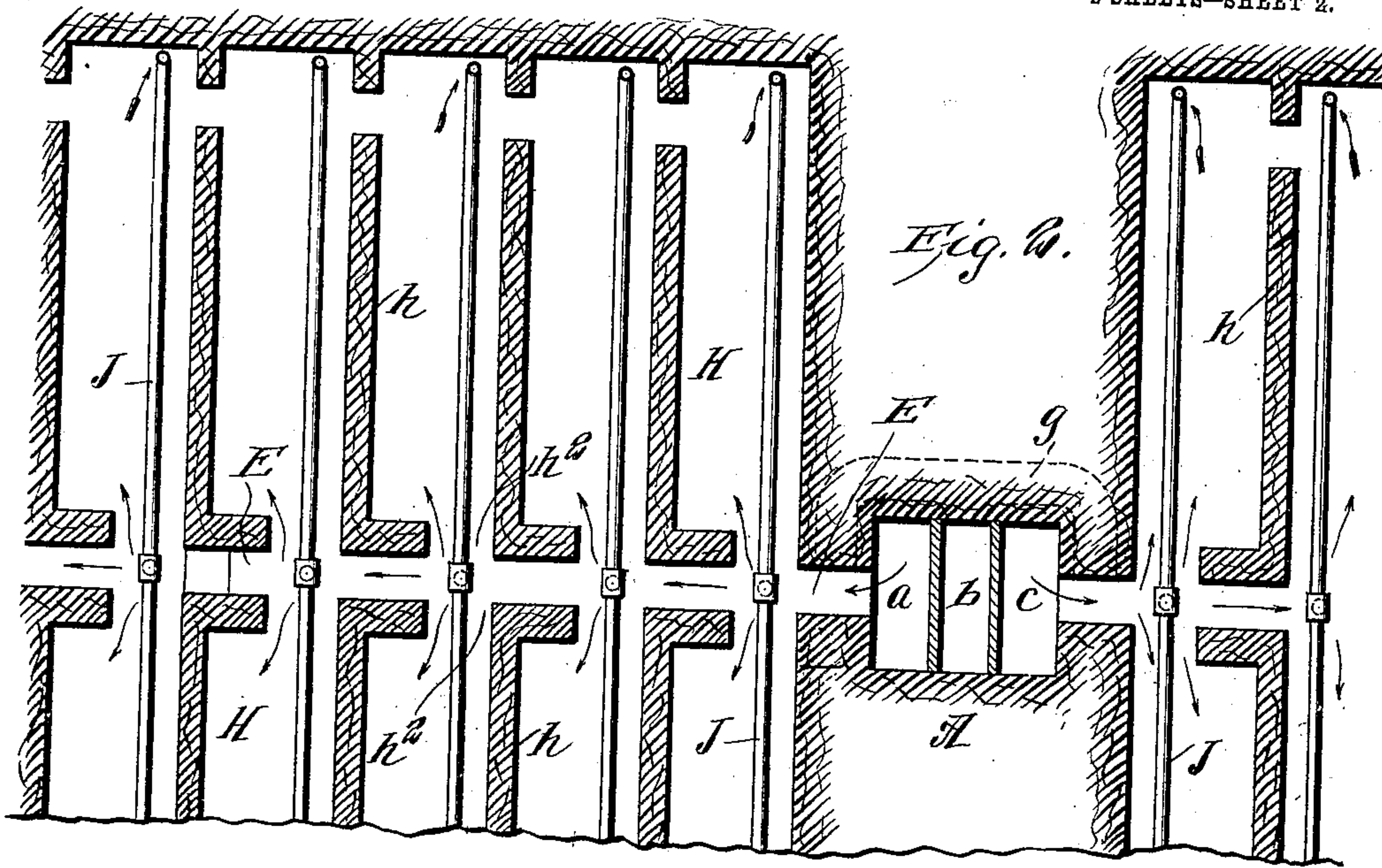
ATTORNEYS

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2 SHEETS—SHEET 2.



WITNESSES
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UNITED STATES PATENT OFFICE.

DOMENICO BELLONI, OF EDRI, PENNSYLVANIA.

SYSTEM OF MINE VENTILATION.

No. 925,274.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed January 29, 1909. Serial No. 475,034.

To all whom it may concern:

Be it known that I, DOMENICO BELLONI, a citizen of the United States, and a resident of Edri, in the county of Indiana and State of Pennsylvania, have made certain new and useful Improvements in Systems of Mine Ventilation, of which the following is a specification.

My invention relates to improvements in means for ventilating mines. It is especially applicable to the ventilation of coal mines in which noxious gases are liable to accumulate, but it is also applicable to any mine in which the removal of foul air is desirable.

The main object of my invention is to provide means by which fresh air may be continually supplied to the miners and the foul air, together with the dangerous gases, may be drawn off separately.

A further object of my invention is to provide means by which the ventilation of a mine may be accomplished effectively at all stages of the work, so that every part of the mine in which the work is being carried on is being ventilated, thereby rendering the mine safe for those who are working it.

A further object of my invention is to provide means whereby the fresh air may be directed to the parts which are being worked, the old workings being cut off, so to speak, from the path of the incoming stream of fresh air, thus effecting a great economy in the power required to operate the air driving means.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section through a mine provided with my system of ventilation. Fig. 2 is a horizontal section through the mine along one of the working tunnels. Fig. 3 is a vertical section through the working rooms at right angles to Fig. 2. Fig. 4 is an enlarged detail view in section showing the location of the exhaust pipe. Fig. 5 is a horizontal section along the exhaust tunnel and through the vertical shafts.

A common system of mine ventilation is to force air through one shaft down around through the various workings of a mine and out of another shaft. Thus all the gases which accumulate in various parts of the mine are driven around through the mine mingling with the fresh air and the foul gases have to be inhaled by the miners as well as the fresh air. Where there is a great volume

of fresh air brought in by a fan or other air moving device, this plan of ventilation works all right but it necessitates the constant forcing of a tremendous quantity of fresh air into a mine to successfully accomplish the purpose, otherwise the foul gases which are mixed with this incoming stream of fresh air are conveyed by it from one portion of the mine to another before finally being driven out. In the present system the foul gases are taken out by separate means from the point at which they accumulate and are thus not distributed by the incoming fresh air to the various parts of the mine.

Referring now to Fig. 1 I have shown therein a vertical section of the mine equipped with my improved ventilating means. This means consists of a vertical shaft which I will denote in general by A, extending from the surface B of the earth downwardly. The shaft is divided into three sections, *a*, *b* and *c*, respectively, by partitions *e* and *f*. At the top of the passage *a* is a fan C, which is arranged to force air down the passage, while at the top of the passage *b* is a suction fan D designed to draw the air out of the passage. The third passage *c* is left open as shown.

My system of ventilation involves the use of the triple entry tunnels extending laterally from the main shaft. These tunnels are seen at E, F and G. The upper and lower tunnels E and F, respectively, are the working tunnels, while the central tunnel G constitutes an exhaust air passage which communicates with the central vertical passage through the medium of the by-passes *g* as clearly shown in Fig. 5.

In Fig. 2 I have shown the rooms at either side of the tunnel (in this case the upper tunnel E), these rooms H being separated by the walls *h* as shown. It will be observed that the tunnels extend on both sides of the main shaft A, a description of the workings on one side being sufficient for an understanding of the workings on the other.

The exhaust pipes J, see Figs. 2 and 3, are disposed in the working rooms H leading off from the tunnels E and F in the manner shown in Fig. 3. Fig. 4 shows a detail view in which the pipe J terminates near the ceiling of the room and is provided with a funnel into which the foul air is drawn.

Referring again to Fig. 1 it will be seen that the upper and lower tunnels E and F are connected by means of a vertical cut K.

Between the cut K and the passage *a* is shown a similar cut which has been filled in to provide continuous passages E, F and G, as will be hereinafter explained.

5 From the foregoing description of the arrangement of the shafts, tunnels and pipes the operation of the ventilating system will be readily understood. Fresh air is drawn in by the fan C at the top of the shaft or
10 passage *a* and is forced downwardly in the direction shown by the arrow. When it reaches the first tunnel E it is deflected into the tunnel by means of the brattice L. In case the shaft is to be used for hauling up
15 the mined material, this brattice should be pivoted so as to permit the passage of the cage. The air then passes into the rooms H which adjoin the tunnel E and in which the work is being carried on. The foul air and
20 gases tend to accumulate in these rooms and they are drawn out of the rooms by means of the suction fan D at the top of the passage *b*, entering the ends of the pipes J as illustrated in Fig. 4, passing thence to the central ex-
25 haust tunnel G, see Fig. 3, and thence to the passage *b* by means of the passages *g*, see Fig. 5, and out through the fan D. The excess of fresh air which is forced in by the fan C passes along to the end of the tunnel,
30 thence down the vertical cut K and back through the tunnel F to the shaft and down the shaft to the next tunnel M, continuing around in the direction indicated by the arrows and finally escaping through the pas-
35 sage *c* to the air. It will be noticed that the central exhaust tunnel G is closed by means of a brattice *k* so as to shut off communication of the tunnel G with the tunnels E and F and the down cut K. The pipes *p*, *p'* and
40 *p''* communicate with the exhaust tunnel G and are preferably made of flexible tubing so that they may be taken to the ends of these tunnels where the workmen are en-
45 gaged in extending them as shown at Q in Fig. 1. As the sections of the tunnels are extended the brattice *k* is removed from the central exhaust passage to the succeeding
one. The down cut K is then filled up as shown in Fig. 1 and this makes continuous
50 passages of the tunnels E, F and G as heretofore explained. The fresh air coming down the passage A is then first forced to the next down cut K and back along the lower tunnel F and thence down to the next
55 level. As the mined material in the rooms H is removed the openings *h*², see Fig. 2, may be walled up, thereby confining the incoming fresh air to the tunnel.

With this system it will be seen that the
60 incoming fresh air is forced to all parts of the mine in its pure state. The foul air is removed directly from the place in which it congregates to the suction tunnels G and thence is drawn up through the central pas-
65 sage B. Furthermore the pressure of the

incoming air aids in driving out the foul air and therefore one fan works in conjunction with the other.

This system may be applied to any mine by merely running the three tunnels in the man- 70
ner described. It may be as successfully applied to old mines as to new. It is obvious also that instead of a vertical shaft, such as that shown, the entrance to the mine might be made by means of a tunnel or in- 75
clined shaft without departing from the spirit of my invention.

I claim—

1. In a system of mine ventilation, a main conduit comprising three longitudinal pas- 80
sages, two of said passages being in communication with each other at their lower ex-
tremities, upper and lower tunnels in communication with one of the outer passages, a
central tunnel in communication with the in- 85
ner of said passages, means for driving air down one of said outer passages, means for
deflecting the air into the communicating tun-
nels, a plurality of rooms communicating
with said upper and lower tunnels at one end 90
and with the central tunnel at the other end, and an exhaust device for withdrawing the
air from said central passage.

2. In a system of mine ventilation, a main shaft comprising three longitudinal pas- 95
sages, two of said passages being in communication with each other at their lower ex-
tremities, upper and lower tunnels in communication with one of the outer passages, a
down cut between said lower and upper tun- 100
nels, a central tunnel in communication with the inner of said passages, a fan in the mouth
of one of the outer passages for forcing air into the same, means for deflecting the
air into the communicating tunnels, a plu- 105
rality of rooms communicating with said upper and lower tunnels at one end, a series of
exhaust pipes disposed in said rooms and communicating with the central tunnel, and
an exhaust fan for withdrawing the air from 110
said central passage.

3. In a system of mine ventilation, a main shaft comprising three longitudinal passages, 115
two of said passages being in communication with each other at their lower extremities,
upper and lower tunnels in communication with one of the outer passages, a down cut
between said lower and upper tunnels, a central tunnel in communication with the inner
of said passages, a removable brattice for 120
shutting off communication between said central tunnel and said down cut, a fan in the
mouth of one of the outer passages for forcing air into the same, means for deflecting the
air into the upper of said communicating 125
tunnels on one side of the shaft and for deflecting the air into the lower of the commu-
nicating tunnels on the other side of the shaft, a plurality of rooms communicating
with said upper and lower tunnels at one end, 130

a series of exhaust pipes disposed in said rooms and communicating with the central tunnel, and an exhaust fan for withdrawing the air from said central passage.

5 4. In a system of mine ventilation, a series of fresh air conduits, working rooms each having communication at one end thereof with said conduits, a second series of conduits having communication with the oppo-
10 site ends of each of said working rooms, means in the first named conduits for forcing in fresh air and means in the second named conduits for withdrawing the foul air.

15 5. In a system of mine ventilation, a main conduit comprising longitudinal passages, one of said passages being designed for fresh air and the other for foul air, a series of working rooms each having direct communication with the fresh air passage at one end and each
20 communicating with the foul air passage at the other end, a blower in the mouth of the fresh air passage for forcing in fresh air and a

suction fan in the mouth of the foul air passage for withdrawing the foul air.

6. In a system of mine ventilation, a main 25 conduit comprising three longitudinal passages, two of said passages being in communication with each other at their lower extremities, the two communicating passages being designed for fresh air, and the third 30 passage being designed for foul air, lateral tunnels communicating with the fresh air passages, work rooms in communication with the lateral tunnels at one end, a second series of exhaust tunnels communicating 35 with said foul air passage, exhaust pipes connecting each of said rooms with said exhaust tunnel and a fan at the top of said exhaust passage for withdrawing the foul air.

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Witnesses:

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