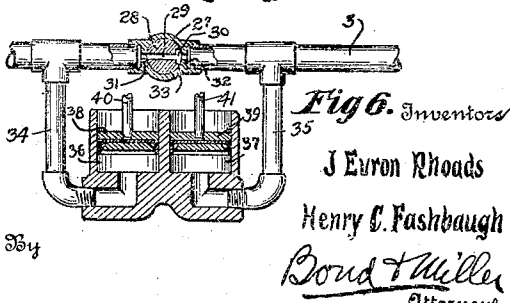
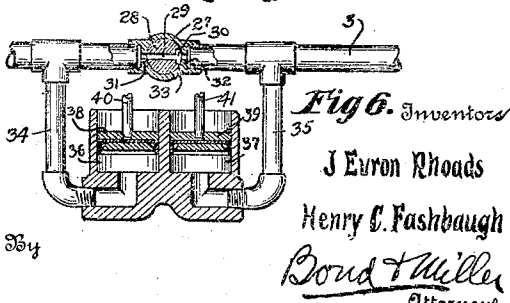
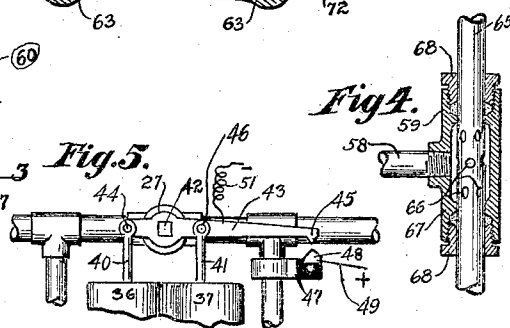
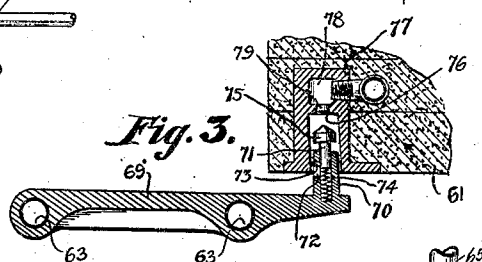
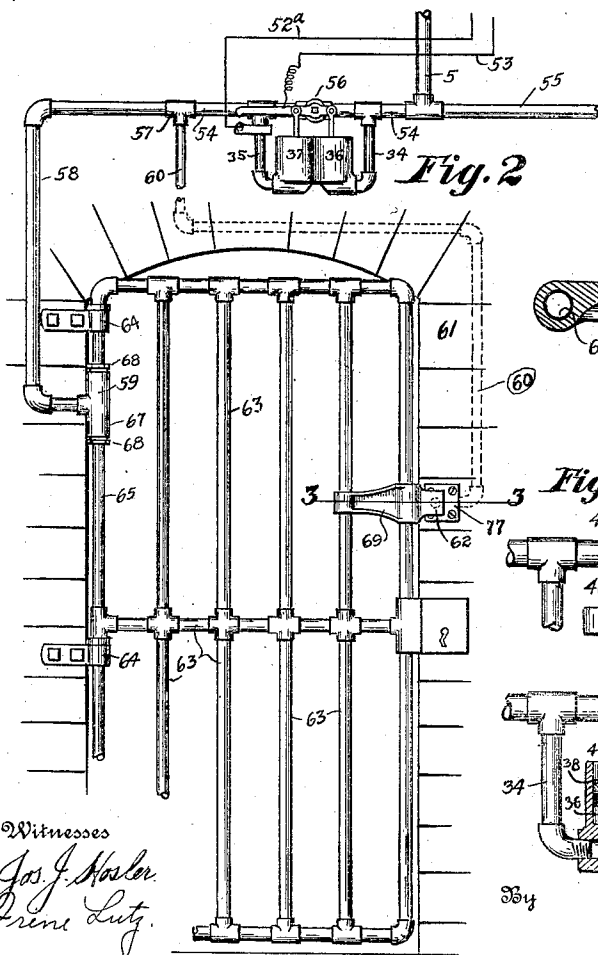
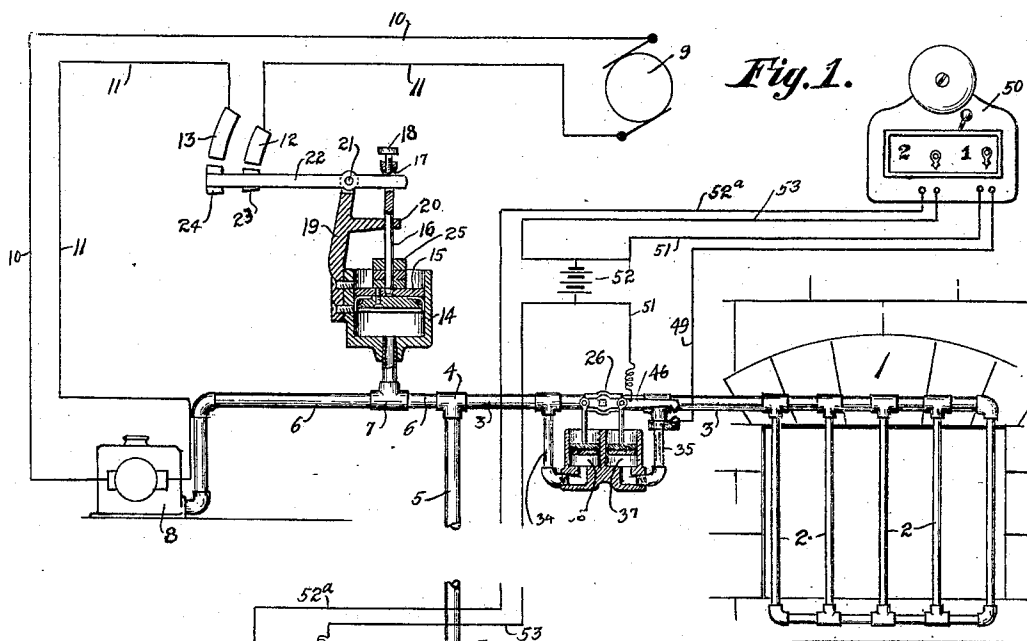


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AUTOMATIC PRISON SIGNAL.
APPLICATION FILED MAY 10, 1909.

934,626.

Patented Sept. 21, 1909.



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AUTOMATIC PRISON-SIGNAL.

934,626.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed May 10, 1909. Serial No. 495,125.

To all whom it may concern:

Be it known that we, J EVRON RHOADS and HENRY C. FASHEAUGH, citizens of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Automatic Prison-Signal, of which the following is a specification.

Our invention relates to improvements in devices for detecting the attempts of prisoners to break out of prison: and the objects of the improvement are to provide a device adapted to the purpose mentioned which will be simple in construction, certain in operation, comparatively cheap in first cost and inexpensive to maintain in repair. These objects, together with other objects readily apparent to those skilled in the art we attain by the construction illustrated in the accompanying drawing in which—

Figure 1 is a view, partly in section, illustrating a complete device embodying our invention and connected to a prison window grating, also showing the broken connections for the portion of the device illustrated in Fig. 2. Fig. 2 illustrates a prison door and the necessary pipe and wires intended to be connected with the system illustrated in Fig. 1. Fig. 3 is a horizontal sectional view on the line 3—3 of the Fig. 2. Fig. 4 is a fragmentary view, partly in vertical section, illustrating the pneumatic joint for connecting the door in Fig. 2 with the air system. Fig. 5 is a fragmentary view in elevation illustrating the exterior construction of one of the signal valves with its electrical connections. Fig. 6 is a view of one of the signal valves, showing parts broken away and parts in vertical section.

Throughout the several views similar numerals of reference indicate similar parts.

The numeral 1 indicates the wall of the prison provided with a window opening in which is secured a grating 2 composed of hollow tubes or pipes, each of the pipes in the grating being in pneumatic connection with the local supply pipe 3. The said local supply pipe extends to the T connection 4 from which connection also leads the supply pipe 5. Connected with the T connection 4 is also the general supply pipe 6 upon which is arranged a T connection 7, for the purpose hereinafter described, the supply pipe 6 extending to the electrically operated air pump 8 to which it is appropriately connected.

A source of suitable electric current 9 is

provided and the wires 10 and 11 connected to the source of current 9 and the pump 8 for supplying the necessary current to the said pump. The wire 11 is not continuous, however, but is provided with the spaced contacts 12 and 13 for the purpose hereinafter disclosed.

In pneumatic connection with the pipe 6 through the T connection 7 is the governor cylinder 14 provided with a piston 15 adapted for ready vertical reciprocating movement within said cylinder. To the piston 15 is connected the piston rod 16, at the upper end of which is a vertical slot 17 into the top end of which extends a vertically disposed set screw 18 arranged in a screw threaded aperture in the crown of said slot. Fixedly connected to the cylinder 14 is the support 19 provided with the laterally extending guide arm 20 provided with an aperture in which the rod 16 is adapted to slidably move. At the upper end of the support 19 at the point 21 is pivotally connected the switch lever 22, one end of which extends through the slot 17 in the piston rod and the other end of which is provided with the contacts 23 and 24 adapted to engage the contacts 12 and 13 when the lever 22 is appropriately rocked upon the point 21 by the action of the piston. It will be understood that the contacts 23 and 24 are in electrical connection with each other so as to complete the circuit through the wires 10 and 11 when the contacts 23 and 24 are in engagement with the contacts 12 and 13. It will now be understood that if the contacts 23 and 24 are held in engagement with the contacts 12 and 13 the pump 8 will be operated to pump air into the pipe 6. Let it be assumed that there is no escape of air from the pipe 6 or the pipes 3 and 5. The air in the pipe 6 will be compressed, whereupon the piston 15 will be forced upwardly, rocking the lever 22 upon its pivotal point, drawing the contacts out of engagement, opening the circuit and thus discontinuing the operation of the pump 8. The weights 25 may be arranged upon the piston rod 16 and resting upon the piston 15 for the purpose of regulating the amount of air pressure necessary to operate said piston. The slot 17 is of greater vertical dimension than the vertical dimension of the lever 22, and the set screw 18 may be adjusted to allow various amounts of play of said lever within the said slot, the purpose of such adjustment being to permit a slight

movement of the piston 15 without operating the lever 22 thus permitting a slight variation in the air pressure without opening or closing the circuit as the case may be. By means of the governor cylinder and related parts, it will be seen that the air pressure within the pipes 6 and the pneumatically connected portions of the system may be maintained with practical uniformity.

Upon the pipe 3 intermediate the connection 4 and the grating of the window is arranged the signal valve 26. This valve consists of a valve cylinder 27 interposed between portions of the pipe 3 and forming a part of the pneumatic passage way through said pipe. In the valve cylinder 27 is arranged the rotatable valve 28, the axis of which lies in a horizontal plane transverse to the pipe 3 and which is provided with a reduced opening 29 adapted to normally lie substantially in the longitudinal axis of the pipe 3. At the end of said opening toward the grating 2 the said opening is enlarged, as shown at 30. Extending across the valve cylinder at the points 31 and 32 are transverse walls provided with reduced apertures of the same cross sectional area as the opening 29 and lying substantially in the axis of the pipe 3. Through the wall of the valve cylinder at 33 extends an opening leading from the exterior to the valve 28 and lying just beyond the edge of the enlarged portion of the opening 29 when the valve is in the normal position illustrated in Fig. 6.

In pneumatic connection with the pipe 3 on both sides of the signal valve 26 are the pipes 34 and 35 leading to the valve-controlling cylinders 36 and 37 respectively. The said cylinders are provided with the pistons 38 and 39 adapted for ready reciprocating movement in a vertical direction within said cylinders and connected to the piston rods 40 and 41. The pipes 34 and 35 it should be noted are of the same capacity and are connected with passage ways leading through the bottoms of the cylinders. It should also be noted that the cylinders are of the same relative size and are of similar construction. Upon an exterior extension, 42, of the valve 28 is fixedly mounted the valve lever 43, which extends a short distance to one side of said extension, where it is pivoted at 44 to the piston rod 40 and extends for a greater distance to the other side of said extension, where it is provided with a contact point 45, the piston rod 41 being pivotally connected to said lever at the point 46. From the description just given it will be understood that if either one of the pistons 38 or 39 be moved, a corresponding rotation of the valve 28 will take place in connection with the movement of the lever 43 and an opposite movement of the other piston.

Suitably arranged, preferably upon a

bracket 47, attached to the pipe 35, is a contact point 48 adapted for engagement with the contact point 45. The point 48 is insulated from the bracket and from the pipe 35 and a wire 49 leads to an annunciator 50 provided with the usual bell and indicating mechanism. From the annunciator 50 the wire 51 leads, through the battery, or other source of current, 52, to the lever 43 with which it makes permanent electrical connection. It will be understood that if the lever 43 is operated to bring the points 45 and 48 into contact a circuit will be closed through the battery and annunciator which will ring the bell and indicate which signal valve has closed the circuit.

In setting the device for operation the lever 43 should be held in the position illustrated in the figures, thus maintaining the pistons 38 and 39 at the same relative height in their respective cylinders, as illustrated in Fig. 6, and causing the opening 29 to register with the reduced openings in the transverse walls 31 and 32. The air under pressure in the pipe 6 will thereupon flow through the opening 29 and compress the air in the grating 2. The pipes 34 and 35 being of the same capacity, and the areas of the pistons 38 and 39 being the same, when the air in the grating 2, the pipe 3 beyond the signal valve 26, the pipe 35 and the controller cylinder 37 is compressed to the same degree as the air in the pipe 6, the pipe 34 and the controller cylinder 36, the pistons 38 and 39 will be so balanced by the equal air pressure that no movement of said pistons will take place so long as such pneumatic balance is maintained.

Let it be supposed that the pistons 38 and 39 are balanced as just described. If then an attempt is made to saw through any of the pipes composing the grating 2, or if said grating is otherwise injured sufficiently to permit the escape of air therefrom the air in said grating and the pipe 3 lying between said grating and the signal valve 26, as well as the pipe 35 and the controller cylinder 37 will be reduced. It should be noted that in order to supply air to equalize this reduction, the new supply will be compelled to pass through the reduced opening 29. This opening is of such small capacity as to be unable to supply air fast enough to counteract any substantial leakage, and as a result the pressure in the cylinder 36 will become greater than the pressure in the cylinder 37, thereby moving the piston 38 upwardly and the piston 39 downwardly. As the piston 38 rises and the piston 39 falls the opening 29, by reason of the movement of the lever 43 being communicated to the valve 28, will be thrown into register with the opening at 33, thus connecting the reduced opening in the wall 32 and the said opening 33 in such way as to permit the compressed air in the grat-

ing 2, the pipe 35, the cylinder 37, and the portion of the pipe 3 concerned to immediately escape, thus still further unbalancing the pressure in the cylinders 36 and 37 and temporarily locking the lever 43 in position to place the points 45 and 48 in contact. In this way any serious tampering with or attempted cutting of the grating 2 will be immediately indicated on the annunciator 50 and in order to again set the signal valve 26 it will be necessary to repair the leak and hold the lever 43 in the position illustrated in the drawings until the air pressure in the cylinders 36 and 37 again balances the pistons.

One pump 8, one general supply pipe 6 and one governor cylinder 14 and related parts will be found sufficient for the maintenance of the air pressure in a large system embodying our improvement. Each cell may be supplied with one of the signal valves just described and its connection with an annunciator suitably located to attract the attention of the prison guard. If desired, however, one of the signal valves may be arranged for each window grating or for any portion or division of the prison where such gratings are used.

In Fig. 1 we have shown a supply pipe 5 leading from the general supply pipe 6 and also the wires 52^a and 53 leading from the annunciator 50 and including the battery 52 in the circuit.

In Fig. 2 we have shown a prison door provided with a prison signal constructed in accordance with our invention.

The pipe 5 is adapted to supply the local supply pipe 54 and the local supply pipe 55, which latter pipe may lead to another window grating, cell, cell door, or other structure of the prison composed of connected hollow pipes or tubes and forming a part of the prison structure. On the pipe 54 is arranged a signal valve 56 substantially the same in structure and operation as the signal valve 26 heretofore described. Leading from the signal valve 56 the supply pipe 54 branches at the T connection 57, whence the pipe 58 continues to the pneumatic joint 59 hereinafter to be described. From the T connection 57 also leads the pipe 60, a portion of said pipe being preferably built into the wall 61 and therefore illustrated in dotted lines. The pipe 60 leads to the pneumatic lock 62 hereinafter to be described.

The prison door 63 is composed of a grating of intercommunicating tubes or pipes hinged to one side of the doorway by the hinge connections 64. Said hinge connections are preferably formed so as to journal one of the side pipes of the door in them, as illustrated in Fig. 2, the journaled pipe 65 thus lying in the axis of rotation of the door 63 in the hinge connection 64.

In the pipe 65 are arranged the apertures

66 and around said pipe and inclosing said apertures is the joint casing 67 provided with the stuffing boxes 68. Said stuffing boxes prevent the escape of air at the ends of the joint casing 67, while permitting the pipe 65 to rotate within said joint casing. The pipe 58 is connected to the joint casing 67, as clearly illustrated in Fig. 4 thus supplying air to the interior of the pipes composing the prison door and permitting said door to swing upon its hinges without affecting the pneumatic connection through the joint 59. From the foregoing it will be understood that if any of the pipes composing the door 63 are cut or injured in such way as to permit the escape of air, the signal valve 56 will be operated, in the same manner as the signal valve 26 would be operated by an injury to the grating 2. When the valve 56 is operated the electric current will be closed through the electric wires connected therewith, thus operating the annunciator 50, which will indicate that valve 56 has sent in the signal.

For the purpose of preventing the escape of prisoners by the unlocking of the door 63 and opening said door upon its hinges, the pneumatic lock 62 is provided. At the free edge of the door is fixedly attached the locking arm 69 which extends beyond the edge of the door and is provided with an inwardly turned barrel portion 70, the opening in said barrel portion being directed inwardly and a slidable pin 71 being arranged in said opening and adapted to move inwardly and outwardly in said opening. In the side of the barrel 70 is located a slot 72 and a stop pin 73 arranged in the pin 71 engages the sides of said slot for the purpose of preventing the pin 71 from moving entirely out of the barrel opening. The spring 74 is arranged in the barrel to normally hold the pin 71 in the position of greatest extension, as illustrated in Fig. 3. At the inner end of the pin 71 is the conical head 75 which is adapted to engage a correspondingly shaped valve seat 76 in the pneumatic lock socket 77. The said socket consists of a hollow chamber 78 into which the pipe 60 leads, the front wall of the said chamber being provided with the valve seat 76 mentioned. When the door 63 is closed the head 75 will engage the valve seat 76, the spring 74 acting to hold said head in proper engagement with said valve seat, thereby preventing the escape of air through the aperture 79 in which the valve seat 76 is arranged. When the door is opened, however, the head 75 will be withdrawn from the valve seat permitting the air to escape through the aperture 79 from the pipe 60 and operating the signal valve 56, thus causing the annunciator 50 to operate.

It should be noted that the amount of pressure in the system above described is

preferably not great, a pressure of a few pounds only being preferred.

We claim:

1. In an automatic prison signal, a grating
5 composed of intercommunicating tubes, a
supply pipe for conducting air under pres-
sure to said tubes, a signal valve provided
with cylinders and pistons and reducing
means, said reducing means arranged in said
10 supply pipe and forming a sole, minute pas-
sage way for air through said supply pipe,
means of communication between one of the
cylinders and the supply pipe on one side
of the said reducing means, means of com-
15 munication between the other cylinder and
the supply pipe on the other side of the said
reducing means, and electrical signaling
mechanism connected to the pistons in the
two cylinders, said electrical signaling mech-
20 anism adapted to be operated by the move-
ment of the said pistons and adapted to be
held in inoperative position when the pres-
sure in the two cylinders is the same, and
adapted to be moved into operative position
25 when the pressure in the two cylinders is not
the same.

2. A prison signal comprising a grating
composed of intercommunicating pipes, a lo-
cal supply pipe communicating with said
30 grating, means for conducting air under
pressure into said local supply pipe, a signal
valve arranged on said local supply pipe,
said valve constituting a portion of the pas-
sage way through said pipe, said valve com-
35 prising a valve cylinder and rotatable valve,
a lever connected to said rotatable valve,
spaced cylinders provided with pistons, a
pipe connecting one of said cylinders with
the local supply pipe on one side of the valve
40 and a pipe connecting the other cylinder with
the local supply pipe on the other side of
the valve, piston rods connecting said pistons
with said lever, said valve provided with a
reduced opening for the passage of air from
45 the local supply pipe on one side of said
valve to the local supply pipe on the other
side of said valve, an electric indicating de-
vice and a source of current, spaced electric
contacts arranged in circuit with said elec-
50 tric indicating device and said source of cur-
rent, and one of said contacts connected to
said lever and adapted for movement there-
with into engagement with the other con-
tact to close the circuit.

3. In an automatic prison signal the com-
55 bination of a grating composed of intercom-
municating tubes, a local supply pipe con-
nected to said tubes and adapted to supply
air thereto, and a signal valve arranged upon
60 said local supply pipe, said signal valve com-
prising a valve cylinder interposed between
adjacent portions of the said local supply
pipe, a rotatable valve located in said valve
cylinder, said valve cylinder provided with
65 transverse walls on both sides of said rotata-

ble valve, said walls provided with reduced
openings forming the sole passage way from
the adjacent portions of the local supply
pipe to said rotatable valve, said rotatable
valve provided with a reduced opening 70
adapted to register with the openings in the
said transverse walls, said rotatable valve
adapted to rotate within the valve cylinder
to throw the opening in said rotatable valve
out of register with the opening in the trans- 75
verse wall on the side from which the air is
supplied, the opening in said rotatable valve
on the side toward the grating being en-
larged, the wall of said valve cylinder pro-
vided with an externally open aperture, the 80
enlarged portion in the opening of the said
rotatable valve adapted to provide commu-
nication between said externally open aper-
ture and the aperture in the transverse wall
on the grating side of said valve when the 85
said rotatable valve is turned to throw the
other end of the opening out of engagement
with the aperture in the other wall, spaced
cylinders provided with pistons, a lever con-
nected to said rotatable valve, piston rods 90
connecting the said pistons with opposite
ends of said lever, a pipe providing pneu-
matic communication between one of said
cylinders and the local supply pipe on one
side of the signal valve and another pipe 95
providing pneumatic communication between
the other of said cylinders and the local sup-
ply pipe on the other side of said valve, and
electric contacts adapted to be operated by
said lever substantially as described. 100

4. In an automatic prison signal, in com-
bination, an air supply pipe, means for con-
ducting air under pressure to said pipe, a
pneumatically operated signal valve, an elec-
105 tric circuit including signaling means, said
signal valve adapted to operate said signal-
ing means through said circuit, said valve
adapted to operate when air is exhausted
from said supply pipe, a door arranged in a
doorway and adapted to be opened and 110
closed, an air chamber arranged at the side
of said doorway and connected with the said
supply pipe, said air chamber provided with
an aperture for the exhaust of air from said
supply pipe, a locking arm fixedly attached 115
to said door and provided with a pin having
a head adapted to close the aperture in said
air chamber when said door is closed and to
be moved from said aperture to permit the
exhaust of air therefrom when said door is 120
opened.

In testimony that we claim the above, we
have hereunto subscribed our names in the
presence of two witnesses.

J EVRON RHOADS.
HENRY C. FASHBAUGH.

Witnesses:

IRENE M. LUTZ,
WILLIAM H. MILLER.