

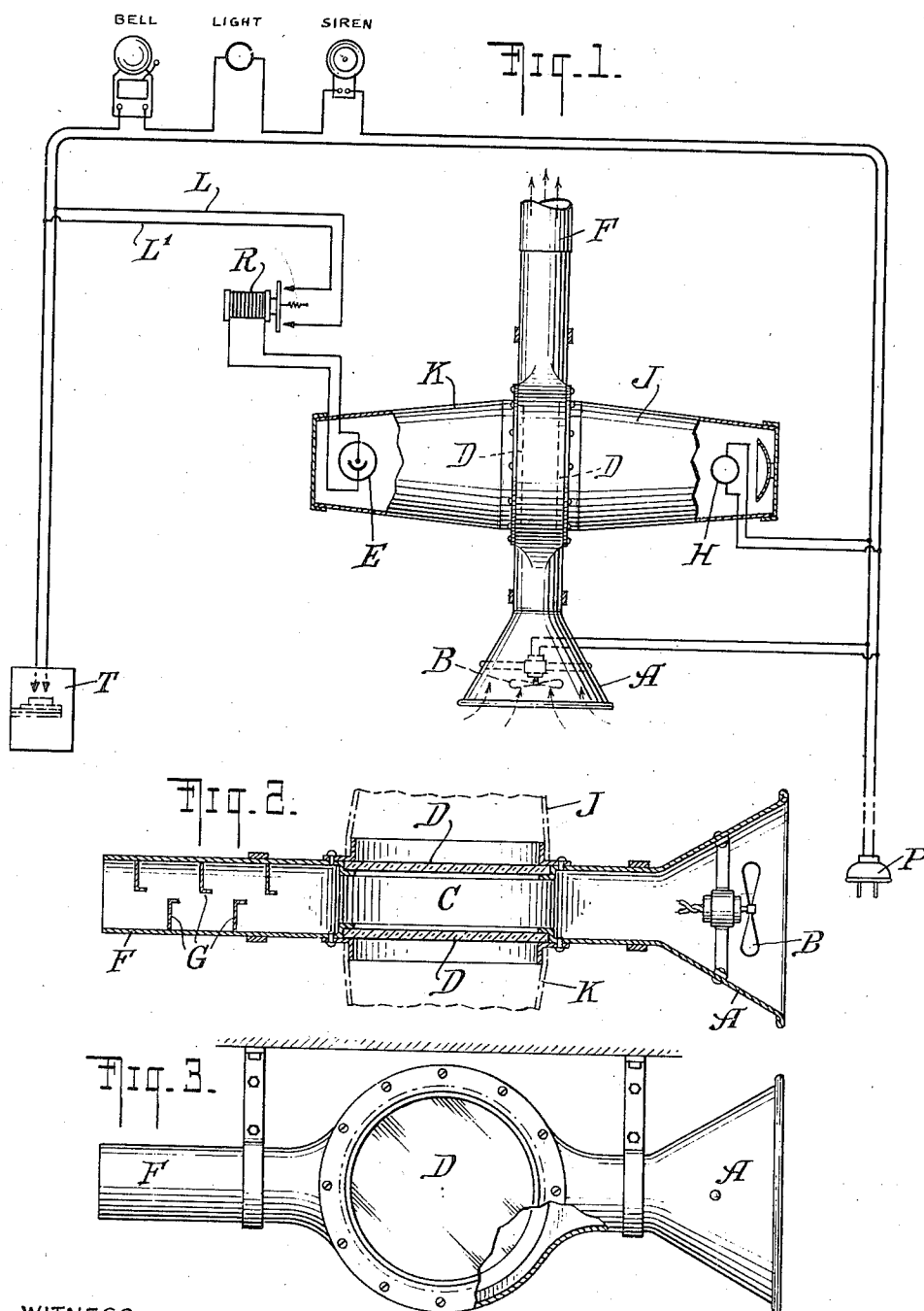
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FIRE DETECTOR

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WITNESS

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FIRE DETECTOR

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2 Claims. (Cl. 177-311)

This invention relates to apparatus adapted for automatic detection of conditions produced by fire and has for its object the provision of means which will give notice as promptly as possible after a fire condition has begun, that such a condition exists. The invention is illustrated in the accompanying drawing in which Fig. 1 is a plan view of the apparatus partially in section with the circuits and electrical connections shown diagrammatically. Fig. 2 is a longitudinal section of the air and smoke passage portion of the apparatus and Fig. 3 is a side elevation of the parts of the apparatus shown in Fig. 2.

The apparatus illustrated in the drawing is one which is adapted to be placed in any convenient position in any room, building, or storage space. It consists of apparatus which includes the funnel-shaped air duct A and within which is supported the fan B. The upper end of the funnel-shaped air duct A communicates with the chamber C bounded by transparent discs D preferably constituted of quartz glass. The chamber C communicates at its upper portion with an exhaust duct F equipped with baffle plates G. The function of these plates G is to retard smoke when present and to cause such smoke to move turbulently in the interior of the chamber C before being forced through the exhaust. On either side of the chamber C are the conically shaped shields J and K. The shield J supports the lamp socket which carries the lamp H. The shield K supports a photo-electric cell E, said cell in turn controlling the relay R and said relay in turn being effective to operate one or more signals as indicated diagrammatically at "bell", "light", and "siren". The electric connections are as follows: A plug P, insertable in a conveniently located outlet, supplies electric current to the lamp and fan and whenever the thermostat T or the relay R is operated, supplies current to operate the "bell", "light", and "siren" signals.

A thermostat T is arranged to close an electric switch when the temperature in its vicinity exceeds a predetermined temperature. The relay R under the control of the cell E prevents electric current from flowing through the branch lines L and L' so long as the cell E is affected by the light from the lamp H, but to close said electric circuit when effective projection of light from the lamp H to the cell E is interrupted. As the apparatus is set up and the switches to the lamp and to the fan motor are closed, the fan draws air through the funnel A, the chamber C, and out through the exhaust pipe F. The beam of the lamp H is directed against the cell E and the

switch controlled by the relay R is open as is also the switch controlled by the thermostat T.

These being the normal conditions of the system, let us suppose that a fire condition comes into existence in the vicinity of the apparatus. An early manifestation of such a fire condition is frequently the generation of smoke and such smoke will be drawn through the inlet funnel A and will cloud the chamber C, the clouding being accentuated by the effect of the baffles G. This clouding of the chamber C interferes with the clear projection of the rays from the lamp H to the cell E and causes the cell E to cease to affect the magnet of the relay R. As soon as the relay magnet is deenergized its spring moves its armature to close a switch so that an electric circuit is at once established via lines L and L' to the "bell", "light", and "siren" signals which are located at convenient points so that a watchman, the nearest fire station, or any person in or near where the building, room, or warehouse is situated, may have instant notice and opportunity of extinguishing the fire before it grows out of control. Should the fire condition be such as to produce a flame without much smoke, its heat will be at once communicated to the thermostat T and the thermostat switch will at once close the circuit to the "bell", "light", and "siren" stations.

Should the lamp H burn out, or fail, or its fuse blow out, the arrangement is such that when any of such events occur, the lamp will cease to illuminate the cell E with the result that the signal means will also be actuated, but in this case the watchman or inspector or other person who responds to the signal will find that a necessary repair or replacement was the occasion for the signal and not a fire condition.

The reason why it is suggested that the transparent discs D should preferably be constituted of quartz glass is that the radiation from tungsten filament sources consists largely of infra red or heat rays which quartz glass intercepts, thereby preventing the heat rays from reaching the cell. Accordingly, while quartz glass is not absolutely necessary, its use is desirable.

The apparatus can be very readily installed, is automatic in its operation, and requires no attendance. In providing a smoke detector which will give immediate warning when the fire has only just started, it affords an opportunity for extinguishing the fire before it is out of control. The casing of the apparatus proper may be of any suitable material, preferably sheet metal.

It is apparent that many modifications with

respect to details of construction can be made without departing from the scope of the invention. For example, the thermostat may be entirely omitted and the arrangement of the electric circuits may be varied. The particular shape and size of the several parts of the smoke conductor operation of the instrument may be varied and modified in many directions familiar to a person skilled in the art. Any convenient visible or audible signal system may be employed and these systems may extend either to one station only or to a multiplicity of stations.

I claim:

1. The combination of a casing provided with an intake duct and an exhaust duct forming a means of ingress and egress, respectively, through said casing, said casing being closed at each end by a wall of light permeable material and together with said walls forming an enlarged chamber, a fan disposed in said intake duct for drawing air, and smoke when present in such air, through said duct and forcing such mixture into the chamber, means disposed in said outlet duct for retarding the escape of the gaseous mixture from the chamber to produce a greater concentration of smoke than is present at that time in the atmosphere and to cause the gaseous mixture to move turbulently within the chamber, a source of light and light-sensitive means arranged on opposite sides of the chamber so that beams from

said light source pass through the two end walls and the chamber to said light-sensitive means, and housing members connected to said casing and enclosing said light source and light-sensitive means.

2. The combination of a cylindrically-shaped casing, the flat ends of which are constituted of walls of light permeable material and the annular portion of which is provided with an intake duct and exhaust duct forming a means of ingress and egress, respectively, through such annular portion of the casing, means disposed in said inlet duct for drawing air, and smoke when present in said air, through said inlet duct and forcing such gaseous mixture into said casing, baffles contained in said exhaust duct to produce a greater concentration of smoke in said casing than is present at that time in the atmosphere and together with said cylindrically-shaped casing to cause the gaseous mixture to move turbulently within said casing, a source of light positioned exteriorly of said casing and arranged to throw light beams through said walls of light-permeable material and the interior of said casing and light-sensitive means positioned exteriorly on the opposite side of said casing and arranged to receive the light beams passing through the casing from said light source.

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