C. SMITH.

FIRE AND TEMPERATURE ALARM OR INDICATOR.

APPLICATION FILED SEPT. 11, 1908.

934,225. Patented Sept. 14, 1909.

FIG. 1.

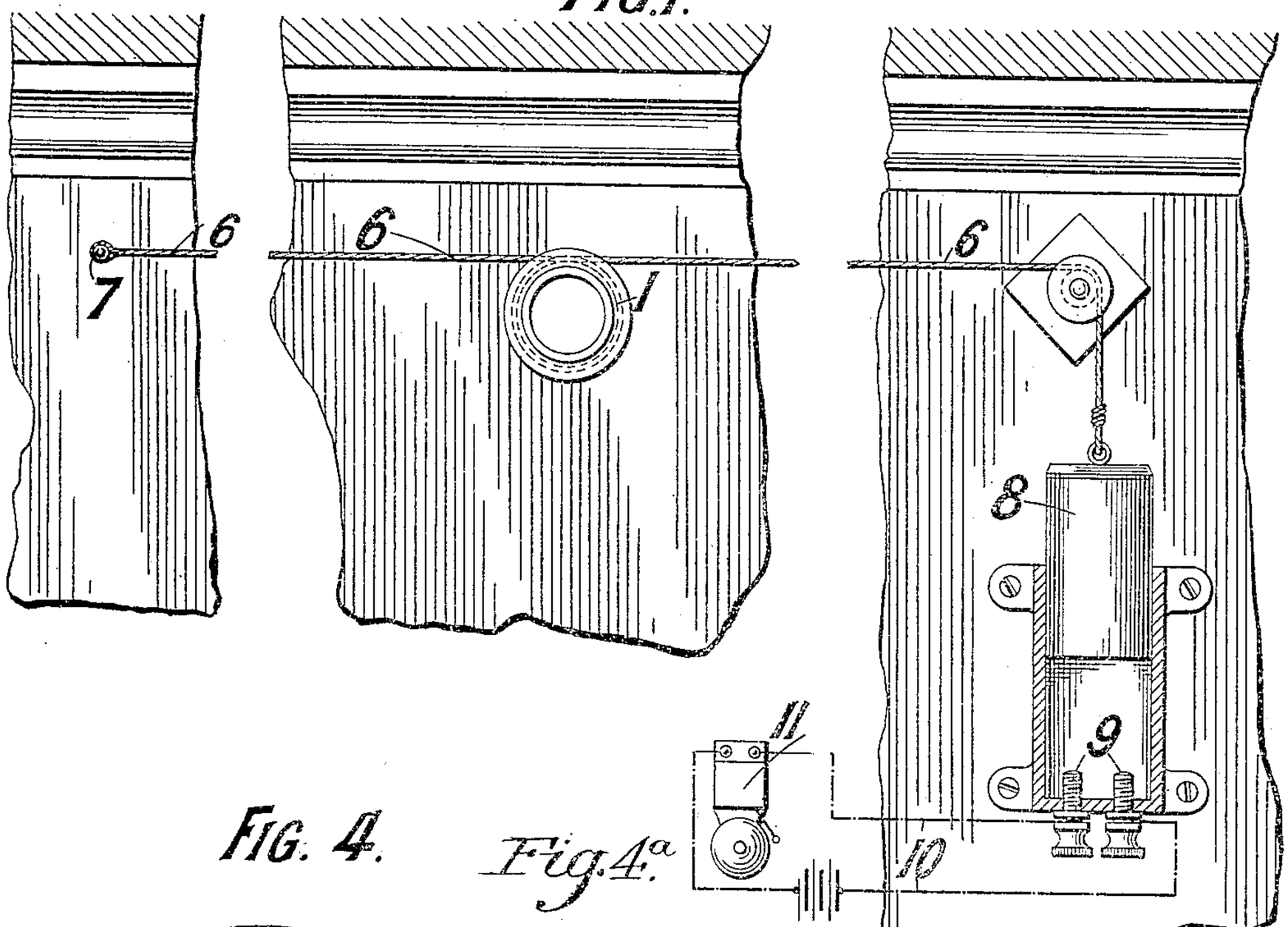
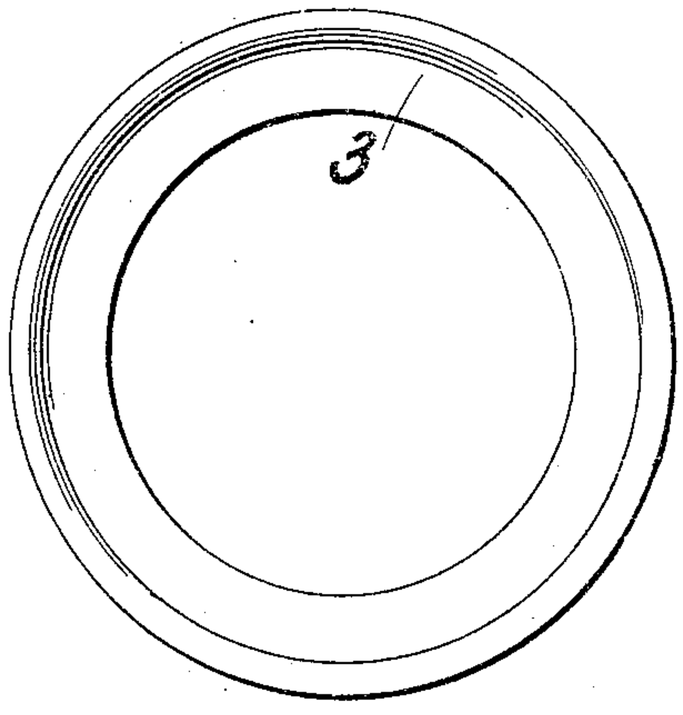


FIG. 4.

Fig. 4a.



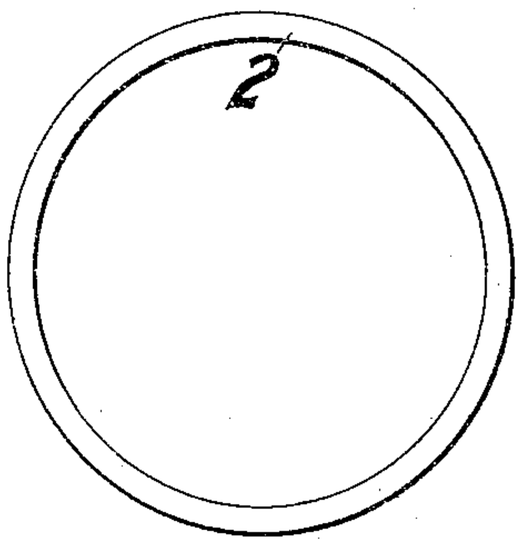


Fig. 5a.

FIG. 5.

FIG. 2.

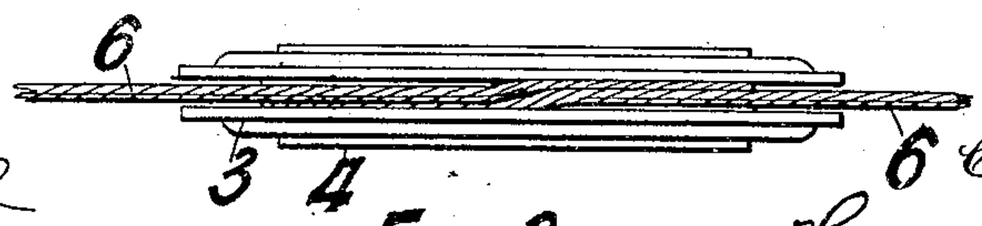


FIG. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES SMITH, OF SOUTH CROYDON, ENGLAND.

FIRE AND TEMPERATURE ALARM OR INDICATOR.

934,225. Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed September 11, 1908. Serial No. 452,645.

To all whom it may concern:

Be it known that I, CHARLES SMITH, a subject of the King of Great Britain, residing at South Croydon, in the county of Surrey, England, have invented certain new and useful Improvements in Fire and Temperature Alarms or Indicators, and of which the following is a specification.

In the specification of my prior United States Patent No. 867681 dated the 8th October, 1907, I have described a tensioned flexible connection extending to and passing at some point in its length around the exterior periphery of a fusible member which is thus wholly supported by the said flexible connection, and by passing around the fusible member the flexible connection is shortened in length. The fusible member is generally constructed in annular or wheel form, the flexible connection such as a wire passing around the periphery of the said wheel or ring. The connection may continue and pass around in its course other similar fusible members if desired, and is then connected to an electric circuit closing or breaking device which operates upon the extension of the connection permitted by the softening or melting of the fusible member through the action of heat. Thus the flexible connection may be fixed at one of its ends to a stationary support, and after passing around one or numerous fusible rings it may be extended over a pulley at its other end and be connected to and tensioned by a weight. Upon one or more of the rings fusing, the weight naturally descends and operates the electric devices. The flexible connection I employ, generally consists of a braided wire having great tensional strength and flexibility. Now it has been suggested that a continued strain of the flexible connection around the periphery of a member such as a metal ring of fusible alloy, may produce a deformation of the said fusible member—hereinafter termed "ring"—and this change of form may continue until it permits of such an increase of the effective length of the flexible connection—hereafter termed "wire"—as to perhaps cause a fire alarm to be given, or the wire it has been suggested might in time owing to the continued strain upon the ring of fusible alloy or upon ears or flanges formed thereon and therewith, bend apart those flanges or ears and so permit of the wire passing off of the ring, and so becoming increased in its effective length, with the result before mentioned.

The object therefore of the present invention is to render such deformations of the metal rings of fusible alloy, if such be probable, absolutely impossible, by relieving the fusible alloy ring entirely from the burden due to the tension of the wire. To this end therefore and according to the present invention, I provide a built-up or composite ring in which the tension of the wire passing around it is received by a ring or band of harder or tougher metal than the fusible metallic alloy which I employ for the body of the ring, while flanges of similar harder metal, such for instance as brass, entirely separate from the body of fusible metal and from the bearing ring or band, are employed. With such a structure the wire is passed around the periphery and rests upon the bearing ring and is retained thereon by the flanges, so that the tension of the wire is not in any way borne by the fusible body portion, and the latter can be left for an indefinite time suspended by the tensioned wire, without any sign of change taking place, as I have found by practical experiment. When the temperature around such a compound ring rises to about the predetermined temperature at which the fusible metal softens or melts, then upon such taking place the body portion collapses, and the bearing ring and its separate flanges separate, and fly apart, so instantaneously releasing the loop of wire which surrounds the bearing ring. Such broadly are the general characteristics of the present invention, and I do not limit myself to the precise sections of either the body ring, the bearing ring, or the flanges, but to give a better illustration of this invention I will describe a specific example with reference to the accompanying drawings:—

Figure 1 is an elevation illustrating diagrammatically the general arrangement and mode of employing the rings hereafter described. Fig. 2 is a horizontal section of one of my improved rings drawn to a larger scale than the previous figure, and Fig. 3 is a plan view of the ring with the wire or braided metallic cord in position thereon. Fig. 4 is an elevation showing one of the flanges detached. Fig 4ª is a vertical cross section through the flange shown in Fig. 4. Fig. 5 is an elevation showing the bearing ring detached and Fig. 5ª is a vertical cross

section through the bearing ring shown in Fig. 5.

In constructing my improved composite fusible ring 1 as shown at Fig. 1, I provide a bearing ring 2 Figs. 2, 5, and 5ª of brass or some other metal of sufficient strength, which is substantially of rectangular section, and then I also provide two separate disk-like rings 3, Figs. 2, 4, and 4ª, to form the flanges. The flanges 3 are then placed in contact with the edges of the bearing ring 2 so as to form between the three parts an annular trough, and a ring 4 of fusible alloy is then formed, by casting, on the interior periphery of the flanges 3 and of the bearing ring 2, which fusible alloy ring 4 retains the bearing ring 2 and is extended outward slightly so as to come above the interior edges of the flanges 3, whereby the said flanges 3 and the bearing ring 2 are held together and in position.

It will be obvious that when heat is applied and the fusible metal ring 4 softens or melts nothing remains to hold together the flanges 3 and the bearing ring 2, and they fly apart and release the wire instantaneously as I have proved by many experiments.

From the diagrammatic view at Fig. 1 it will be readily understood that one end 7 of the braided metallic cord or wire 6 is firmly attached to some stationary point, and that throughout its length the cord passes over one or many of such fusible rings as I have described, and that then its other and free end is attached to for instance a weight 8 such as shown, or some other means by which the cord is held in tension, and suitable devices are provided—such as two electric contacts 9 illustrated—by which the descent of the weight due to the elongation of the cord completes an electric circuit 10 and sounds an alarm 11.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In an automatic fire and temperature alarm; the combination with a composite member composed of a ring of metallic alloy fusible at a comparatively low temperature, an outer band of harder metal only fusible at a much higher temperature than said ring and surrounding the outer periphery of the latter, two separate flanges in the form of annular plates of hard metal similar to said band, said flanges being located upon said fusible ring one on each side of said hard metal band, and flanges of easily fusible metal on said fusible ring to hold said hard metal band and flanges together; of a flexible cord, means for holding one end of said cord stationary, a normally open electric circuit, and means acting upon the opposite end of said cord to maintain the latter in tension, said cord passing around the external periphery of said hard metal band and being located between said hard metal flanges to reduce the effective length of said cord and to support said composite member until the inner fusible ring becomes fused and said cord is thereby released by the separation of said band and hard metal flanges, and adapted to complete the electric circuit by the extension in length of said cord, substantially as set forth.

2. In an automatic fire and temperature alarm; the combination with a composite member composed of a ring of metallic alloy fusible at a comparatively low temperature, an outer band of harder metal fusible at a higher temperature than said ring and surrounding the outer periphery of the latter, two separate flanges in the form of annular dished plates of hard metal similar to said band, said flanges being located upon said fusible ring one on each side of said metal band, the concave faces of said flanges being located opposite to each other, so that the space between the peripheries of said flanges is less than the width of the hard metal band, and flanges of easily fusible metal on said fusible ring to hold said hard metal band and flanges together; of a flexible cord, means for holding one end of said cord stationary, a normally open electric circuit, and means acting upon the opposite end of said cord to maintain the latter in tension, said cord passing around the external periphery of said hard metal band and being located between said hard metal flanges to reduce the effective length of said cord and to support said composite member until the inner fusible ring becomes fused and said cord is thereby released by the separation of said band and hard metal flanges, and adapted to complete the electric circuit by the extension in length of said cord substantially as set forth.

3. In an automatic fire and temperature alarm; the combination with a composite member composed of a ring of metallic alloy fusible at a comparatively low temperature, an outer band of harder metal fusible at a higher temperature than said ring and surrounding the outer periphery of the latter, two separate flanges in the form of annular dished plates of hard metal similar to said band, said flanges being located upon said fusible ring one on each side of said metal band, the concave faces of said flanges being located opposite to each other, so that the space between the peripheries of said flanges is less than the width of the hard metal band, and flanges of easily fusible metal on said fusible ring to hold said hard metal band and flanges together; of a flexible cord, means for holding one end of said cord stationary, a pulley at a distance from said stationary end of said cord over which pulley said cord passes, a weight attached to the pendent end of said cord to maintain

the latter in tension, said cord between said stationary end and said pulley passing around the external periphery of said hard metal band of said composite member and being located between said hard metal flanges to reduce the effective length of said cord and to support said composite member, two electric contacts located below said weight and adapted to be electrically connected upon the descent of said weight, an electric circuit connected with said electric contacts and an alarm device in said circuit actuated upon the descent of said weight permitted by the extension of said cord due to the separation of the parts of said composite member upon the fusing of its fusible ring, substantially as set forth.

4. In an automatic fire and temperature alarm and in combination, a fusible body, a multi-part device, the members of which pass immediately around the said fusible body and are separable upon the fusing of the said fusible body, a cord passing through said device, a normally open electric circuit and means for effecting tension on said cord and whereby the said electric circuit is closed when the tension on the said cord is released by the fusing of said fusible body and the separation of the members of said device.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

CHARLES SMITH.

Witnesses:
THOMAS W. ROGERS,
WILLIAM A. MARSHALL.