

C. SMITH.  
AUTOMATIC FIRE ALARM.  
APPLICATION FILED JULY 9, 1907.

FIG. 1.

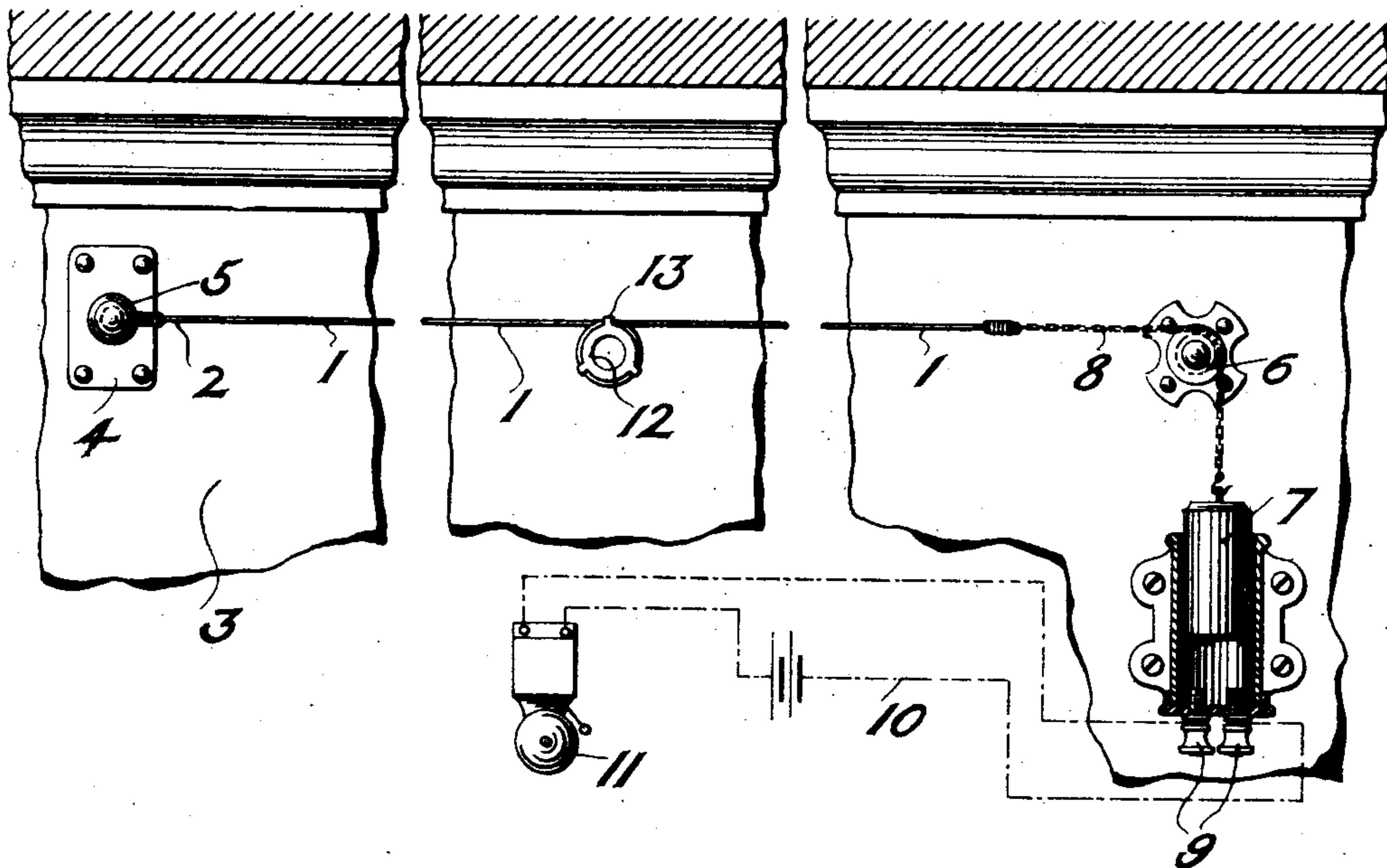


FIG. 2.

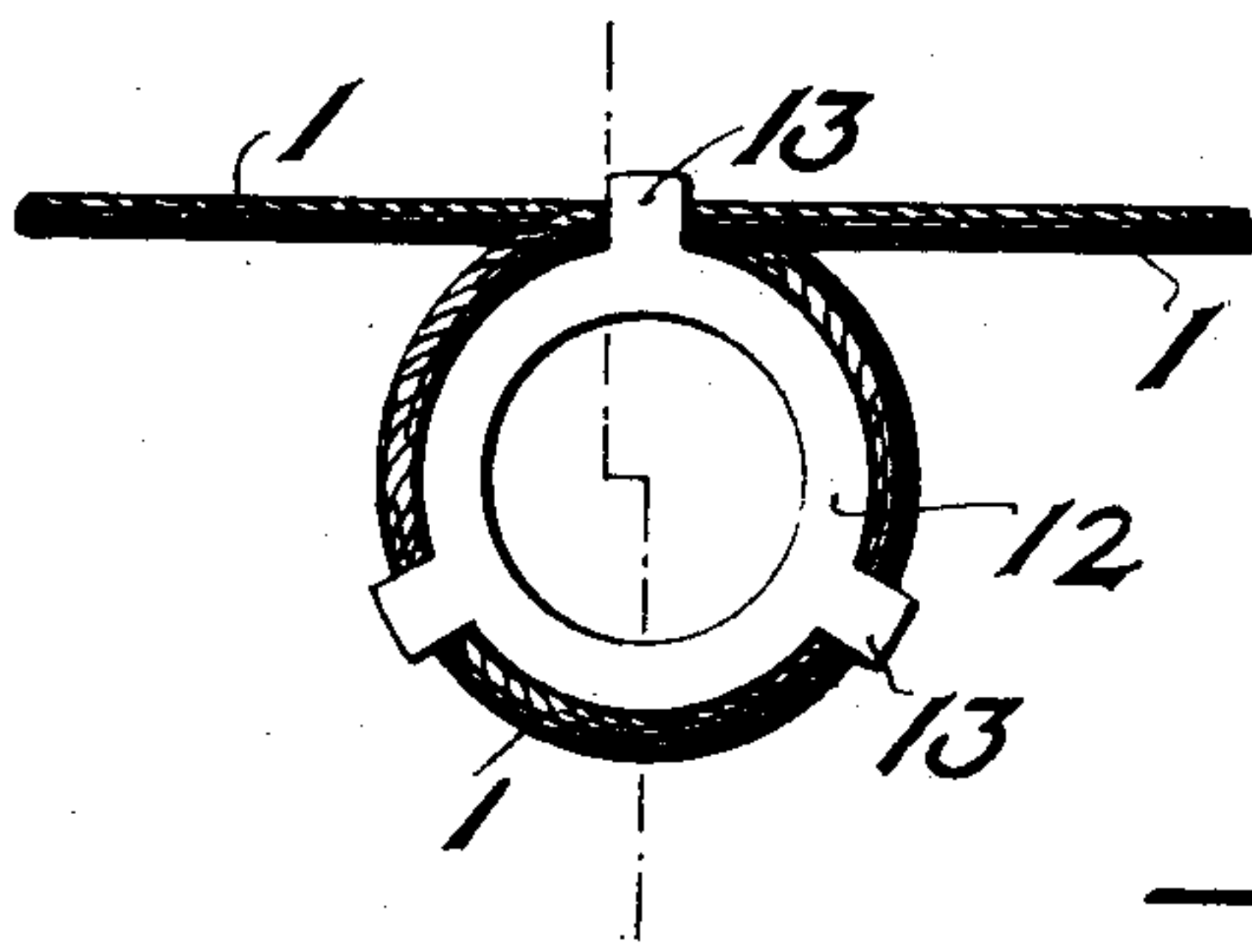


FIG. 4.

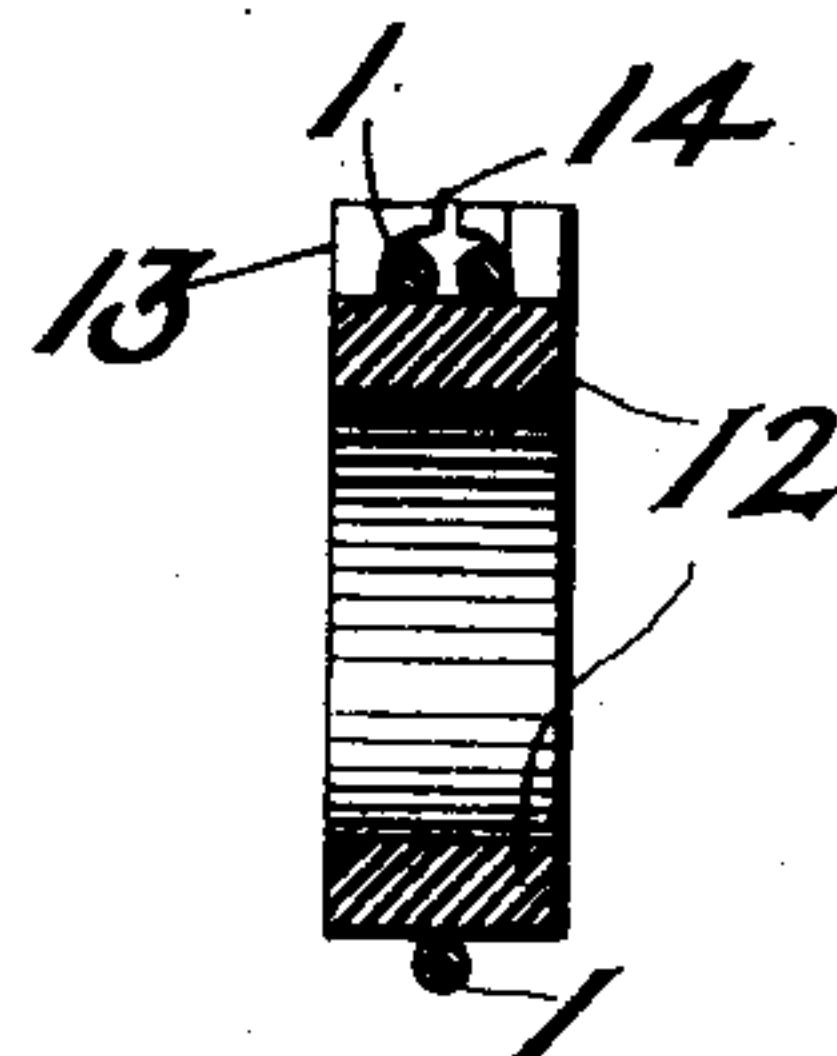


FIG. 3.

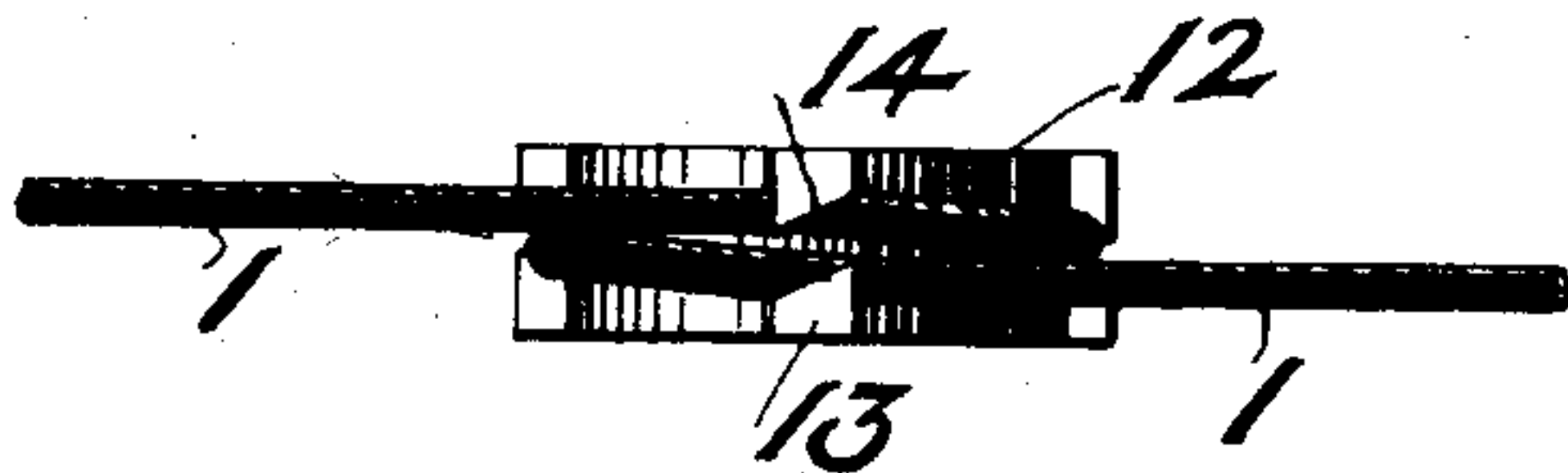
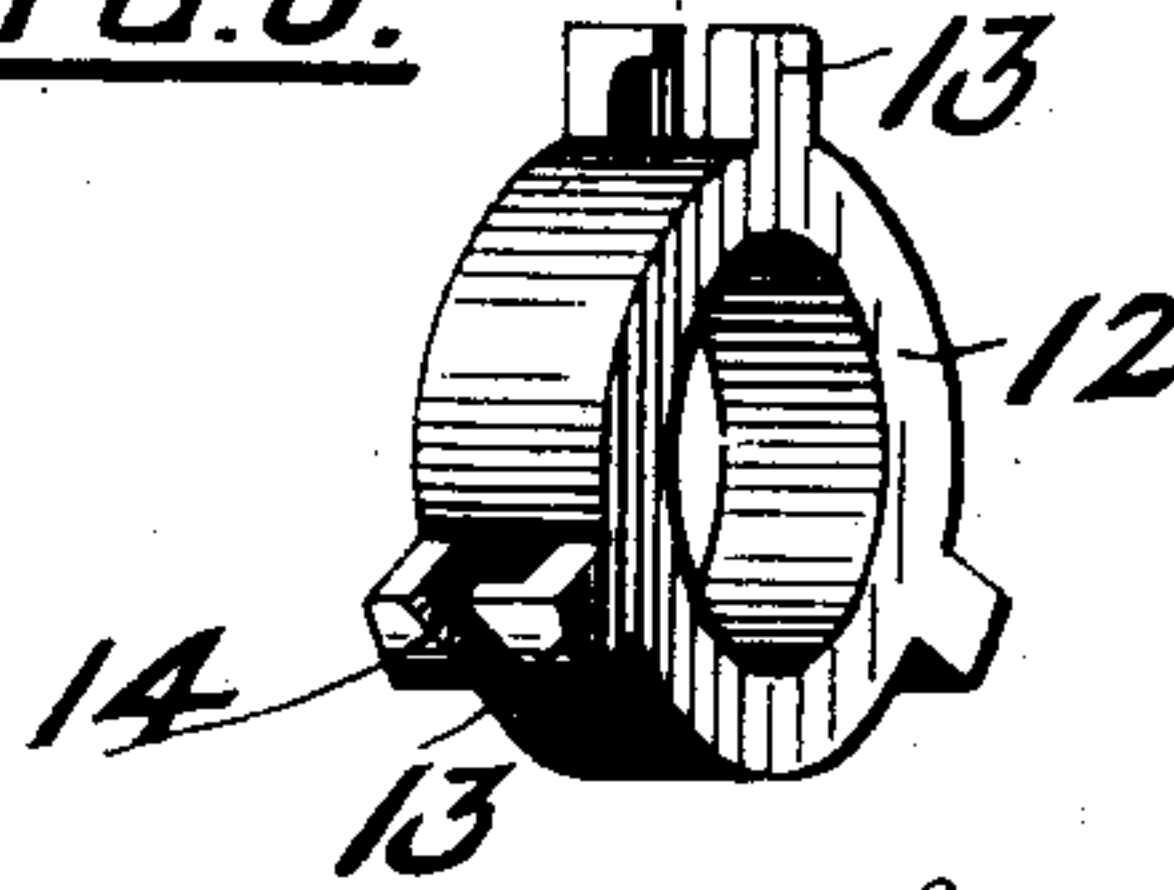


FIG. 5.



Witnesses  
Charles Smith  
Harold Surrell

Inventor  
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Per atty

# UNITED STATES PATENT OFFICE.

CHARLES SMITH, OF SOUTH CROYDON, ENGLAND.

## AUTOMATIC FIRE-ALARM.

No. 867,681.

Specification of Letters Patent.

Patented Oct. 8, 1907.

Application filed July 9, 1907. Serial No. 382,856.

*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 Automatic Fire-Alarms, and of which the following is a specification.

The object of this invention is to provide an improved automatically acting fire alarm, which shall operate by simple and reliable mechanical means, and shall not require any electrically conducting wires to extend through the premises to be protected, and further shall be of such construction that it can be fitted with little expense, is certain and prompt in its action in case of fire, and is such that its reliability and effectiveness does not vary or deteriorate.

According to this invention the premises to be protected are fitted with a flexible cord, one end of which is firmly anchored to the wall at or near the ceiling or roof, and continued around the interior of the premises, being carried over pulleys where angles occur, and the cord is finally conducted to say near the entrance of the building and is there connected with a pendent weight so that the cord is held in tension; at intervals in the length of the cord the latter is passed around the exterior surface of one or more easily fusible metal members (which may be made in the form of rings or disks) which are not fixed to the wall or to any other place, but are simply held suspended by the cord passing around their circumference, the cord by so passing around the said fusible members being shortened in its effective length, and such a fusible member can be fitted wherever required by simply looping the cord around it.

The fusing point of the metallic alloy (which is well known) and of which the fusible members are composed, is about 160° Fahrenheit, but they can be constructed, by regulating their thickness, to collapse at a much lower or at any desired temperature. It will thus be understood that upon a fire occurring in premises so fitted, one or more of the fusible metal members will become softened and collapse, and permit the flexible cord to be extended in length, and the weight to descend. I cause the descent of this weight to complete an electric circuit and actuate an alarm, such as a bell for instance, or the descent of the weight may be caused to operate any convenient or well known mechanism which will automatically transmit an electric signal.

An example of construction of the invention is shown in the accompanying drawings, whereon

Figure 1 is an elevation showing the flexible metallic cord anchored at one end, one of the fusible members or rings around which the cord passes, and the weight suspended at the other end of the cord adapted to complete an electric circuit and sound an alarm when the said weight descends. Fig. 2 is an elevation, Fig. 3 is

a plan, Fig. 4 a vertical transverse section, and Fig. 5 is a perspective view of the construction of one of the fusible metallic rings which I employ having ears to retain the flexible cord in position.

The flexible metallic cord 1 employed in this invention may suitably be composed of a number of strands laid as usual, and may be of phosphor bronze with a minimum breaking strain of for instance about 100 lbs, and one end 2 of the cord 1 is firmly fixed to a wall such as 3, by means of a wall plate 4 having a stud 5. The cord 1 extends around or through the room or rooms to be protected, passing, where angles occur, over suitable pulleys or fixed guides, and the opposite end of the cord is passed over a pulley 6 and carries at its end a weight 7.

In the diagrammatic drawing, Fig. 1, the end of the flexible metallic cord 1 is connected to a small length of chain 8, where it passes downwards over the pulley, but this is not necessary, as I have found that the metallic cord can be obtained in commerce with sufficient flexibility to pass over the pulley. The weight, in the diagram view shown, is caused upon its descent to connect two contact studs 9, and so complete an electrical circuit 10 and sound an alarm bell 11.

At any required number of points in the length of the cord 1, I place one of the fusible metallic rings 12, the ring 12 being supported by the cord 1 being passed once around its circumference, and then upon the fusible metal ring 12 becoming sufficiently softened or melted (which can be caused to occur at a temperature of about 140° to 160° Fahrenheit) the cord will be extended in length by the action of the weight 7, and consequently the weight will fall and complete the electric circuit and give the necessary indications that a fire has occurred.

In constructing the rings, it is desirable that means should be provided to prevent the flexible cord 1 accidentally slipping off, and to this end I form ears 13 (Figs. 2 to 5) extending radially from the outer periphery of the ring, and each ear is formed with a hole near its base extending in the plane of the annulus, and a slot 14—such as a saw-cut—is formed in the top of the ear to communicate with the hole, this slot being at an angle to the plane of the annulus. With such a construction of fusible member 12, the cord 1 can be given one turn around the periphery of the ring 12, so that the cord 1 passes, by way of the slot 14, into the hole formed through each ear. There are three ears shown in the drawing, and therefore the cord passes singly through two of such ears, while the hole through the third ear would contain two strands of cord as shown at Fig. 3, one passing in the direction of the stationary stud 5, and the other towards the weight 7.

By the construction of the fusible member in the form shown at Figs. 2 to 5, I have found by experiment that the effect of the heat acting upon the same is firstly



to soften the ears 13, and then the tendency is for the tensioned cord to force off the two parts of an ear side-wise in opposite directions; the ring then falls away, and the loop of the cord opens out and can be stretched  
 5 into a straight line without kinking. Thus I do not depend for the action upon the mere expansion of the metal composing the cord, but upon the fusing of the ring 12, or of some part of it, and to some extent upon the flexibility of the metallic cord in proportion to the  
 10 weight 7 by which it is stretched.

From the foregoing description it will now be clear that any number of the fusible rings at any required distances apart can be placed upon a flexible metallic cord (which is already fixed in position) by simply  
 15 passing the cord once around each member, and in fact, if so desired, the members can be adjusted upon the cord as to distance apart, by simply moving them along and allowing the cord to pass around their circumference.

20 The form of construction of the invention which has been described, where each fusible member is made in the shape of a ring, is of advantage, because the thickness of the rings can be varied and the time elapsing between the outbreak of a fire and the giving  
 25 of the alarm thereby varied, while the particular form of construction of the rings shown having ears, permits the cord to pass away from the rings, or the rings to pass away from the cord, and the cord to be extended or straightened without twisting or kinking.

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

1. In an automatic fire alarm; the combination with a flexible cord, a fusible metallic member around the external periphery of which the cord passes to support said  
 35 member and to reduce the effective length of said cord until said member becomes fused, means for holding the said cord in tension, and means for completing an electric circuit by the extension in length of said cord when said member is fused, substantially as set forth.

40 2. In an automatic fire alarm; the combination with a flexible cord, means for holding one end of said cord stationary, a pendent weight connected to the opposite end to hold said cord in tension, stationary electric contact studs adapted to be electrically connected by said  
 45 weight to complete an electric circuit when said weight descends, and an alarm device in said circuit; of a fusible metallic member, around the external periphery of which the cord passes to support said member and to reduce the effective length of said cord until said member becomes  
 50 fused and thereby permits said weight to descend, substantially as set forth.

3. In an automatic fire alarm; the combination with a flexible cord, means for holding one end of said cord stationary, a pulley over which the opposite end of the  
 55 cord passes, a pendent weight connected to the latter end

of the cord to hold the said cord in tension, stationary electric contact studs adapted to be electrically connected by said weight to complete an electric circuit when said weight descends, and an alarm device in said circuit; of a fusible metallic member located between the fixed end  
 60 of the cord and the pulley at the weighted end, and around the external periphery of which member the cord passes to support said member and to reduce the effective length of the cord until the said member becomes fused, and permits said weight to descend, substantially as set forth. 65

4. In an automatic fire alarm; the combination with a flexible cord, means for holding one end of said cord stationary, a pendent weight connected to the opposite end to hold said cord in tension, stationary electric contact studs adapted to be electrically connected by said weight to complete an electric circuit when said weight descends, and an alarm device in said circuit; of a ring of metallic alloy fusible at a comparatively low temperature, around the external periphery of which ring said cord  
 75 passes to support the said ring and to reduce the effective length of said cord until said ring becomes fused and thereby permits the said weight to descend, substantially as set forth. 70

5. In an automatic fire alarm; the combination with a flexible cord, means for holding one end of said cord stationary, a pendent weight connected to the opposite end to hold said cord in tension, stationary electric contact studs adapted to be electrically connected by said weight to complete an electric circuit when said weight descends, and an alarm device in said circuit; of a ring of metallic alloy fusible at a comparatively low temperature, around the external periphery of which ring said cord passes to support the said ring and to reduce the effective length of said cord until said ring becomes fused  
 90 and thereby permits said weight to descend, and means for retaining said cord upon the periphery of said ring, substantially as set forth. 80 85 90

6. In an automatic fire alarm; the combination with a flexible cord, means for holding one end of said cord stationary, a pendent weight connected to the opposite end to hold said cord in tension, stationary electric contact studs adapted to be electrically connected by said weight to complete an electric circuit when said weight descends, and an alarm device in said circuit; of a ring of metallic alloy fusible at a comparatively low temperature, radial ears extending from the outer periphery of said ring, each of said ears having a hole formed through it near its base in the plane of the ring, and having a slot extending from the top of the ear to the hole to permit said cord to pass into said hole through said slot of each ear as said cord is passed around the periphery of the ring to support the latter and to reduce the effective length of said cord, the hole of one of said ears containing two strands of said cord, one passing in the direction of the pendent weight and the other in the direction of the holding means, substantially as set forth. 100 105 110

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

CHARLES SMITH.

Witnesses:

THOMAS W. ROGERS,  
 WILLIAM A. MARSHALL.