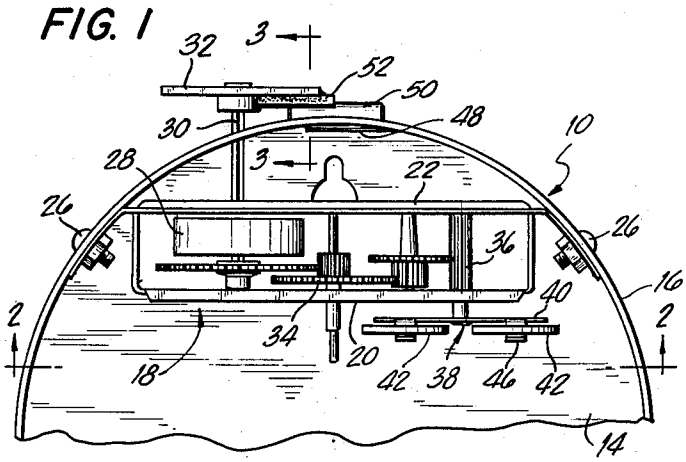
Sept. 15, 1964 R. KAPLAN 3,148,658

MECHANICAL SOUND-PRODUCING FIRE ALARM DEVICE

Filed Aug. 6, 1962

FIG. 1



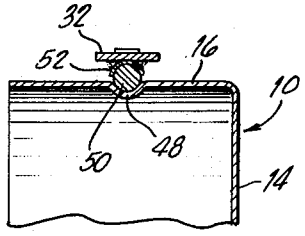


FIG. 3

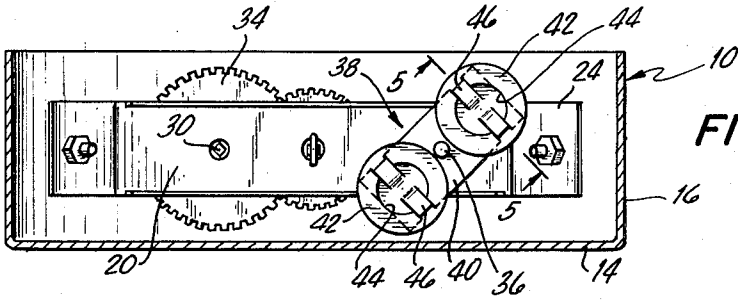


FIG. 2

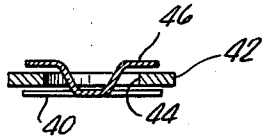


FIG. 5

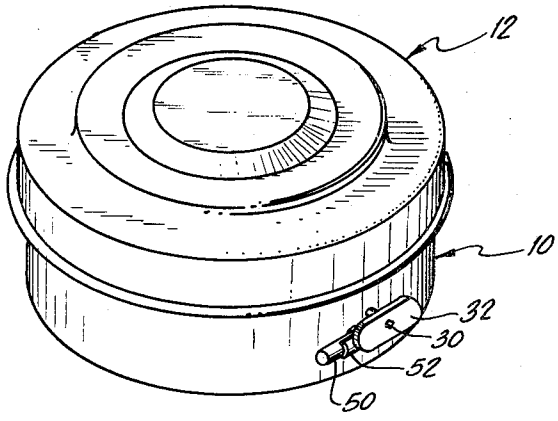


FIG. 4

INVENTOR.
RUTH KAPLAN

BY

ATTORNEY

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MECHANICAL SOUND-PRODUCING FIRE ALARM DEVICE

Ruth Kaplan, 230—41 131st Ave., New York, N.Y.

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The present invention relates to a sound-producing fire alarm device, and more specifically to a mechanical sound-producing fire alarm device, and particularly to such device utilizing a spring-wound motor.

Many types of mechanical sound-producing fire alarm devices utilizing a spring-wound motor have been known. These devices utilize a striker actuated by the motor to strike against a metallic body. Generally, the motor of such device is wound up and is inhibited from unwinding by interposition, in various arrangements, of a fusible metal element that interferes with such unwinding under normal conditions and permits unwinding and striker sound-producing action only when melted under heat of its fusion point. Such mechanical sound-producing fire alarm devices of the prior art have generally been of complicated construction and relatively costly to produce. These prior art devices have also been unreliable in their operation because of the inherent characteristic of the fusible metallic element which renders them subject to flow and distortion under tension, such as the tension exerted by the wound spring motor, especially under temperatures approaching, though not necessarily reaching, their fusion temperature, so that such devices are subject to the tendency of setting off the alarm before a critical temperature is reached, when no alarm is actually called for.

The present invention has for its object to provide a mechanical sound-producing fire alarm device, of the character described, which is of improved characteristics with respect to the two above features. Thus, it is one primary object of the present invention to provide a fire alarm device of the character described which is of highly simplified construction with respect to the sound-producing or striking means of the device, to thereby render the device relatively economical to produce and assemble.

It is another important object of the present invention to provide a fire alarm device, of the character described, in which the fusible element is so formed and so held that it will not flow and become distorted under tension, even at relatively high temperature, short of its fusing temperature, so that the alarm will not be falsely set off.

It is still another object of the present invention to provide a fire alarm device, of the character described, which produces a great volume of sound.

It is a further object of the present invention to provide a fire alarm device, of the character described, which may be readily and easily reset and re-used after each alarm.

It is a still further object of the present invention to provide a fire alarm device, of the character described, in which the striking element of the striker is loosely and freely mounted and centrifugally moved into striking position, so that it strikes without strain upon the striker and other striker portions of the device and, therefore, with a minimum tendency for distortion of the striking mechanism and of the motor actuating it, thereby to render the alarm device sturdy and durable.

The foregoing and other objects and advantages of the fire alarm device of the present invention will become more readily apparent to those skilled in the art from the embodiment thereof shown in the accompanying drawings and from the description following. It is to be understood, however, that such embodiment is shown by way

of illustration only, to make the principles and practice of the invention more readily comprehensible, and without any intent of limiting the invention to the specific details therein shown.

In the drawings:

FIG. 1 is a fragmentary top plan view of the fire alarm device of the present invention, with its cover removed, shown in set position;

FIG. 2 is a section taken on line 2—2 of FIG. 1;

FIG. 3 is a section taken on line 3—3 of FIG. 1;

FIG. 4 is a perspective view, on a reduced scale of the device of FIG. 1 with a cover in place thereon; and

FIG. 5 is a section taken on line 5—5 of FIG. 2.

Referring now in greater detail to the embodiment of the invention illustrated in the drawings, the same is shown to comprise a base, generally designated as 10, and a cover section, generally designated as 12. The base section comprises a preferably circular bottom 14, and an upstanding flange 16, forming the base wall; the cover 12 being formed to fit tightly over the edge of the wall 16.

A spring-wound motor, generally designated as 18, is mounted within the base 10. Such motor 18 may comprise a frame, including spaced parallel walls, 20 and 22, with one of such walls, as the wall 20, having extensions 24, which are offset to lie against the inner face of the base wall 16 to which they are secured, as by bolts and nuts sets 26. The frame walls 20 and 22 support between them a spring-wound motor including a spring 28, and a winding stem therefor, 30, which extends through a suitable opening formed in the base wall 16 to be exterior thereof, and mounts, on its end, a winding key 32. The motor is preferably disposed off center of the base 10, with the winding stem 30 likewise disposed off center, in substantially parallel relation to a radius of the circular base wall 12, with the winding key 32 disposed in tangential relation to the periphery of the base wall 16 but slightly spaced therefrom.

This spring motor drives a suitable gear train, which may be designated in its entirety as 34, which, in turn, drives a shaft 36, mounted between the frame sides 20 and 22 in parallel relation to the bottom wall 14 of the base, and which projects from the motor frame, preferably inwardly into the base. The projection of shaft 36 mounts a striking or sound-producing means generally designated as 38, consisting of a preferably rectangular bar, 40, which is supported at its center of gravity on the projection of shaft 36. The bar 40 is of such length that each half thereof, to each side of the shaft 36, is of a length less than the distance from the shaft 36 to the base wall 14, so that each bar half will clear the base wall upon rotation of the shaft 36. The bar 40 mounts, longitudinally slidably thereon, preferably at each end thereof, a striker which may preferably be in the form of a washer-like metal ring, 42, formed with a relatively large center opening, 44. The ring 42 is supported in a manner that, in one position, its periphery is substantially flush with the adjacent end of the bar 40 and in its other position it projects beyond such edge, sufficiently to strike against the bottom wall 14 of the base when the bar 40 approaches the normal position relative to the wall 14.

The strikers or rings 42 may be slidably supported on the bar 40 in any suitable manner. In the illustrated embodiment of the invention the ring-supporting means comprises a pair of preferably transversely-directed lugs, 46, struck out from the bar 40 and extending in opposed directions. The lugs 46 are of a width less than the diameter of the ring opening 44 and are spaced from one another at their bases a distance less than such diameter, and the distance between their free ends is greater than the diameter of the ring opening 44. The rings 42 may thus each be mounted in place by first upending the opposed lugs 46 and fitting the ring 42 over the upended

lugs and thereafter offsetting the lugs laterally to a position that they overlie the ring 42 without actually contacting it; thereby retaining the ring 42 in place and permitting it to slide on the end of bar 40 in any direction.

It will be apparent that as the shaft 36 is rotated by the motor as the latter unwinds, the bar 40 will be rotated in a plane normal to base wall 14, and the rings 42 will be moved by centrifugal force to project beyond the ends of the bar 40 to strike against the wall 14 of the base, to produce a sound. However, as the ring is slidable over the bar 40, its striking against the base wall 14 will not inhibit the rotation of the bar 40 but merely result in the sliding of the ring inwardly on the bar and permit it to continue rotation, to bring each of the rings 42 successively and repeatedly into sound-producing contact with the bottom wall 14 for as long as the motor continues to unwind; producing two sounds upon each rotation of shaft 36. Means are provided for engaging the key 32 of the winding stem 30 in position against the base 10 of the alarm device, to prevent unwinding of the motor after it is wound to set the alarm, by a fusible element that will not flow or become distorted under tension. Generally stated, such means comprise cooperating means on the key 32 and the base 10 that will engage the short dimension or thickness of a fusible element between them, so that such key becomes immobilized by such element which, because it is held by the short dimension or thickness thereof, rather than its length, will undergo a minimum of flow and distortion under pressure or strain and will remain effective, under temperatures below its fusion point as a locking means for the key 32.

Such cooperating means may comprise a depressed recess, 48, formed in the wall 14 of the base 10 radiating from the winding stem opening and of a depth to receive a substantial portion of the thickness of a fusible, preferably rod-shaped element, 50 and an oppositely recessed member, 52, adapted to engage a substantial complementary portion of the fusible element 50 provided on the winding key 32 at one or both of its ends, and opening into its end, with the recess facing the base wall 14. It will be understood that each end of the winding key 32 may itself be formed with a fusible element-receiving recess, instead of having a recessed member secured thereto, as illustrated. Preferably, though not necessarily, the fusible element 50 may be of cylindrical shape and the recess 48 and the recess of member 52 for receiving it may be of arcuate cross-section, as illustrated.

To set the fire alarm of the invention, the winding key 32 is manually turned to wind the spring motor to relatively tense state. The winding process is terminated when the recess 52 on the winding key is in register with the recess 48 on the casing, and when in such position the fusible element 50 is slid into the two registering recesses to hold the key immobilized in that position. It will be apparent that because the immobility is effected by the thickness of the cylindrical fusible element, it will resist tension to a maximum and will resist flow to a key-releasing position to a minimum. When the element 50 is melted at its fusing temperature, as under the heat of a fire, the key will be disengaged from the casing and released to permit the unwinding of the spring motor, which will cause shaft 36 and the striker bar 40 mounted on it to rotate. This will cause the striker rings 42 to move to extended position on the bar 40 by centrifugal force exerted by the rotation, in position to strike against the bottom 14 of the base 10 to produce a sound. The ring will then move upwardly on the bar 40, to clear the bottom wall 14 under the impact of the bottom wall against it.

It will be clear that the alarm device of the present invention may be easily and conveniently disposed in any desired location, as by merely resting it on a supporting surface or by suspending it by the opening provided in the bottom wall 14, from a hook or the like that may be set in the wall or the like, and that it may be transferred from place to place as may be required.

This completes the description of the mechanical sound-producing fire alarm device of the present invention. It will be readily apparent that the fire alarm device of the invention has improved sound-producing striker means which will successively, repeatedly strike the housing of the device without hinderance or interference with the motion of the striker means and without undue wear upon or damage to either the striker means or the housing.

It will also be apparent that the alarm device of the present invention has improved fusible element retaining means that will effectively hold a fusible element without subjecting it to undue flow or distortion under pressure, and immobilize the alarm-sounding means without risk of inadvertent release.

It will be further apparent that the sound-producing or striker means of the invention and the striker-releasing means of the invention are of highly simplified construction that may be easily and economically produced and assembled, to provide an alarm device that is highly effective for its purpose.

It will be still further apparent that numerous modifications and variations in the mechanical sound-producing fire alarm device of the present invention may be made by anyone skilled in the art in accordance with the principles of the invention hereinabove set forth, and without the exercise of any inventive ingenuity. I desire, therefore, to be protected for any and all such modifications and variations that may be made within the spirit of the invention and the scope of the claims hereto appended.

What I claim is:

1. A sound-producing fire alarm device, comprising a housing, a spring-wound motor mounted within said housing, said motor including a winding stem extending through a wall of said housing to the exterior thereof, a winding key secured on the end of said winding stem in close proximity to said housing wall, a shaft operatively associated with said spring-wound motor for rotation upon unwinding of said motor, said shaft disposed in parallel relation to a wall section of said housing, and striking means mounted on said shaft adapted to strike against said wall section upon rotation of said shaft, said striking means including a bar secured at substantially its longitudinal center on said shaft, said bar being of a length to have the distance of each end thereof from its said shaft less than the distance from said shaft to said wall section, and striker elements freely and slidably mounted at each end of said bar for longitudinal slidable movement thereon from a position of having the striking periphery thereof disposed at a distance from said shaft not exceeding the distance from said wall section to said shaft, in one position thereof, and to have the striking periphery thereof disposed at a distance from said shaft exceeding the distance from said wall section to said shaft in another position thereof, and cooperating means on said winding stem, exteriorly of said housing, and an adjacent portion of said wall for receiving and holding a fusible element, said fusible element immobilizing said winding stem relative to said wall section, said cooperating means comprising an outwardly-facing recess provided on said wall extending radially relative to said shaft, and a cooperating, oppositely-facing recess provided in an end of said winding key adapted to be disposed in register with said recess in said wall, said fusible element having a portion thereof disposed in each of said recesses.

2. The sound-producing fire alarm device of claim 1 wherein said housing includes a base and a peripheral wall normal to said base, said motor secured within said housing with said shaft parallel to said base.

3. The sound-producing fire alarm device of claim 2, wherein said base is circular and said peripheral wall is cylindrical, and wherein said motor includes a frame and is secured by said frame to said peripheral wall.

4. A sound producing fire alarm device, comprising a housing, a spring wound motor mounted within said housing, said motor including a shaft extending through a wall of said housing to the exterior thereof and operatively associated with said motor for rotation upon unwinding of said motor, said shaft including a head portion formed with a groove therein adapted to receive a portion of the thickness of a rod shaped fusible element, a second shaft operatively associated with said motor for rotation upon unwinding of said motor, said second shaft disposed in parallel relation to a wall section of said housing, a striking means mounted on said second shaft adapted to strike against said wall section upon rotation of said second shaft, said striking means including a bar secured at substantially the longitudinal center thereof on said second shaft, said bar being of a length to have the distance of each end thereof from said second shaft less than the distance from said second shaft to said wall section, and striker elements freely and slidably mounted at each

end of said bar for longitudinal axial slidable movement thereon, from a position of having the striking peripheral thereof disposed at a distance from said second shaft not exceeding the distance from said wall section to said second shaft, and to a position of having the striking periphery thereof disposed at a distance from said second shaft, means on the exterior of said housing, including a recess, adapted to receive a portion of the thickness of a rod shaped fusible element therein, said head of said first shaft and said recess therein disposed in position for alignment with the recess on said means and in proximity thereto for the said two recesses to engage portions of the same rod shaped fusible element.

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