Jan. 13, 1953 H. L. BUSH ET AL 2,625,004

EXPLOSION RESISTING CLOCK

Filed April 14, 1948 2 SHEETS—SHEET 1

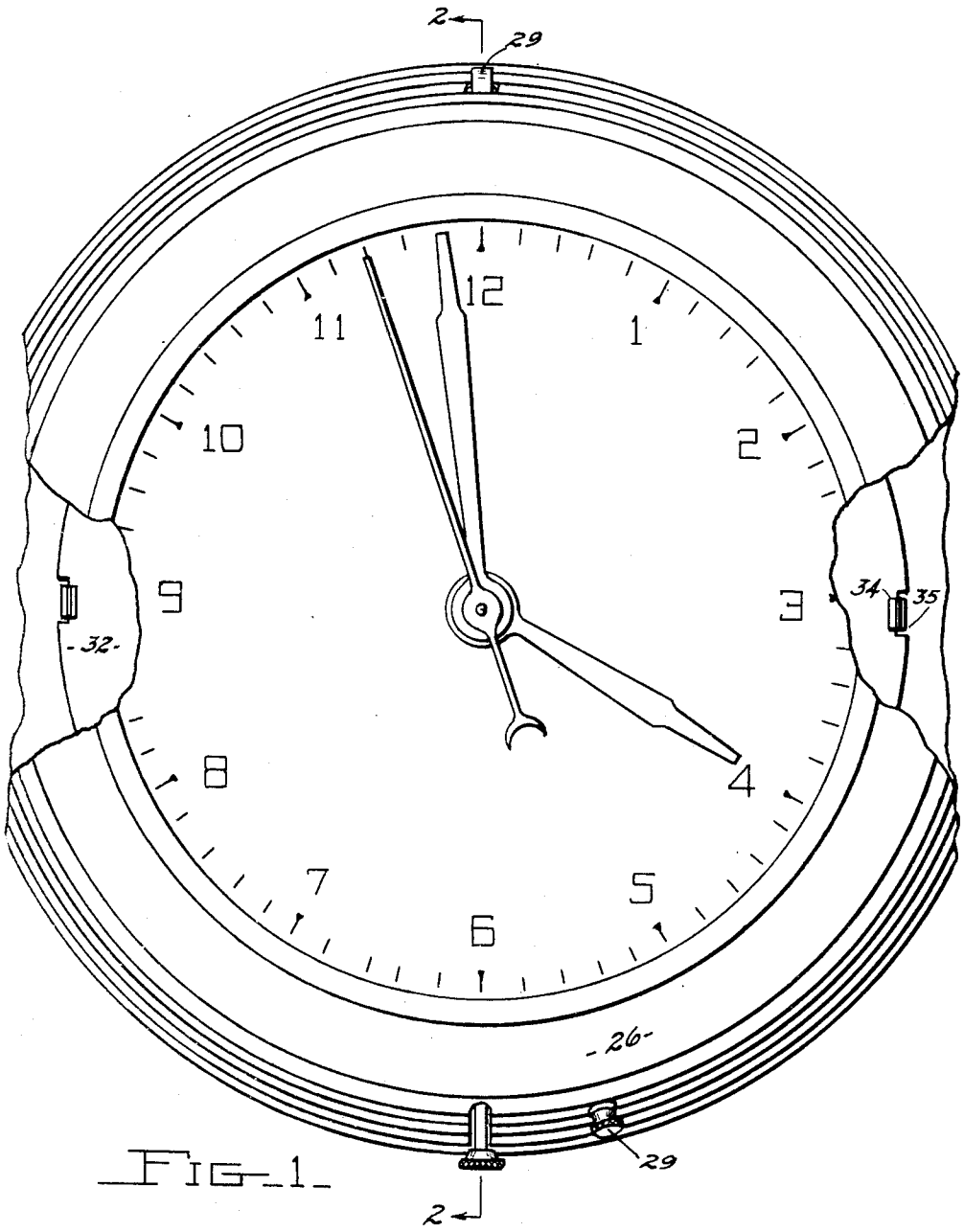



FIG. 1

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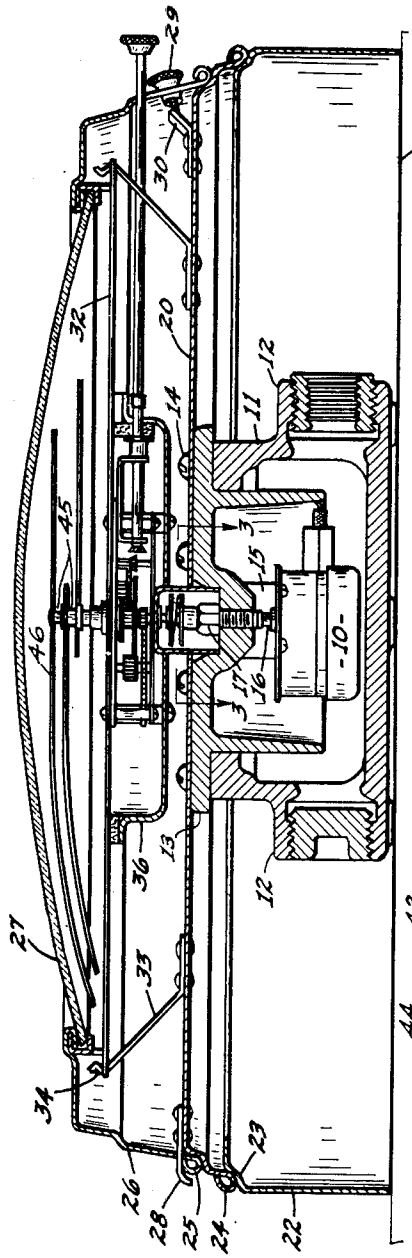


FIG-2-

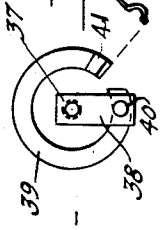


FIG-4-

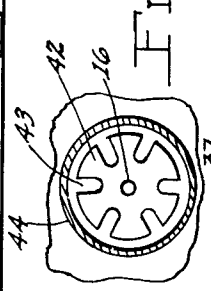


FIG-3-

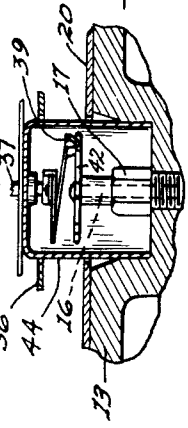


FIG-5-

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# UNITED STATES PATENT OFFICE

2,625,004

## EXPLOSION RESISTING CLOCK

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6 Claims. (Cl. 58—23)

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This invention relates to electrically operated timed clocks, and more particularly to an explosion resisting clock for use in hazardous locations where there are inflammable or explosive materials in the atmosphere.

The invention has as an object a clock of the type described embodying a structure by which the operating motor for driving the clock mechanism is totally enclosed in a flame tight housing, and further embodying a structural arrangement by which the outer casing and the crystal may be quickly and conveniently removed and thereupon the dial and clock works assembly removed, all without interfering or otherwise affecting the flame tight mounting of the actuating motor.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a front elevational view of a clock embodying our invention, with parts broken away.

Figure 2 is a sectional view taken on line 2—2, Figure 1.

Figure 3 is a view taken on line 3—3, Figure 2, showing the driving disk carried by the output shaft of the motor in top plan.

Figure 4 is a plan view of the coupling member carried by the input shaft of the clock works.

Figure 5 is a side elevational view of the structure shown in Figures 3 and 4 for connecting the motor and clock works, with a contiguous portion of the closure of the motor housing in section.

The driving motor 10 is mounted in a housing 11 formed with one or more internally threaded hubs 12 for connection to a conduit line. One side of the housing 11 is formed with an opening of considerable dimension, and a closure 13 is provided for the opening being detachably secured to the housing, as by screws 14.

The motor 10 is supported by bosses depending from the under side of the cover 13. The output shaft 15 of the motor extends through a bushing 17 threaded into the closure. The length of the bushing is such as to meet the requirements of a flame tight joint between the bushing and the motor shaft 16. The outer face of the closure is formed with a depression concentric with the bushing.

A plate 20 is detachably secured to the housing, or the closure 13, as by the screws 14, and extends radially outwardly from the housing. The housing is mounted upon a wall surface 21, and the plate 20 serves to hold a cylindrical casing 22 against the wall, the casing being formed with

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an annular groove 23 to receive a bead 24 formed on the periphery of the plate 20. The plate 20 is also formed with a groove to receive a bead 25 formed on the edge of a cylindrical casing 26 which carries the clock crystal 27. The casing 26 is apertured to receive a strap 28 carried by the plate 20, and the opposite side of the casing is provided with a screw 29, the inner end of which is movable into engagement with an inclined bracket 30 also carried by the plate 20, the strap 28 and screw 29 serving to detachably secure the casing 26 to the plate 20.

A dial 32 is detachably mounted on the plate 20 and is yieldingly pressed outwardly into engagement with the casing 26. A plurality of spring arms 33 are secured to the plate 20 and are inclined outwardly therefrom. The outer ends of the arms 33 are formed with bent or hook portions 34 positioned in notches 35 formed in the peripheral edge of the dial 32. With this arrangement, the dial is inserted snap-fashion into the arms 33, and when the outer casing 26 is mounted upon the plate 20, the casing engages the dial forcing the same downwardly against the yielding action of the arms.

A clock works, or gear train, is mounted on the rear side of the dial 32 and is enclosed by a cup-shaped dust shield 36. The clock works includes an input shaft 37, to the lower end of which is secured a radially extending arm 38. A split ring or annular member 39 is secured to the outer end of the arm 38, as at 40, see Figure 4. The opposite end of the member 39 is bent downwardly to form a depending portion 41.

A disk 42 is fixedly secured to the protruding end of the motor shaft 16, and is formed with a plurality of notches 43 extending radially inwardly from the periphery of the disk 42. The end portion 41 of member 39 is arranged to enter into one of the slots 43 when the dial assembly is positioned in the supporting arms 33, as better shown in Figure 5. A cylindrical inverted cup-shaped member 44 is secured to the clock works and depends through the dust cylinder 36 and is arranged concentric with the input shaft 37. When the dial assembly is inserted in the supporting arms 33, this member 44 enters a depression formed in the closure 13 and serves thereby to accurately aline the shaft 37 with the motor shaft 16.

The annular split spring member 39 and the notch disk 42 provide means for detachably connecting the motor shaft with the input shaft of the clock works. The member 39 is formed of thin, resilient sheet material, such as spring steel, and shaped in the form of a helix, whereby when the dial assembly is positioned in the arms 33, the depending end portion 41 is yieldingly moved into engagement with the driving disk

42. As soon as the motor imparts rotation to the disk 42, the end portion 41 of the split ring 39 will enter one of the slots 43 and thereupon effect rotation of the shaft 37. With this arrangement, the mounting of the dial and clock works carried thereby does not in any way result in injury to any of the operating mechanism of the clock. The clock works is provided with the usual output quill shafts 45 extending through the dial and on the outer ends of which are mounted the clock hands 46.

It will be apparent from the description that the clock, while embodying the advantageous feature of being explosion resisting, is convenient to mount, and particularly convenient to disassemble for repair, or replacement.

What we claim is:

1. An explosion proof clock comprising a housing having means for connection to a conduit line and having an opening in one side, a flame tight closure for the open side of the housing, a driving motor mounted in the housing and having an output shaft extending through said closure in flame tight relation thereto, a plate extending radially from said housing, a dial detachably secured to said plate in spaced relation thereto, a clock works assembly carried by said dial and arranged intermediate said plate and dial, said works assembly having output shafts extending through the dial and an input shaft, motion transmitting means connecting said input shaft to the output shaft of the motor, a casing enclosing the dial, means operable externally of the casing for detachably securing the casing to said plate, and a crystal carried by said casing and overlying the dial.

2. An explosion proof clock comprising a housing having means for connection to a conduit line and having an opening in one side, a closure detachably secured to the open side of the housing in flame tight relation thereto, a driving motor mounted in the housing and having an output shaft extending through said closure in flame tight relation thereto, a plate mounted on the closure and extending radially from the housing, a clock dial detachably mounted on the plate in spaced relation thereto, a clock works carried by the dial and arranged intermediate the dial and said plate, said works having an input shaft, motion transmitting means detachably connecting said input shaft with the output shaft of the motor, a casing detachably secured to said plate by means operable externally of the casing, said casing encircling said dial, and a crystal carried by said casing and overlying the dial.

3. An explosion proof electric clock comprising a housing having means for connection to a conduit line and having an open side, a closure for the open side detachably secured to the housing in flame tight relation thereto, a plate secured to the closure and extending radially from the housing, a dial arranged in spaced relation to the plate, a clock works assembly carried by the dial and arranged intermediate the dial in said plate, said works having output shafts extending through the dial and an input shaft detachably connected to the output shaft of said motor, a casing detachably mounted on the plate, a crystal carried by the casing and overlying said dial, and means carried by said plate and cooperable to yieldingly press said dial against said casing.

4. An explosion proof electric clock comprising a housing having means for connection to a conduit line and being formed with an open side, a closure for the open side of the housing detachably secured thereto in flame tight relation, a driving motor mounted in the housing and having an output shaft extending through the closure in flame tight relation thereto, a plate detachably secured to said closure and extending radially from the housing, a casing detachably secured to said plate, a crystal carried by said casing, a dial arranged in the casing, a clock works assembly carried by the dial and arranged intermediate the dial and said plate, motion transmitting means detachably connecting said works with the output shaft of said motor, means carried by said plate and cooperable to detachably secure the dial to the plate and to yieldingly urge the dial into engagement with said casing.

5. An explosion proof electric clock comprising a housing having means for connection to a conduit line and having an open side, a closure for the open side of the housing detachably secured thereto in flame tight relation, a plate extending radially from the housing, a plurality of yieldable arms mounted on said plate and extending outwardly therefrom, a dial plate detachably mounted on said arms, a clock works assembly mounted on the under side of the dial plate and having an input shaft, a driving motor mounted in the housing and having an output shaft extending through said closure, said closure and said dial plate having means cooperable to position the input shaft of the clock works and the output shaft of said motor in axial alinement, and motion transmitting means detachably connecting said shafts.

6. An explosion proof electric clock comprising a housing having means for connection to a conduit line and having an open side, a closure for the open side of the housing detachably secured thereto in flame tight relation, a motor arranged in the housing and being mounted on said closure and having an output shaft extending therethrough, a supporting plate mounted on said closure and extending radially therefrom, a dial detachably mounted on said plate, a clock works mounted on the under side of said dial and having an input shaft, said closure being formed with a depression concentric with the output shaft of said motor, said clock works having a sleeve extending into said depression and being operable to position the output shaft of said motor and the input shaft of said works in axial alinement, and means mounted within said sleeve and operable to detachably connect said shafts.

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