April 15, 1947. R. H. WHITEHEAD 2,419,103

HAIR SPRING ASSEMBLY

Filed Feb. 17, 1940

Fig. 1.

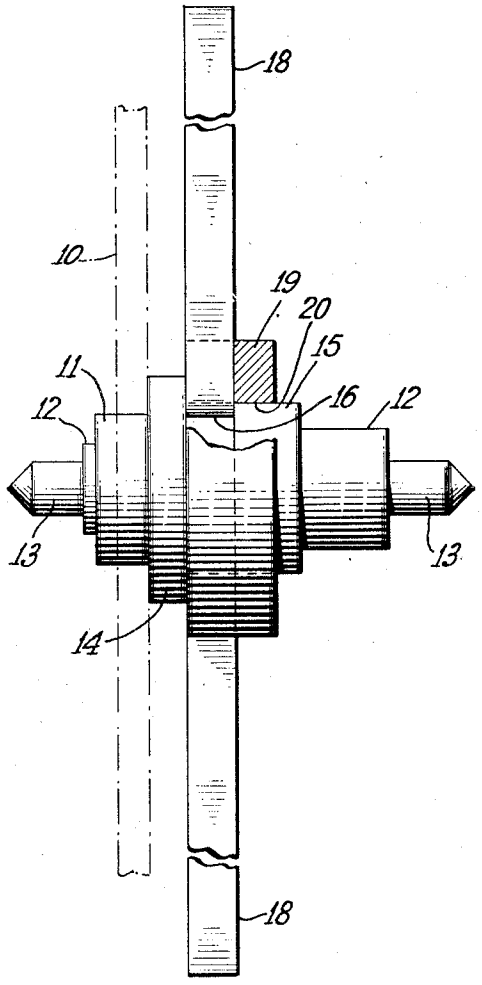
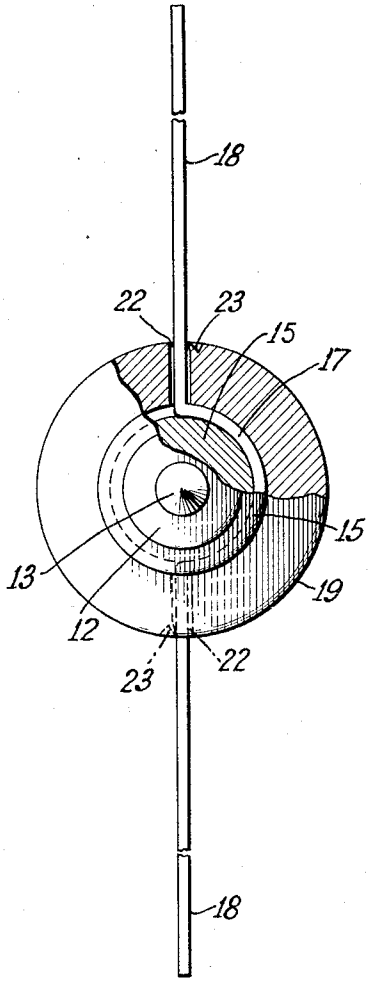


Fig. 2.



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HAIRSPRING ASSEMBLY

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2 Claims. (Cl. 58—115)

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This invention relates to balance wheel constructions. It is particularly adapted for use in rapid timing mechanisms such as time fuses and it is particularly described in connection with such a use.

Certain devices of time fuses have a vibrating member which is controlled by a hair spring which extends diametrically outward in a straight line through the center of the axis of the balance wheel, particularly in order that the centrifugal forces acting upon it, when it is used as a time fuse, may not interfere with the timing function.

Heretofore in time fuses it has been customary to drill the shaft or arbor of the balance wheel, insert the hair spring through the drilled hole and then hold it in place by a wedge. Such a construction has proven unsatisfactory because it imparts to the hair spring certain internal strains which interfere with its proper functioning and may cause it to break either inside of the arbor or at the ends of the arbor opening where the bending moment is concentrated. Moreover, the insertion of a flat hair spring in a round opening and the holding of it by a wedge again introduces further strains which make the timing uncertain. Such a construction, moreover, is expensive and is not adapted to manufacture by quantity production methods.

It is an object of this invention to provide a mechanism of the character described in which the hair spring itself may be attached to the arbor in a manner to cause it to function reliably and without danger of breaking.

The invention accordingly comprises an article of manufacture possessing the features, properties and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description, taken in connection with the accompanying drawing, in which:

Fig. 1 is a side elevation, parts being broken away, of a device embodying this invention.

Fig. 2 is an elevation at right angles to Fig. 1, parts being broken away.

In the drawings the numeral 10 designates a vibrator which may hereafter be referred to as a balance wheel, although in fact the word "wheel" is not strictly applicable to the form of balance element usually employed in these time fuses. This balance wheel is mounted upon a hub 11 carried by a shaft 12 having pivots 13

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adapted to rotate in bearings in suitable supports not shown. The hub 11 is provided with a flange 14 and an outwardly extending cylindrical portion 15, which latter has a circumferentially disposed groove 16 adjacent to the flange 14 of a width and depth corresponding to the width and thickness of the hair spring with which the device is to be used. The hair spring itself comprises a central semi-circular portion 17 adapted exactly to fit within the groove 16, and ends 18 adapted, when the central portion is in place within the groove 16, to extend radially outward from the center of the shaft 12.

A collar 19 has a body portion with an internal diameter 20 such as to fit tightly over the cylindrical portion 15 and to project inwardly toward the flange 14 on the outside of the semi-circular portion 17 of the hair spring. Slots 22 are oppositely disposed on the inner end of the collar 19 to fit over the ends 18 of the hair spring so that when the hair spring is in place within the groove 16 and the collar is forced into place the hair spring will be accurately and firmly held in position. For convenience of illustration I have illustrated the slots 22 as wider than the thickness of the hair spring but it is not intended that this thickness should be any more than is necessary to provide clearance while the device is being assembled and after assembly the collar 19 is provided with a punch mark 23 tightly to cause the metal collar to bear against the hair spring so that the length of the hair spring will have a definite quantity and thus timing accuracy can be assured.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A device of the character described comprising a hair spring, a pair of straight end members connected by a central portion bent out of alignment therewith, a hub member having an external recess adapted to receive the bent por-

tion of said hair spring, a collar adapted to fit over said hub and over the outside of said bent portion of said hair spring, said collar being provided with oppositely disposed radial slots of a size and shape to receive said end members.

2. A device of the character described comprising a hair spring, a pair of straight end members connected by a central portion bent out of alignment therewith, a hub member having an external recess adapted to receive the bent portion of said hair spring, a collar adapted to fit over said hub and over the outside of said bent portion of said hair spring, said collar being provided with oppositely disposed radial slots of a size and shape to receive said end members, and means for definitely defining the effective length of said end portions of said hair spring.

RICHARD H. WHITEHEAD.

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