June 5, 1934. H. COLOMB 1,962,056

SPRING END CONNECTION

Filed Sept. 9, 1931

Fig. 1

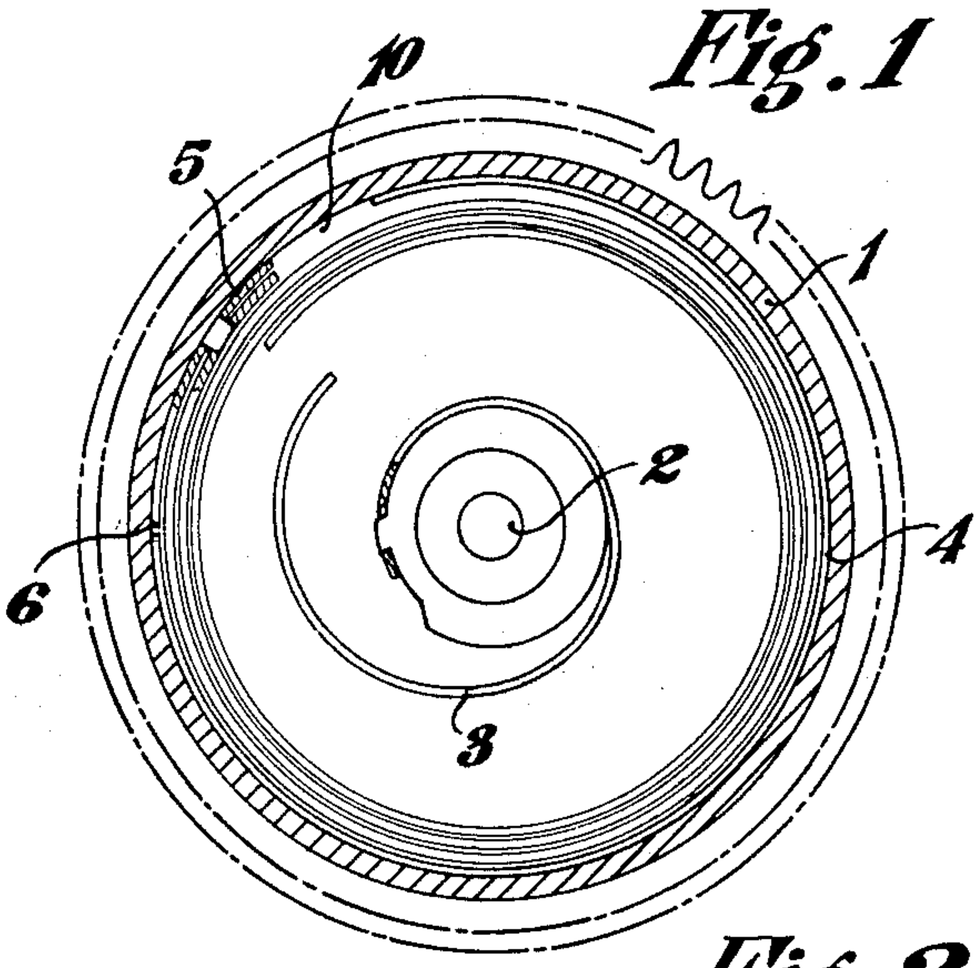


Fig. 3

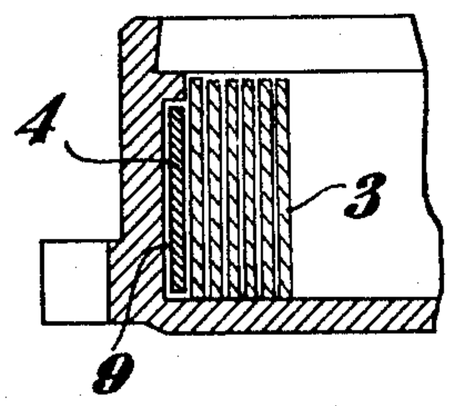


Fig. 4

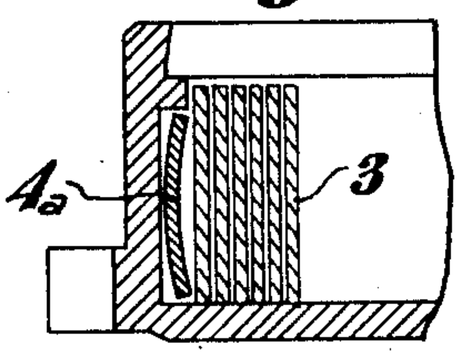


Fig. 2

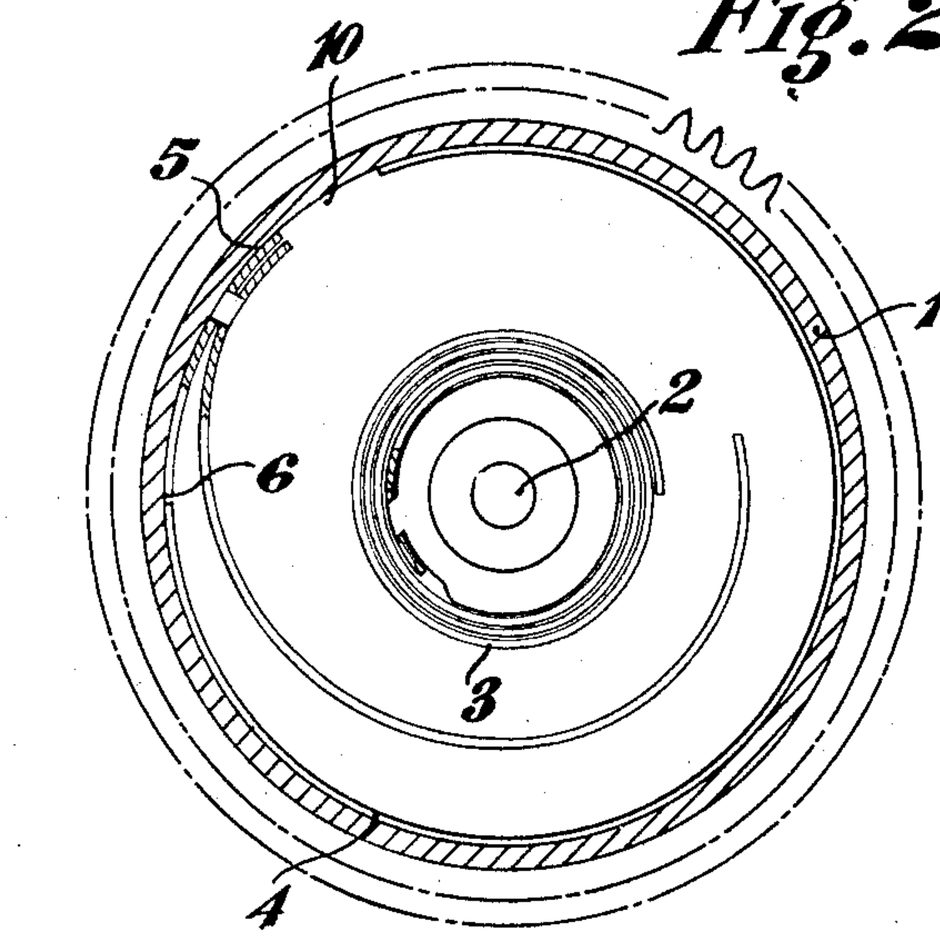


Fig. 5

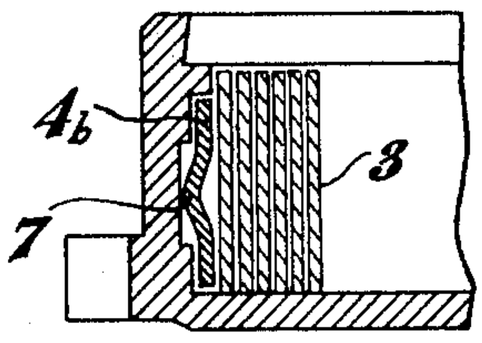


Fig. 6

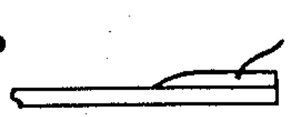
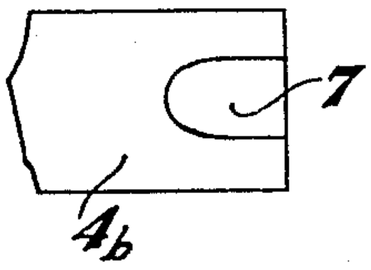


Fig. 7



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UNITED STATES PATENT OFFICE

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SPRING-END CONNECTION

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Application September 9, 1931, Serial No. 561,918
In Switzerland September 17, 1930

5 Claims. (Cl. 58—83)

This invention relates to spring-end connections in watch or clock barrels and has as its object the provision of means to prevent overwinding and rupture of the main driving spring of timepieces.

It is already known to insert a friction ring in the spring barrel, the ring being designed so as to exert a pressure of given amount on the inner cylindrical wall of the barrel and to have the spring end connected to this ring, so that after the spring has been tensioned to the desired limit the power of the spring exceeds the friction between the ring and the barrel and further winding of the spring results in moving the ring relative to the barrel.

According to the present invention use is also made of a friction ring, but this friction ring has two spaced ends so as not to extend over the entire circumference of the barrel, the spring being provided with an end member freely disposed in the space left between the two ends of the ring.

In the accompanying drawing

Figure 1 is a plan view of a spring barrel showing a spring end connection according to the invention, the spring being deenergized.

Figure 2 is a similar view of a spring barrel showing the spring in wound up position.

Figures 3, 4 and 5 are fragmentary cross sections through three modifications of a spring end connection according to the invention.

Figures 6 and 7 show in elevation and plan, respectively, the friction ring end of the modification according to Fig. 5.

In Figures 1 and 2, 1 indicates the spring barrel the cover of which has been removed. The main driving spring 3 is connected in well known manner to the winding shaft 2. The resilient friction ring 4 is applied with pressure against the cylindrical inner wall of the barrel 1. This ring 4 extends over less than the entire circumference of the barrel leaving a free space 10 between its two ends to expose a portion of the inner surface of the barrel. The outer end of the driving spring 3 has a blade-shaped end member 5 riveted or otherwise attached to it, this end member extending at the exterior side of the spring rearwardly relative to the spring and being circularly curved and of such length that it can be passed into the space 10 between the two ends of the friction ring to bear with its entire length against the exposed portion of the inner surface of the barrel. When the spring 3 is wound up, the free end 6 of the end member 5 abuts against the end of the friction ring 4, which ring is so dimensioned that after the desired amount of tension of the spring is reached, it starts to slide circumferentially relative to the barrel 1.

In spring barrels heretofore in use in which a friction ring has been employed to avoid overwinding of the driving spring, the end of the spring has been riveted or otherwise permanently connected to the friction ring. The value of friction between the ring and the barrel in such constructions is exactly calculated in order to obtain the desired maximum tension of the main spring, and this value of friction depends naturally from the dimensions of the portions of the ring which are in contact with the barrel.

In such constructions in which the ring is permanently connected to the main spring, this connection has to be made before the two parts are inserted into the barrel, since the spring has to be inserted while being loose and then there would be no room in the barrel to make the connection with the ring. The insertion of a spring into the barrel is known to be a rather complicated operation and when the friction ring and the spring have to be inserted together, it is possible that the ring can be deformed and after insertion does not act on the barrel with the predetermined force, so that the value of friction is changed and therefore the end tension of the spring changes also.

A further drawback in attaching the friction ring to the spring consists in that the spring, when fully tensioned, pulls the end of the friction ring where it is attached, towards the interior of the barrel, so that a portion of the ring is not more in contact with the barrel and the value of friction is again changed.

These drawbacks are avoided with the spring end connection according to the invention. Since there exists no connection between the spring and the friction ring, this ring can be inserted alone in the barrel with the necessary care and afterwards the spring will be inserted of which the end member enters the space between the two friction ring ends as soon as the spring is wound up.

Figures 3 to 7 concern modifications of the spring end connection described with reference to Figs. 1 and 2. In Fig. 3 the friction ring 4 is inserted into a circular groove 9 formed in the barrel wall.

In Figs. 4 to 7, the free end 4*a* (Fig. 4), 4*b* (Figs. 5 to 7), of the friction ring or of the spring end member, has a specially shaped transverse sec-

tion in order to enlargen the bearing surface and to better prevent the spring end member from sliding off the end of the friction ring. In Figs. 5, 6 and 7 the free end 4b of the friction ring or of the spring end member, or of both the ring and the end member, is provided with a central bulged portion 7.

I claim:

1. In a spring driving mechanism, a spring barrel, a winding shaft, an open friction ring bearing with the whole of its surface against the inner surface of the spring barrel and being shorter than the inner periphery of the barrel so that a portion of the inner periphery of the barrel is exposed between the two ends of the friction ring, a driving spring having its inner end connected to the winding shaft and having its outer end provided with a circularly curved end member freely passing into the space between the two ends of the friction ring to bear with its entire length against the exposed portion of the periphery of the barrel, the free end of said end member bearing against one end of the friction ring upon tensioning of the driving spring.

2. In a spring driving mechanism, a circular spring barrel, a winding shaft, an open friction ring bearing with its entire length against the inner circular surface of the barrel and being of shorter length than the inner periphery of the barrel so that a portion of the inner surface of the barrel is exposed between the spaced ring ends, a driving spring having its inner end connected to the driving shaft, and a circularly curved blade-shaped member secured to the outer end of the driving spring and being of such length as to freely pass into the space between the two ring ends to bear against the exposed portion of the inner surface of the barrel, whereby one end of said blade-shaped member abuts against one end of the friction ring upon winding of the driving spring.

3. In a spring driving mechanism, a spring barrel, a winding shaft, an open friction ring bearing with its entire length against the inner surface of the barrel and being of shorter length than the inner periphery of the barrel so that a portion of the inner surface of the barrel is exposed between the two ends of the ring, a driving spring having its inner end connected to the winding shaft, and a circularly curved blade-shaped end member secured to the outer end of the driving spring and extending at the exterior side of the spring rearwardly relative to the spring, said end member passing into the space left between the two ends of the friction ring to bear with its entire length against the exposed portion of the inner surface of the spring barrel, whereby upon winding of the spring, the free end of said end member abuts against one end of the friction ring to impart tangential pressure on the friction ring.

4. A spring driving mechanism such as defined in claim 3 and wherein the end of the friction ring abutting against said blade-shaped end member upon winding of the driving spring is bulged to enlargen the bearing surface between end member and friction ring.

5. A spring driving mechanism as claimed in claim 3 and wherein the free end of said blade-shaped end member abutting against one end of the friction ring upon winding of the driving spring is bulged to enlargen the bearing surface between end member and friction ring.

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