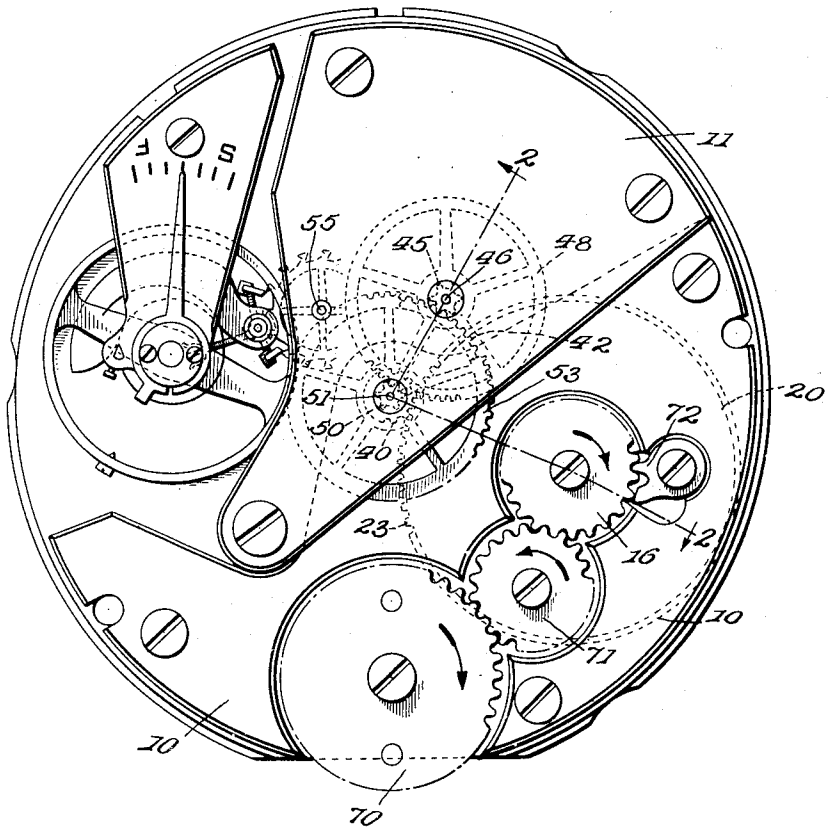
Feb. 17, 1953 M. FAVRET 2,628,690

MULTIPLE-BARREL POWER SPRING ASSEMBLY

Filed April 24, 1951 3 Sheets-Sheet 1

FIG. 1



INVENTOR.
Maxime Favret
BY
Mason, Porter, Dille & Stewart,
attys.

Feb. 17, 1953 M. FAVRET 2,628,690

MULTIPLE-BARREL POWER SPRING ASSEMBLY

Filed April 24, 1951 3 Sheets-Sheet 2

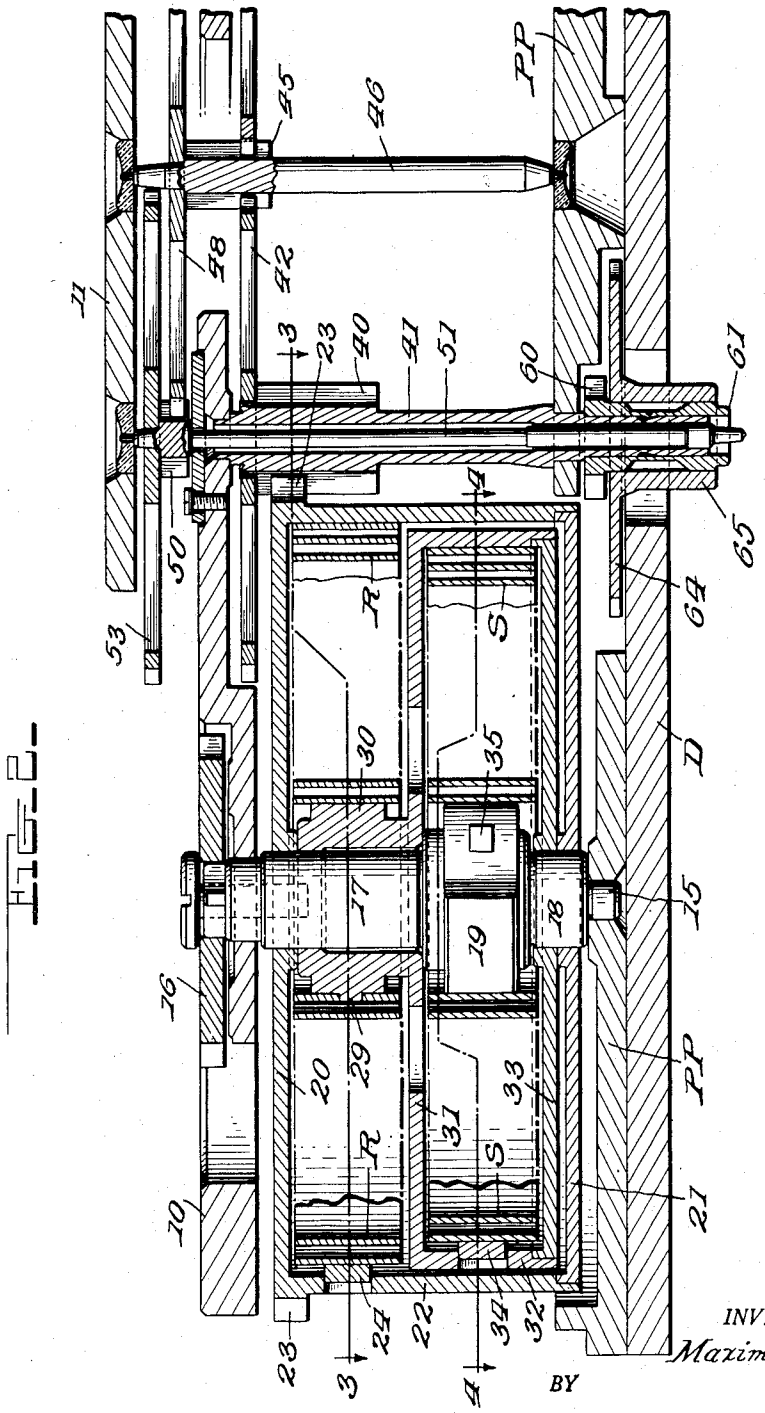


FIG. 2.

INVENTOR.
Maxime Favret

BY

Mason, Porter, Dillon & Stewart,
attys.

Feb. 17, 1953 M. FAVRET 2,628,690

MULTIPLE-BARREL POWER SPRING ASSEMBLY

Filed April 24, 1951 3 Sheets-Sheet 3

FIG. 3

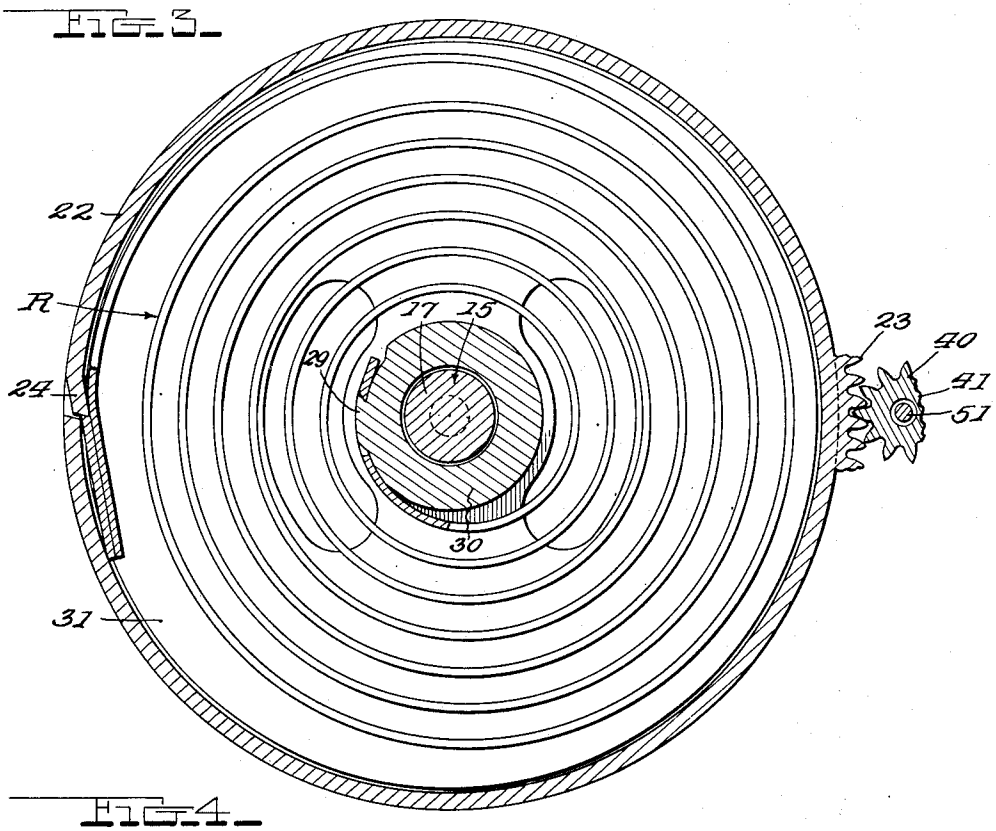
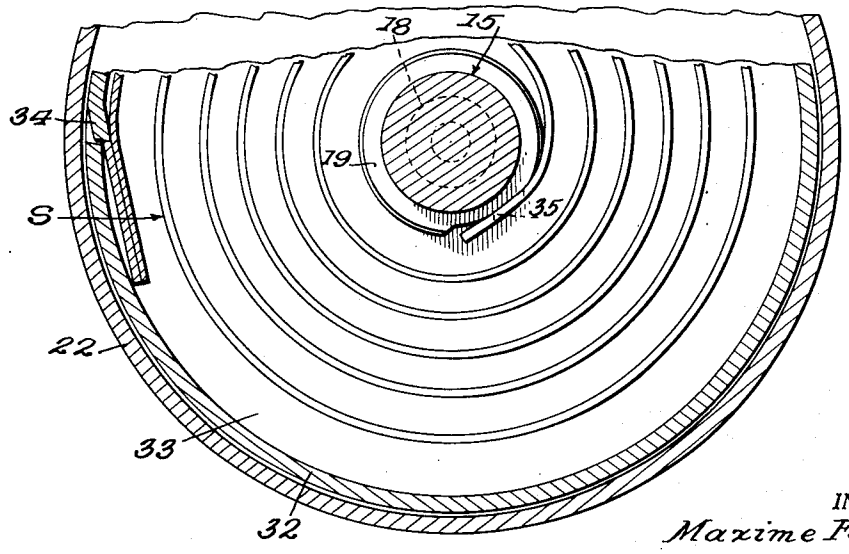


FIG. 4



INVENTOR.
Maxime Favret
BY
Mason, Porter, Dille & Stewart,
attys.

Patented Feb. 17, 1953 2,628,690

UNITED STATES PATENT OFFICE

2,628,690

MULTIPLE-BARREL POWER SPRING ASSEMBLY

Maxime Favret, Elgin, Ill., assignor to Elgin National Watch Company, Elgin, Ill., a corporation of Illinois

Application April 24, 1951, Serial No. 222,573

2 Claims. (Cl. 185—9)

1

This invention relates to power devices employing multiple spiral springs and is of particular value for driving time measuring devices such as clocks and watches.

A feature of the invention is the mounting of such springs side by side about a common arbor axis, and providing barrel structures connected to the outer end of each spring and mounted upon the arbor at each side of the corresponding spring.

Another feature is the provision of inner and outer barrel structures, with a pair of main springs of which one is secured to the outer barrel and the other to the inner barrel, and in which the inner barrel has an extension constituting an arbor for the inner end of the spring which is secured to the outer barrel.

With these and other features as objects in view, an illustrative form of practicing the invention is shown on the accompanying drawing in which:

Fig. 1 is a view of a movement, showing parts including a spring barrel assembly of the present invention, and a winding device;

Fig. 2 is a section substantially on broken line 2—2 of Fig. 1, through the spring barrel and on an enlarged scale;

Fig. 3 is a fragmentary section substantially on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary section substantially on line 4—4 of Fig. 2.

In these figures, the pillar plate PP receives a dial D and supports the train bridges 10 and 11.

A main arbor 15 is mounted for rotation in the plates PP, 10; it projects through the plate 10 and has fixed thereon the winding wheel 16. The parts 17, 18 of the main arbor 15 support the end plate 20 of an outer spring barrel, and a closing plate 21 of this barrel. The barrel has a peripheral portion 22 integral with the end plate 20 and having the teeth 23 for driving the train, and also having (Fig. 3) the lug 24 for engaging the outer end of the main spring R which at its inner end engages the hook pin 29 on the hollow arbor member 30 which is journaled on the portion 17 of the main arbor 15 and is formed integral with the end plate 31 of an inner barrel having a peripheral portion 32 and an end closing plate 33, this plate 33 being journaled on the portion 18 of the main arbor 15. The peripheral portion 32 of the inner barrel has (Fig. 4) a lug 34 engaged with the outer end of the main spring S which at its inner end is connected to the hook pin 35 of the part 19 of main arbor 15.

To indicate the employment of this barrel assembly in a clock or watch, the gear teeth 23 are shown as in mesh with a pinion 40 on the hollow minutes staff 41 which is mounted for rotation in the pillar plate PP and the bridge 10. The wheel 42 secured to the hollow minutes staff 41 drives a pinion 45 on the staff 46 which is mounted in bearings in the pillar plate PP and the train bridge 11 and has secured thereon the wheel 48 in driving relation to the pinion 50 on the seconds staff 51 which extends through the hollow minutes staff and is rotatably supported therein and in a bearing of the train bridge 11. A wheel 53 secured on the seconds staff is in mesh with a pinion on the escape staff 55, in the usual fashion (Fig. 1). Figure 2 also shows the pinion 60 mounted on a cannon sleeve 61, which is frictionally engaged with the hollow minutes staff 41 and itself employed in the usual fashion for driving a reduction train (not shown) leading to the wheel 64 formed as a part of the hollow hour sleeve 65.

2

In operation, when the wheel 16 is rotated by a drive such as the winding wheel 70, acting through an idler 71, the main arbor 15 is rotated in a clockwise direction in Figs. 1, 3 and 4, and thus the part 19 and pin 35 wind the spring S and apply torque to the inner barrel 31, 32, 33 and the hollow arbor 30, which in turn by pin 29 winds the spring R and applies torque to the outer barrel assembly 20, 21, 22 and thus through the teeth 23 applies the going power to the train and escapement in usual fashion. The click 72 prevents retrograde movement of the wheel 16.

It will be noted that these springs R, S may be of the same cross-section and substantially the same number of turns, wherewith the energy introduced by winding is distributed between these two springs which are connected in series, so to speak, between the winding wheel 16 and the pinion 40 of the train. Therefore, the energy stored in the assembly is essentially twice the energy which could be stored in a single spring R or S. A spring of the same cross-section and competent of receiving this double amount of energy, however, would be so large in diameter that the barrel assembly could not be introduced between the plates at the level of the center assembly of seconds and minutes staffs. Further, the employment of a spring of larger cross-section introduces difficulties in the operation of a clock or watch of a given size, and requires increase both in width and in thickness of the spring tape employed, and this increase in thickness again represents a change in the necessary barrel diameter. Finally, a

single spring of the same thickness and length, but of twice the width, introduces troubles of maintaining the desired "cylindrical spiral" position during winding and unwinding, as frequently one or more turns may be relatively displaced upwardly or downwardly, with frictional effects upon and energy losses to the containing barrel.

The instant structure is effective to give a more uniform power delivery over an extended period of time than such alternatives, and thus has better time keeping qualities over such a period. It accomplishes this with a minimum number of parts and space requirement in the train space region; while assuring the barrel positioning and operation by supports at each face of both inner and outer barrels.

The present structure avoids these difficulties, and provides simple parts which are supported adjacent both faces of the spring, wherewith neither the spring itself nor the supporting barrel structures depart from the desired relationship to the axis of the main arbor 15.

It is obvious that the illustrative form is not restrictive, and that the invention may be practiced in many ways within the scope of the appended claims.

I claim:

1. A spring power device having upper and lower supports, a power output shaft pivoted in both said supports and having pinion teeth thereon, and a winding device including a click, in combination with an outer barrel located between said supports and having going teeth in mesh with said pinion, a main arbor operatively connected with said winding device and pivoted in said supports and extending through the outer barrel, a first spiral spring within the outer barrel and connected at its outer end thereto, an inner barrel having a hollow arbor extension located within said first spring and a pin thereon engaged with the inner end of the first spring, a second spring located in said inner barrel and connected at its outer end thereto, and a pin on said main arbor engaged with the inner end of the second spring.

2. A multiple spring assembly comprising a main arbor with means for winding the same, an outer barrel having end plates mounted for rotation on said arbor and having thereon means for driving a train, an inner barrel having end plates mounted for rotation on said arbor and including a hollow arbor extension, said inner barrel being mounted inside said outer barrel, and two spiral springs, one of said springs being located within the inner barrel and having its inner end connected to the main arbor and its outer end connected to the inner barrel, the other spring having its inner end connected to said hollow arbor and its outer end connected to the outer barrel.

MAXIME FAVRET.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
131,614	Howell	Sept. 24, 1872
442,301	Amaron	Dec. 9, 1890
954,602	Von Hobenstein	Apr. 12, 1910
1,125,337	Jorgensen	Jan. 19, 1915
1,328,402	Schiffl	Jan. 20, 1920