

May 1, 1951

S. F. JACOBSSON ET AL

2,550,817

CENTRIFUGAL GOVERNOR

Filed June 3, 1947

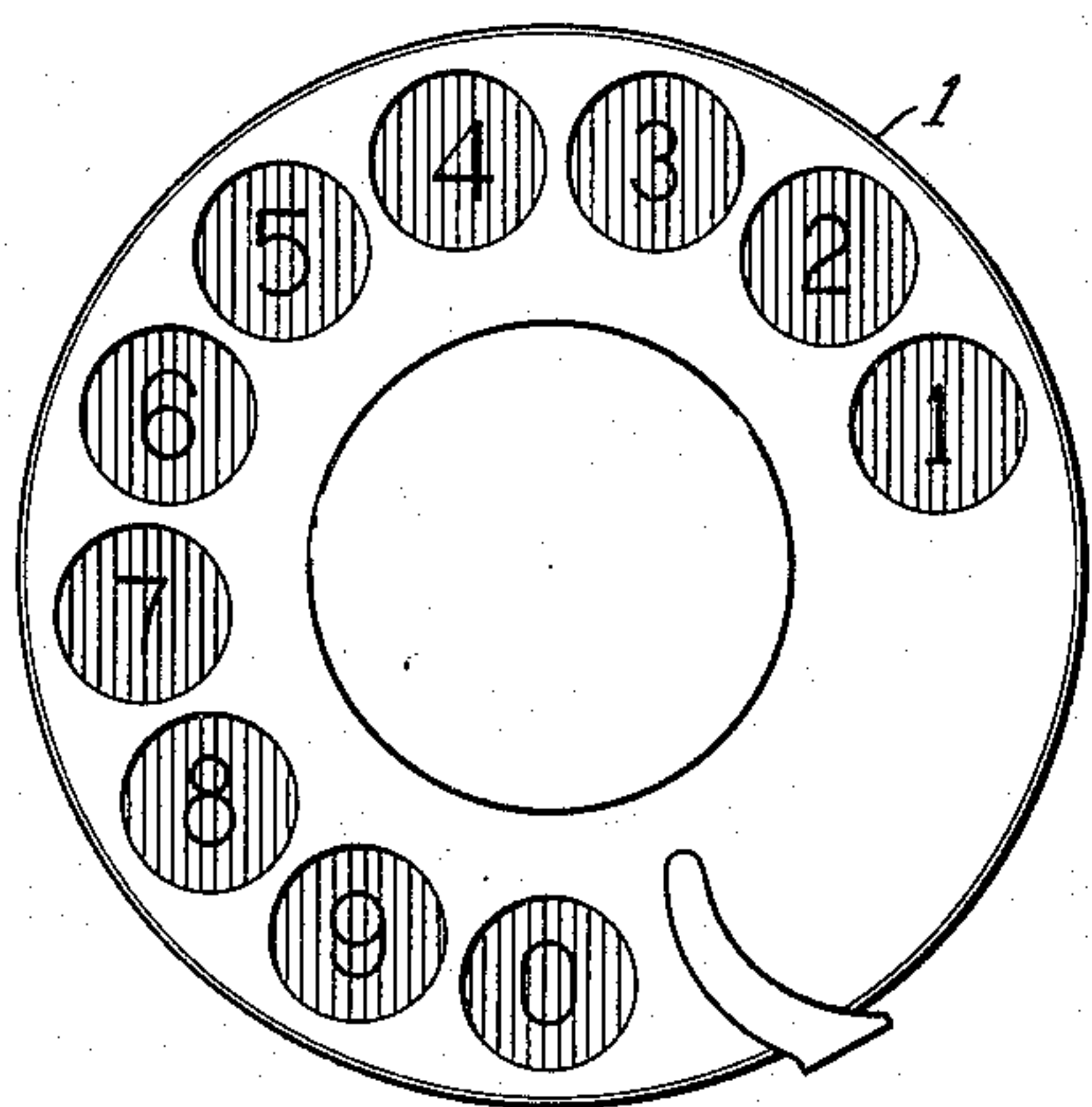


Fig. 1

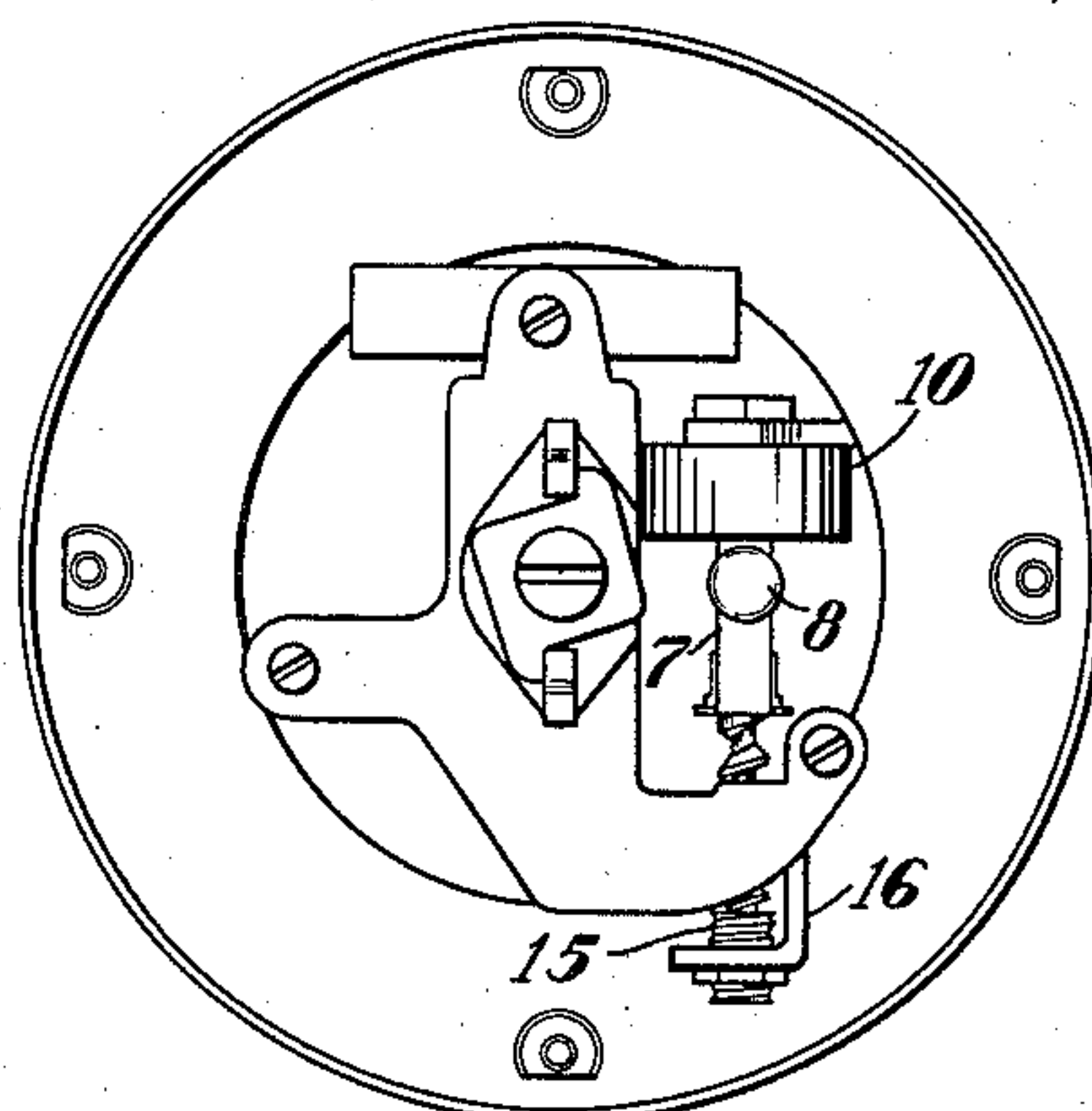


Fig. 2

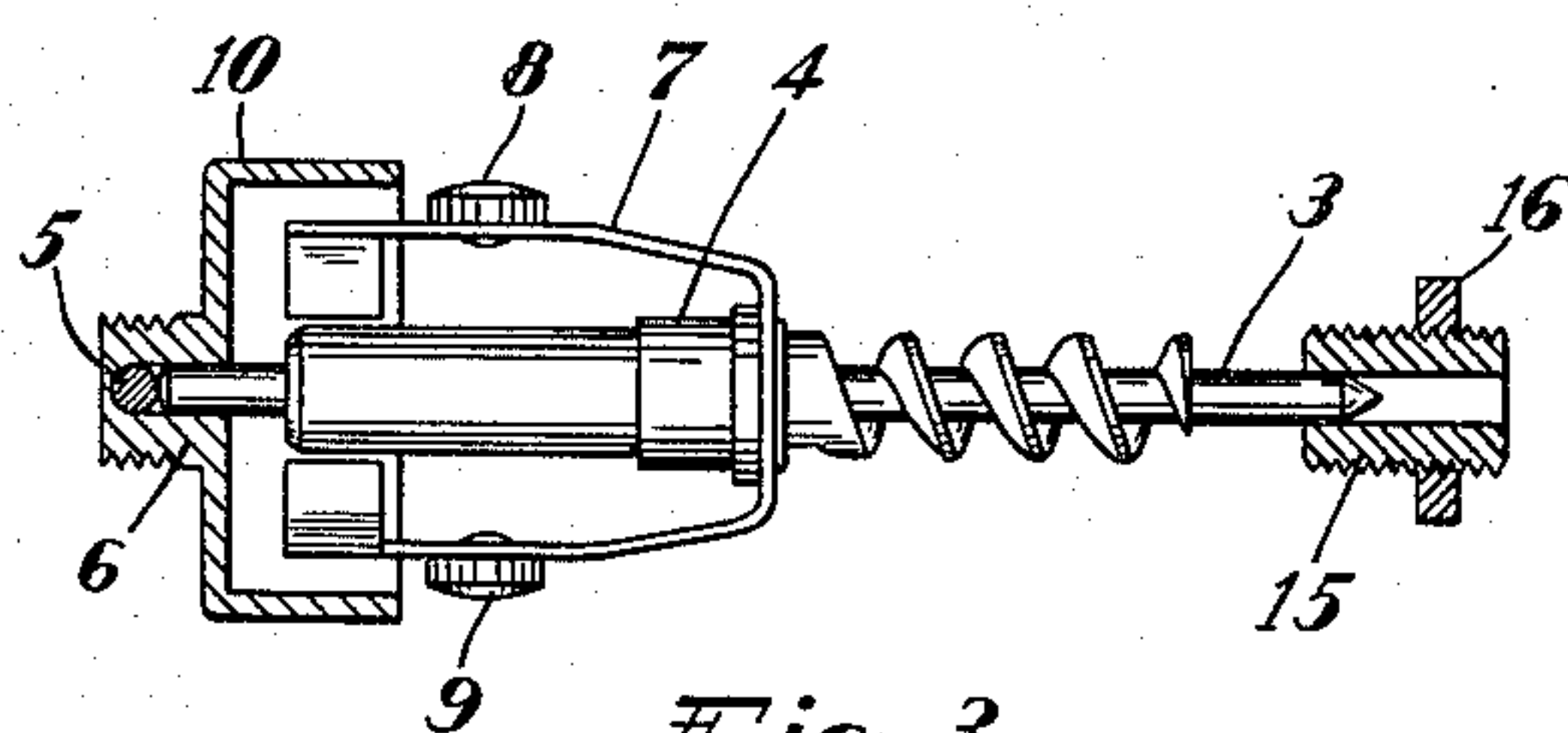


Fig. 3

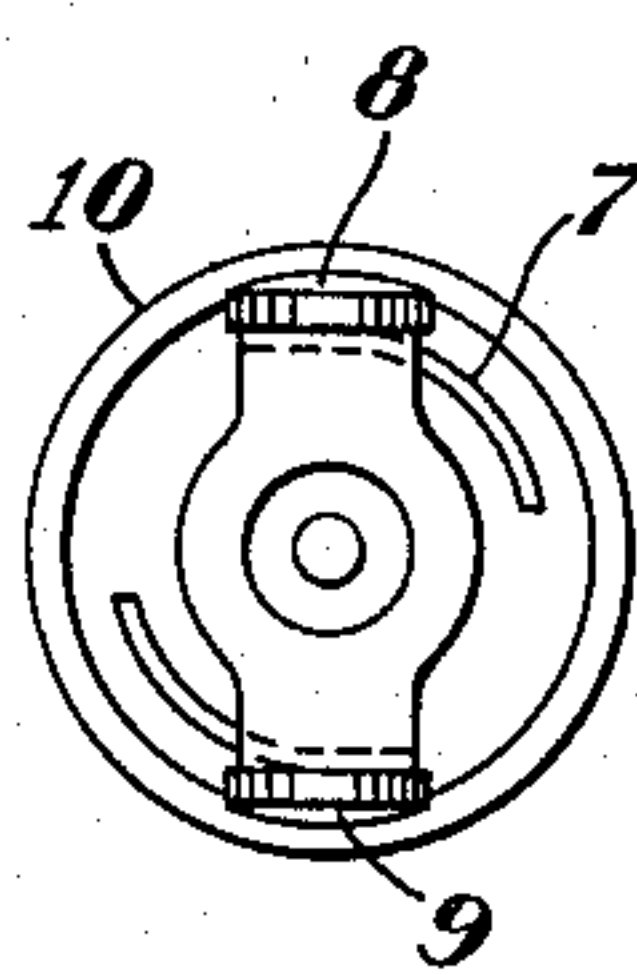


Fig. 4

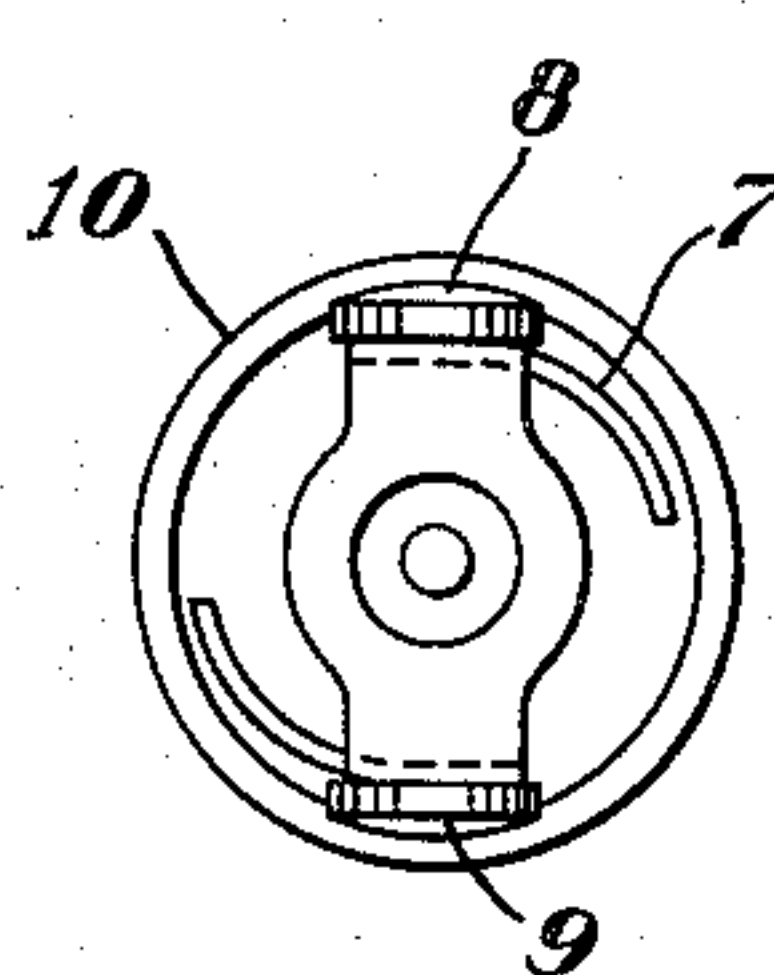


Fig. 5

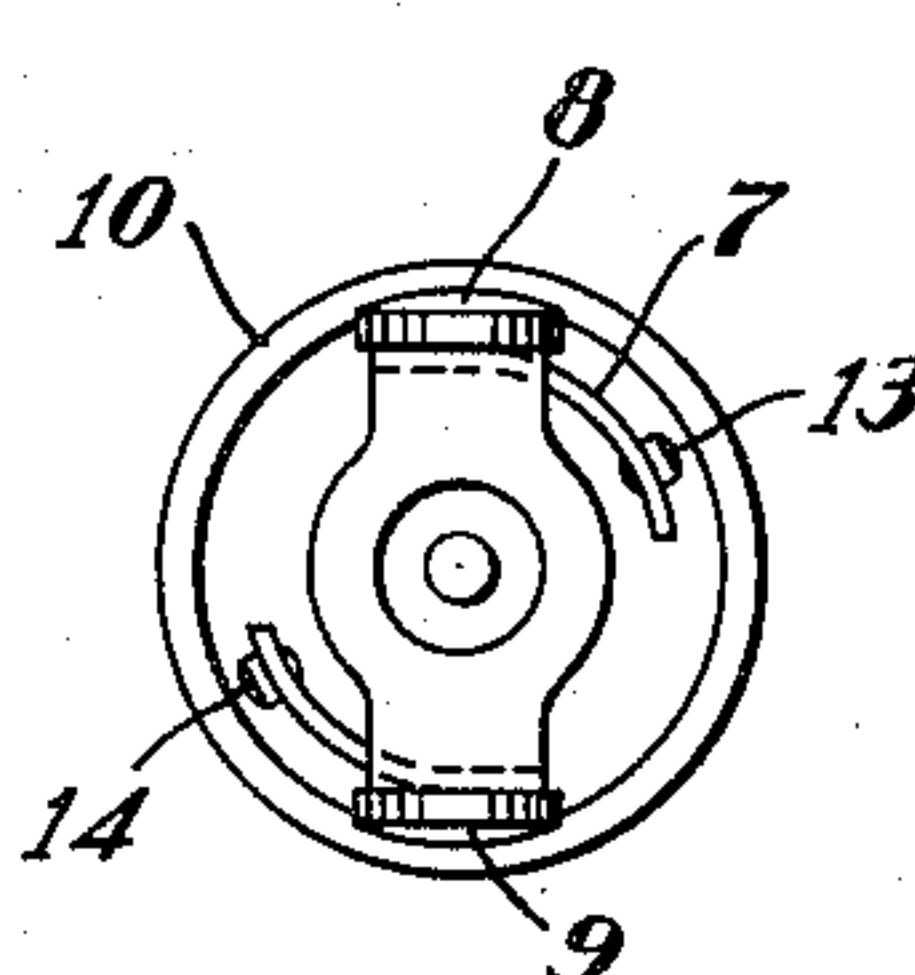


Fig. 6

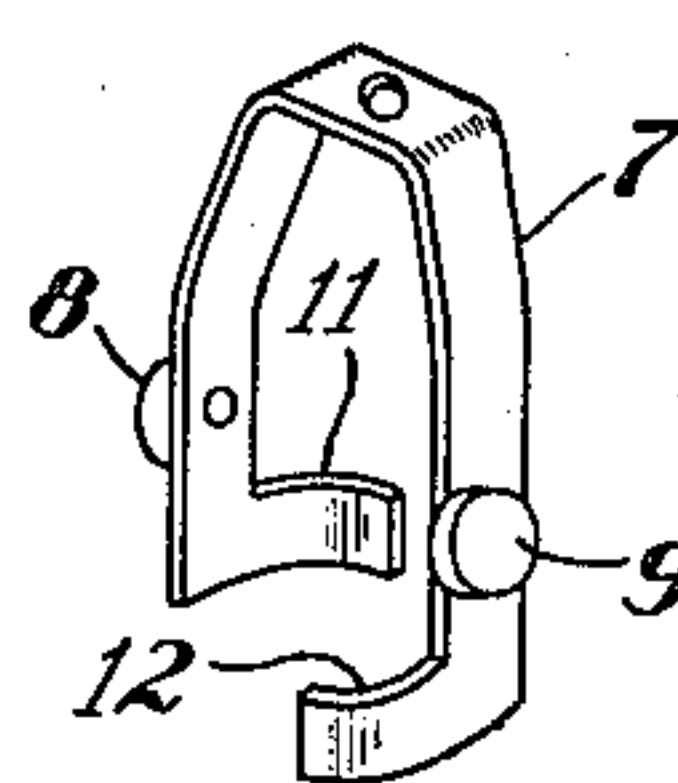


Fig. 7

INVENTOR.  
STIG FOLKE JACOBSSON  
FRED K. VAN ALMELO  
BY

J. L. Bowes

ATTORNEY

## UNITED STATES PATENT OFFICE

2,550,817

## CENTRIFUGAL GOVERNOR

Stig Folke Jacobsson, Scarsdale, and Fred K. Van Almelo, Fairport, N. Y., assignors to Stromberg-Carlson Company, a corporation of New York

Application June 3, 1947, Serial No. 752,010

3 Claims. (Cl. 188—184)

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This invention relates in general to centrifugal brakes and it more particularly applies to governors for dials or calling devices of the type now commonly used in automatic telephone systems. The present invention is not limited to use as a governor for a telephone dial, since the features herewith disclosed may be useful in other type governors, such as for phonograph motors and the like.

The object of the invention is to produce an improved governor of this character embodying a number of novel features.

One feature of this invention is the location of the weights on the governor spring outside the confines of the governor cup so that these weights do not contact or bear against the governor cup, as is the usual arrangement in governors of this type.

Another feature of the invention is the provision of curved arm or wing extensions on the ends of the governor spring, formed to provide a trailing or braking action during the rotation of the governor shaft.

We have found that, by the use of a governor made in accordance with the present disclosure, any tendency toward snubbing and noisy operation is eliminated.

The above, and other features and advantages herein disclosed, will be better understood by referring to the following detailed description taken in connection with the accompanying drawing, the scope of the invention being particularly pointed out in the appended claims.

The telephone dial with which this new governor may be used is diagrammatically illustrated in Figs. 1 and 2, Fig. 1 being a front view and Fig. 2 being a rear view.

Fig. 3 is an axial part section of the governor mechanism.

Fig. 4 is an end view of the governor mechanism showing the trailing or extension portions of the spring.

Fig. 5 illustrates that the trailing extensions may be so formed that they are not parallel with the contour of the cup, thus providing a smaller frictional area than the parallel arrangement shown in Fig. 4.

Fig. 6 illustrates the use of non-metallic inserts or plugs attached to the governor spring extensions for obtaining a co-efficient of friction other than that of metal to metal.

Fig. 7 is a perspective view of the U-shaped governor spring, illustrating how each oppositely disposed arm is formed with an angular flexible extension for providing the trailing surfaces.

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The invention will now be described more in detail, reference being made to the accompanying drawing.

The calling device illustrated in Figs. 1 and 2 comprises the usual finger hold dial 1 pivoted at a central point in the base plate and arranged to be returned to its normal position, for sending impulses, by means of a spring which is tensioned or wound up as the dial is pulled forward. There is usually provided a gear wheel having gear teeth around its circumference and ratchet teeth spaced apart the same angular distance as the holes in the finger hold dial.

Cooperating with the gear teeth in the circumference of the gear wheel, a pinion is usually provided, the pinion being fixed to a shaft upon which is mounted a laminated worm wheel. When the dial is operated for sending impulses over the telephone line, as the finger hold plate is restored in a counterclockwise direction, it is customary to operate a centrifugal governor, which may be of the fly-ball type illustrated in Fig. 3.

Since this invention relates only to the governor portion of the calling device, no reference will be made to other portions of the dial, since they may be arranged in accordance with any one of the numerous types now on the market.

The governor may consist of a hardened steel worm shaft 3, as best shown in Fig. 3. The round brass hub 4 is tightly fitted on shaft 3 in any well known manner. The shaft is flattened at the left end and polished to bear against the hardened and polished steel ball-bearing 5. This ball-bearing may be smaller than the bore of the screw end 6 of cup 10, thus acting as a thrust bearing for shaft 3. The right end of the shaft is supported by bearing 15, preferably with no thrust bearing being provided at this end. Bearing 15 is shown supported by bracket 16, this bracket being a part of the dial frame.

The hub 4 has a collar at one end over which the spring 7 is tightly fitted by forming a cup. The spring may be further held by staking or riveting the collar of the hub which extends slightly beyond the end of the spring, while the hub is further tightened to the shaft by staking the end opposite the collar.

To the arms of the governor spring 7 are riveted, or otherwise attached, governor fly-balls 8 and 9, these fly-balls being located on spring 7 at positions outside the confines of governor cup 10, so that neither one contacts with the governor cup during the operation of the governor.

As illustrated in Fig. 7, governor spring 7 is

U-shaped and has both open ends of the U formed and bent as illustrated at 11 and 12 to provide trailing portions of the governor spring. These trailing portions are so located and adjusted that they contact the inner surface of cup 10 when spring 7 is flexed outwardly by means of the governor weights 8 and 9, during the rotation of shaft 3.

Calling devices of this type are usually arranged so that the governor shaft is not rotated during the operation of the finger hold dial in a clock-wise direction. During the movement of the dial plate in its counter clock-wise direction, the brake shaft 3 is caused to rotate, thus effecting the operation of U-shaped spring 7.

As illustrated in Fig. 6, non-metallic inserts or plugs 13 and 14 may be provided in the trailing extensions of spring 7. It will be apparent that the provision of such non-metallic inserts serves to reduce wear and noise otherwise found in governors, due to the metal to metal friction between the revolving spring and the inner surface of the cup.

By means of the arrangement herewith disclosed, that is the trailing extensions 11 and 12 of governor spring 7 and the arrangement of weights 8 and 9 outside the confines of cup 10, smoother action of the dial is obtained, since any tendency towards a snubbing action, such as found in presently known governors, is obviated. Furthermore, calling devices, or other mechanisms, using this type governor, are considerably more quiet in operation than those governors now in use.

In illustrating our invention we have shown a specific form of apparatus, but we do not wish to be limited to the exact structure as shown, as many modifications and changes may readily suggest themselves to those skilled in the art, and therefore we aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

What we claim as new and desire to secure by United States Letters Patent, is:

1. In a centrifugal governor; a cylindrical cup having an inner wall providing a braking surface; a rotatable shaft concentrically disposed with respect to said cup; a substantially U-shaped member carried by said shaft, the arms of said mem-

ber comprising flexible springs, the free ends thereof extending into said cup; a weight attached to each arm intermediate the ends thereof and outside the confines of said cup; said free ends being arranged for frictional engagement with said braking surface of said cup upon a predetermined amount of centrifugal force imparted to said arms upon rotation of said shaft, at a given speed of rotation thereof, thereby providing braking action; said springs and said weights cooperating to provide an increased braking action at shaft speeds in excess of said given speed.

2. In a centrifugal governor; a cylindrical cup having an inner wall providing a braking surface; a rotatable shaft concentrically disposed with respect to said cup; a pair of leaf springs disposed on opposite sides of and lying parallel to said shaft, one end of each spring being attached to said shaft at a point relatively remote from said cup, the other end of each spring extending into said cup and being arranged for braking engagement with said braking surface; and a weight attached to each spring intermediate the ends thereof and outside the confines of said cup for cooperating with said other ends of said springs for moving said other ends into said braking engagement as a result of the centrifugal force developed at a given speed of rotation of said shaft; said springs and said weights cooperating to provide an increased braking action at shaft speeds in excess of said given speed.

3. The combination of claim 2 in which each of said springs has a trailing extension disposed at an angle with respect to its associated spring and which provides the braking action.

STIG FOLKE JACOBSSON.  
FRED K. VAN ALMELO.

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