

E. A. HUMMEL.

CLOCK.

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949,705.

Patented Feb. 15, 1910.

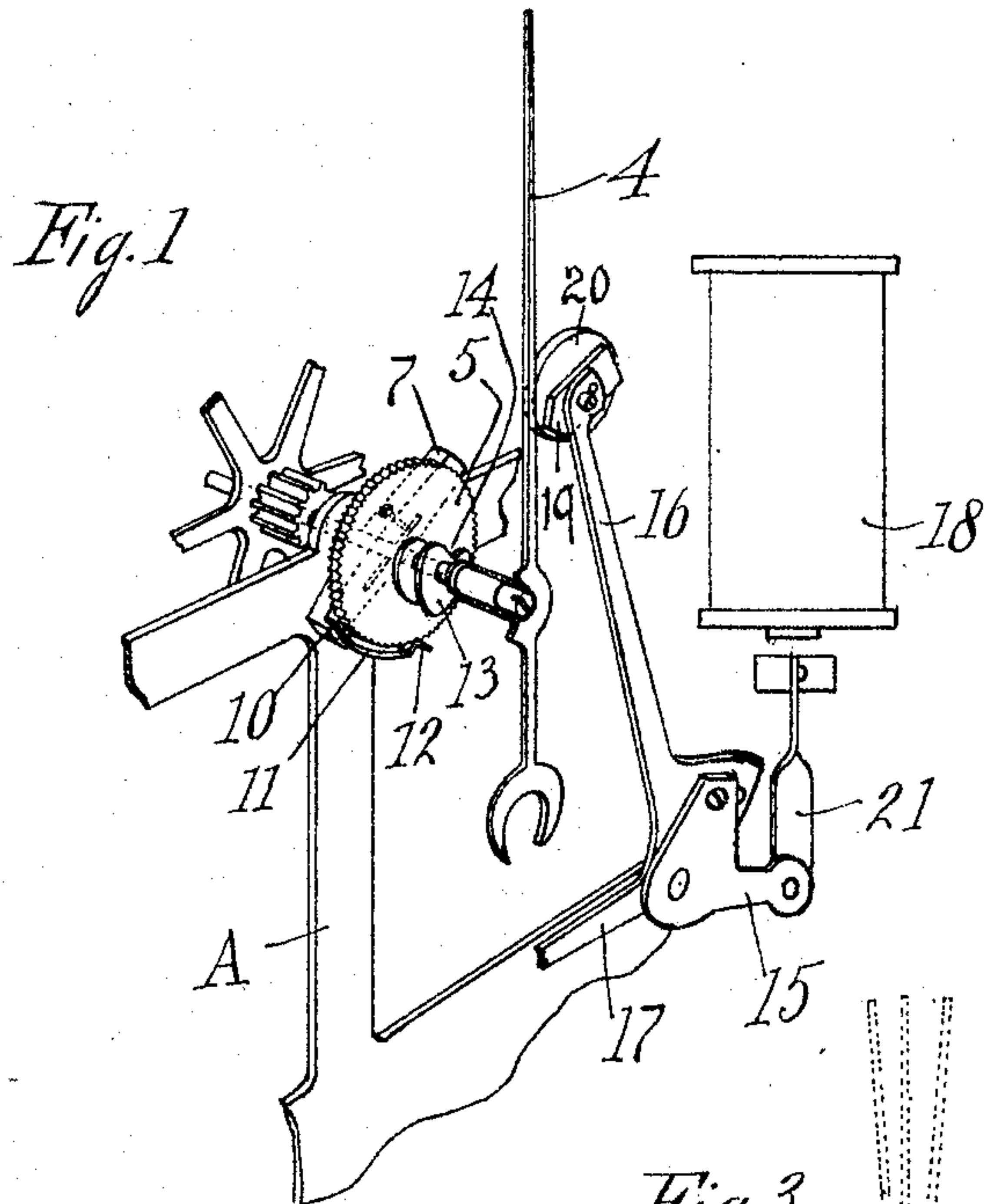


Fig. 2

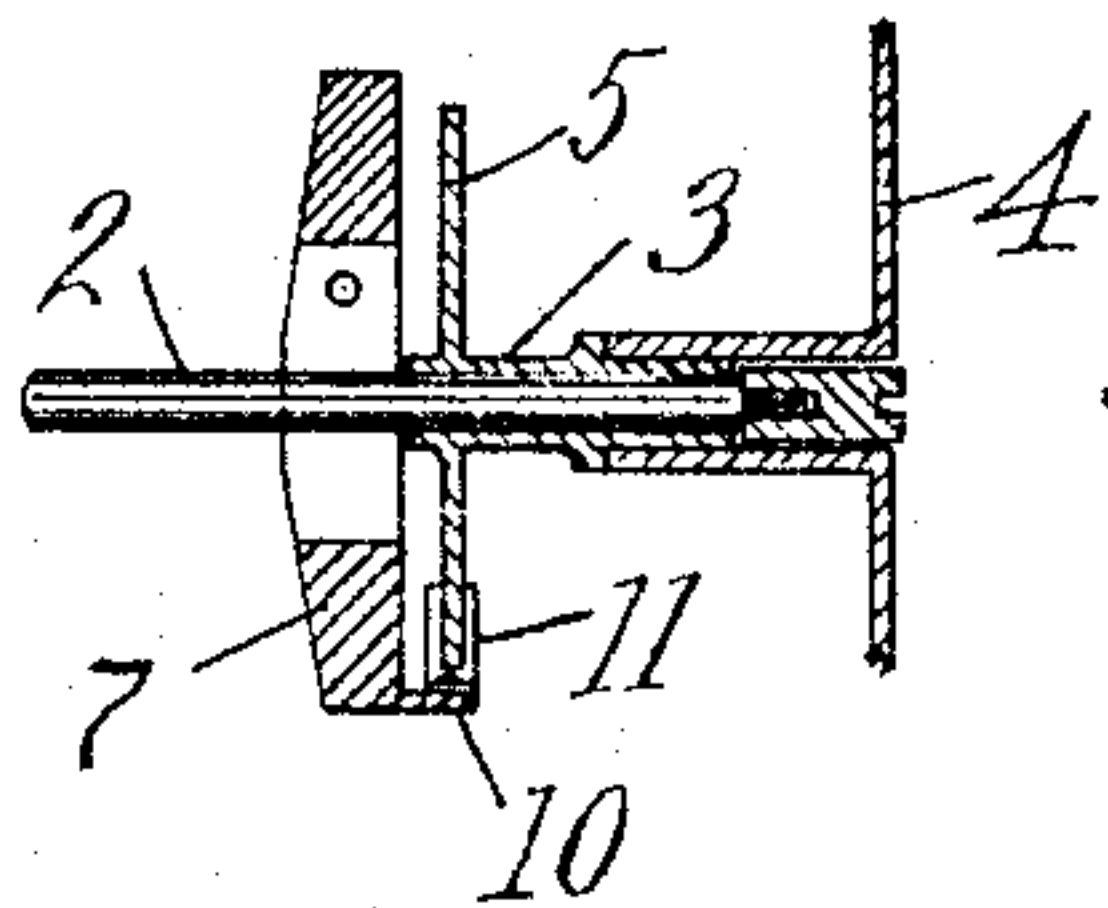


Fig. 3

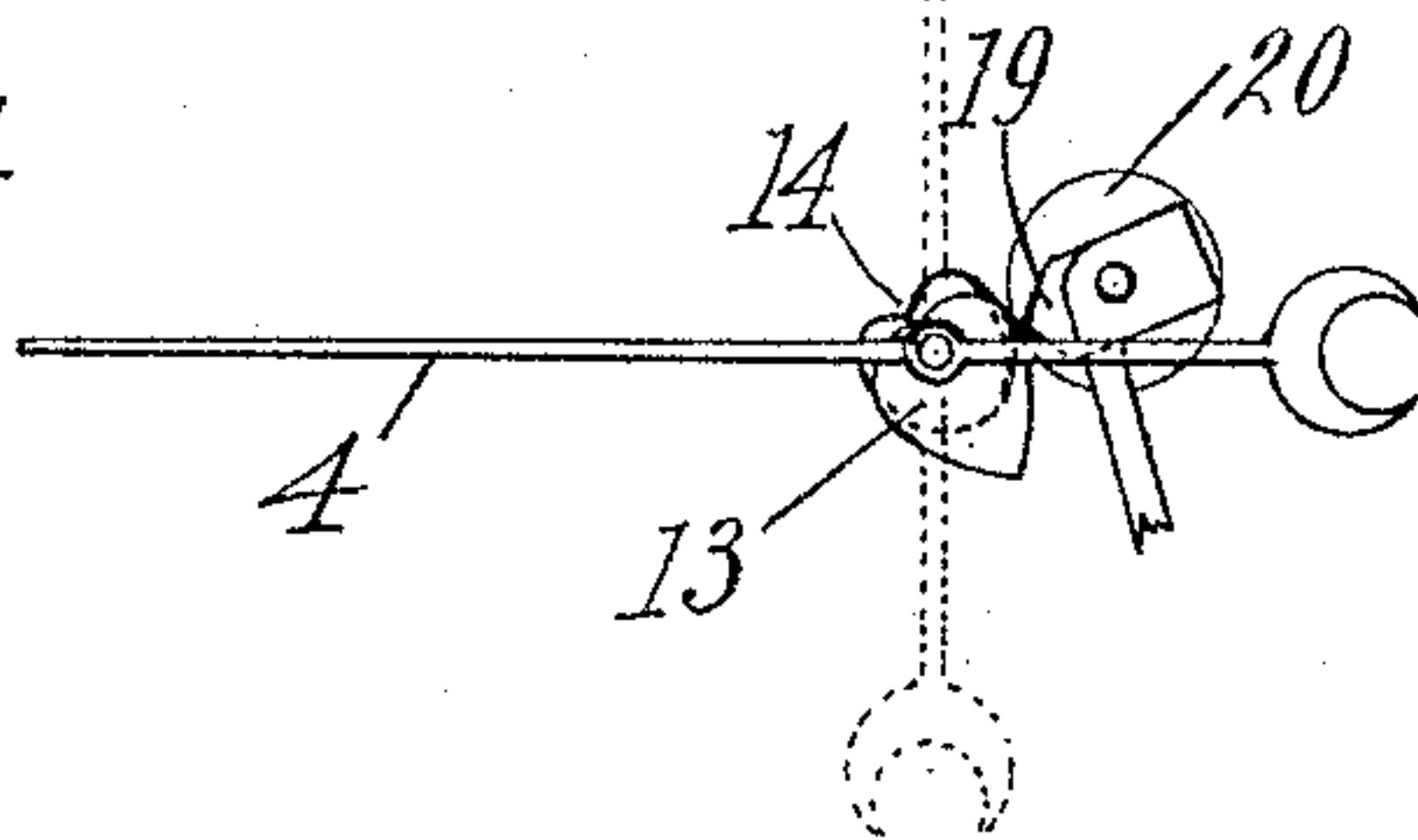
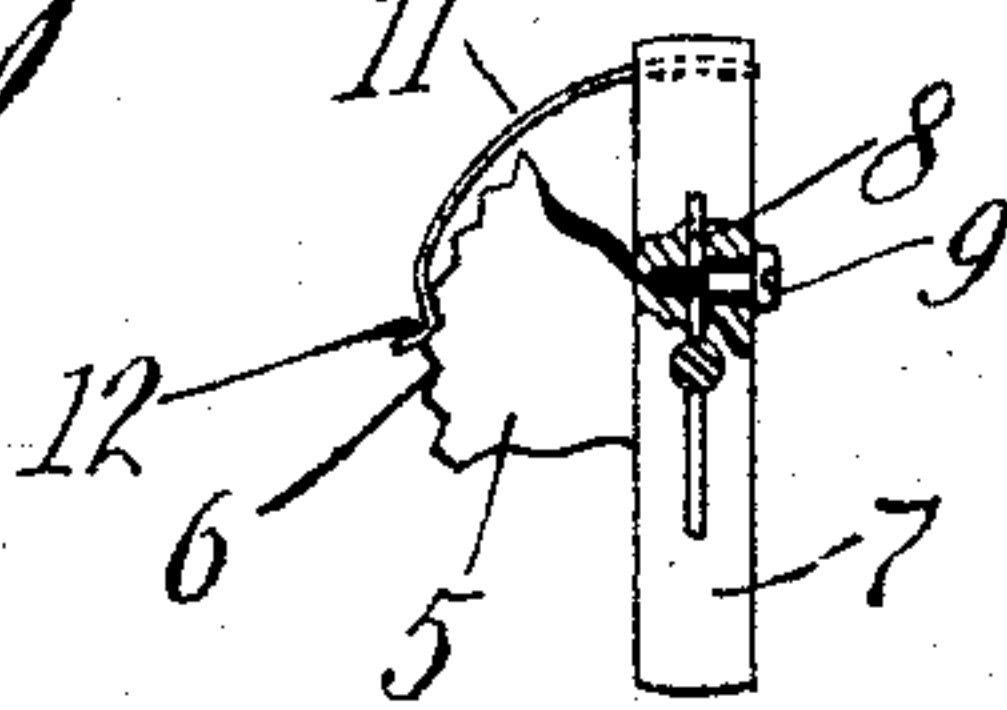


Fig. 4



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CLOCK.

949,705.

Specification of Letters Patent.

Patented Feb. 15, 1910.

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To all whom it may concern:

Be it known that I, ERNEST A. HUMMEL, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Clocks, of which the following is a specification.

My invention relates to improvements in clocks and particularly to those parts of the clock which are constructed to enable it to be electrically synchronized or set by a standard clock.

To admit of such synchronizing the minute and seconds hand are usually mounted upon sleeves which have yielding connection of some sort with the arbor of the hand to be synchronized, so that they will move normally with the arbor, but can be turned independently of the arbor when struck or engaged by the synchronizing lever or other instrumentality. But in the normal operation of the clock the quickly moving seconds hand acquires a momentum, and has a tendency to travel ahead each time it is momentarily checked by the intermittent movement of the escapement. This driving ahead cannot be entirely checked by an ordinary rubbing engagement between the sleeve and arbor, whether peripheral or endwise, unless the engagement is made so tight that the synchronizer will not work.

In order to check this momentum without impairing the working of the synchronizer, or otherwise affecting the normal operation of the clock, and also to minimize the wear upon the engaging parts, and insure greater sureness and accuracy of action of the seconds and minute hands, I have designed the present structure, wherein the sleeve and arbor are yieldingly connected by means of a disk carried by one member and an engaging spring shoe carried by the other member, the disk being preferably notched and having peripheral engagement with the shoe.

More particularly the invention consists in the construction, combination and arrangement of parts hereinafter pointed out in the claims.

In the accompanying drawings forming part of this specification, Figure 1 is a perspective view of a fragment of a clock, showing the invention applied to the seconds hand; Fig. 2 is a longitudinal section through the seconds hand sleeve and the notched disk; Fig. 3 is a detail in elevation

showing the synchronizing lever in engagement with the cam on the seconds hand sleeve; and Fig. 4 is a detail of the notched disk and spring shoe.

In the drawings I have illustrated the invention applied to the seconds hand arbor of a clock, but it will be understood that it is equally applicable to the minute hand arbor. For the sake of simplicity I have shown in the drawings only so much of the clock and synchronizing apparatus as is necessary to an understanding of the invention, the clock work and synchronism mechanism being of a kind well known in the art.

In the drawings A represents the framework of the clock, in which is journaled the seconds hand arbor 2. Upon this arbor is a sleeve 3. Fast upon one of these parts, preferably the sleeve, as shown in the drawings, is a disk 5 of considerably larger diameter than the sleeve; while fast upon the other part, in this case the arbor, is a balanced cross-bar 7. The sleeve carries at its outer end the seconds hand 4. The disk has, preferably, in its peripheral edge, a series of notches 6, usually 60 or some multiple thereof in number, to correspond with the number of seconds in a minute. As here shown, the cross bar 7 is arranged at the rear of the disk and across the same. It is formed with a central slot 8, so that it can be clamped upon the arbor by means of a tightening screw 9, which passes through the slot-separated parts of the bar. At one end of the bar is a flange 10 which overlaps the edge of the disk. To this flange is secured a spring 11, upon the end of which is a wedge shaped shoe 12, which is held by the spring normally pressed into one of the notches 6 in the peripheral edge of the disk. It is desirable to have the shoe and notches V-shaped so as to insure an engagement which will yield in either direction, when the sleeve is struck by the synchronizing lever, according as the clock is running fast or slow.

Fast upon the sleeve in front of the disk 5 is a double edged heart cam 13, having a V-shaped notch 14 between the lobes. Pivotaly mounted upon the clock frame is a synchronizing lever 15 having two divergent arms, an arm 16 for synchronizing the seconds hand and an arm 17 for synchronizing the minute hand (not shown). This lever is connected by means of a link 21 with the

armature of an electromagnet 18, which is in circuit with, and operated by, a standard or master clock (not shown).

The lever arm 16 carries at the top a hammer comprising a bar 19 having a wedge shaped acting end, and a wheel or roller 20 journaled upon the bar. The roller and bar are in the same planes, respectively, as the two faces or edges of the heart-cam 13. These faces are of somewhat different shape, so that, when the lever is actuated to throw the hammer against the cam, the cam will be engaged and turned by either the roller or bar, in whatever position it may be.

In operation, the seconds-hand arbor is turned by the usual clock work mechanism, and the engagement between the spring shoe 12 and the periphery of the disk 5 is strong enough to cause the seconds hand sleeve 3 to rotate normally with the arbor. But when the synchronizing lever is operated to throw the hammer into engagement with the cam 13, the spring 11 will yield and permit the sleeve to be turned independently of the arbor, without twisting or breaking the arbor or the gearing by which it is driven.

It will be understood that the synchronizing usually takes place upon an even hour, when the hands should stand in vertically up-pointing position, as shown in Fig. 1. If, now, the clock has gone fifteen seconds slow, so that the seconds hand, for example, stands in the horizontal position shown in full lines in Fig. 3, the hammer of the synchronizing lever will strike and engage the cam, and thereby turn the seconds hand sleeve from left to right until the roller 20 lodges in the notch 14 of the cam, when the cam and sleeve will come to a stop with the seconds hand pointing up to zero seconds, as shown in continuous dotted lines in Fig. 3. The electromagnet is energized only momentarily, so that the armature is released as soon as the cam has been struck and turned, and the roller 20 is thrown back out of engagement with the cam. In the same manner, if the seconds hand has gone fast, as illustrated in broken dotted lines in Fig. 3, it will be turned back, by reason of the peculiar shape of the cam 13, into the zero position indicated in full dotted lines in Fig. 3. It will be understood that the minute hand is also synchronized by the same operation of the lever 15, but as the particular mechanism for accomplishing this, apart from the yielding connection which enables the hand to be turned independently of its arbor, forms no part of this invention, it is not here shown.

By arranging the yielding engagement between the sleeve and the arbor at a point far distant from the arbor, I provide a very effective check to the momentum of

the hand. And by forming the peripheral edge of the disk with notches which are engaged by a spring shoe I provide a check which is absolutely sure and positive in its action, for the momentum of the seconds hand is never great enough to lift the shoe out of the notch in which it is lodged. These notches are preferably the same in number as the divisions of the dial, so that the position of the seconds hand will always correspond with the indications of the dial. Thus, if the dial is divided into whole seconds, there will be 60 notches; if into half seconds, 120 notches. It will also be seen that the yielding connection here shown does not impair the operation of any of the working parts of the clock.

In my copending application for patent for synchronizing apparatus, filed February 23, 1907, Serial No. 358,952, I have shown the yielding connection which is the subject of this application in connection with a novel synchronizing apparatus of somewhat different character from that herein shown and described, and it will be understood that the same can be used with any appropriate synchronizer.

I claim as my invention:

1. In a clock, the combination with an arbor, and a hand-carrying sleeve loosely mounted thereon, of a disk fast upon one of said parts, and a shoe fast upon the other of said parts, one of said parts having means for receiving the other, whereby said disk and shoe are constantly engaged but free to move relatively to each other.
2. In a clock, the combination, with an arbor and a hand-carrying sleeve loosely mounted thereon, of a disk fast upon one of said parts, and a shoe carried by the other of said parts and yieldingly engaging the edge of the disk.
3. In a clock, the combination, with an arbor and a hand-carrying sleeve loosely mounted thereon, of a notched disk fast upon one of said parts, and a shoe carried by the other of said parts and yieldingly engaging the notches.
4. In a clock, the combination, with an arbor and a hand-carrying sleeve loosely mounted thereon, of a disk carried by one of said parts and a balanced cross-bar carried by the other of said parts, and a spring shoe carried by the cross-bar and yieldingly engaging the edge of the disk.
5. In a clock, the combination, with an arbor and a hand-carrying sleeve loosely mounted thereon, of a disk carried by one of said parts and having a notched peripheral edge, and a shoe carried by the other of said parts and yieldingly engaging the notches in the disk.
6. In a clock, the combination, with an arbor and a hand-carrying sleeve loosely

mounted thereon, of a disk carried by one
of said parts and formed with notches in its
peripheral edge, and a cross-bar carried by
the other of said parts, a spring carried by
5 the cross-bar in the plane of the disk, and
a shoe carried by the spring and yieldingly
engaging the notches in the disk.

In testimony whereof I affix my signature
in presence of two witnesses.

ERNEST A. HUMMEL.

Witnesses:

ARTHUR P. LOTHROP,
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