No. 659,329. Patented Oct. 9, 1900.

R. W. J. SUTHERLAND.

TIME INDICATING MECHANISM.

(Application filed May 14, 1900.)

(No Model.) 2 Sheets—Sheet 1.

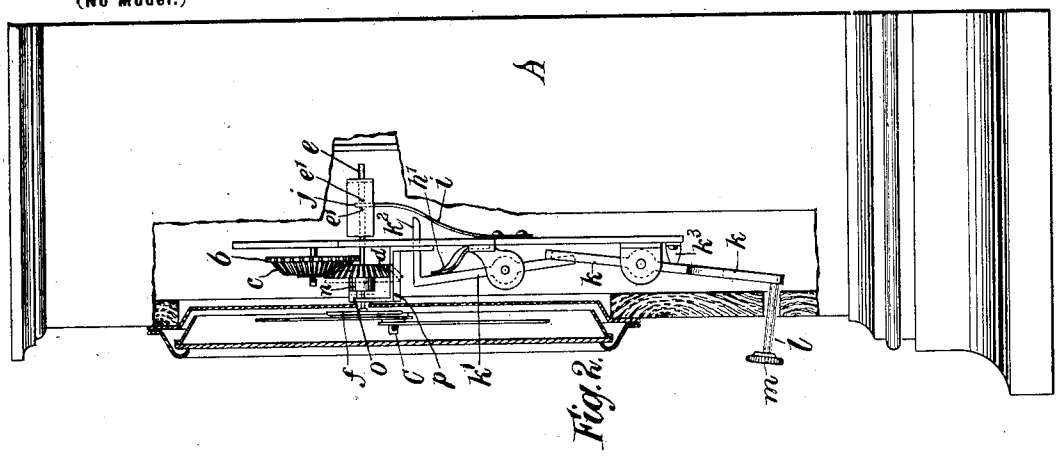


Fig. 2.

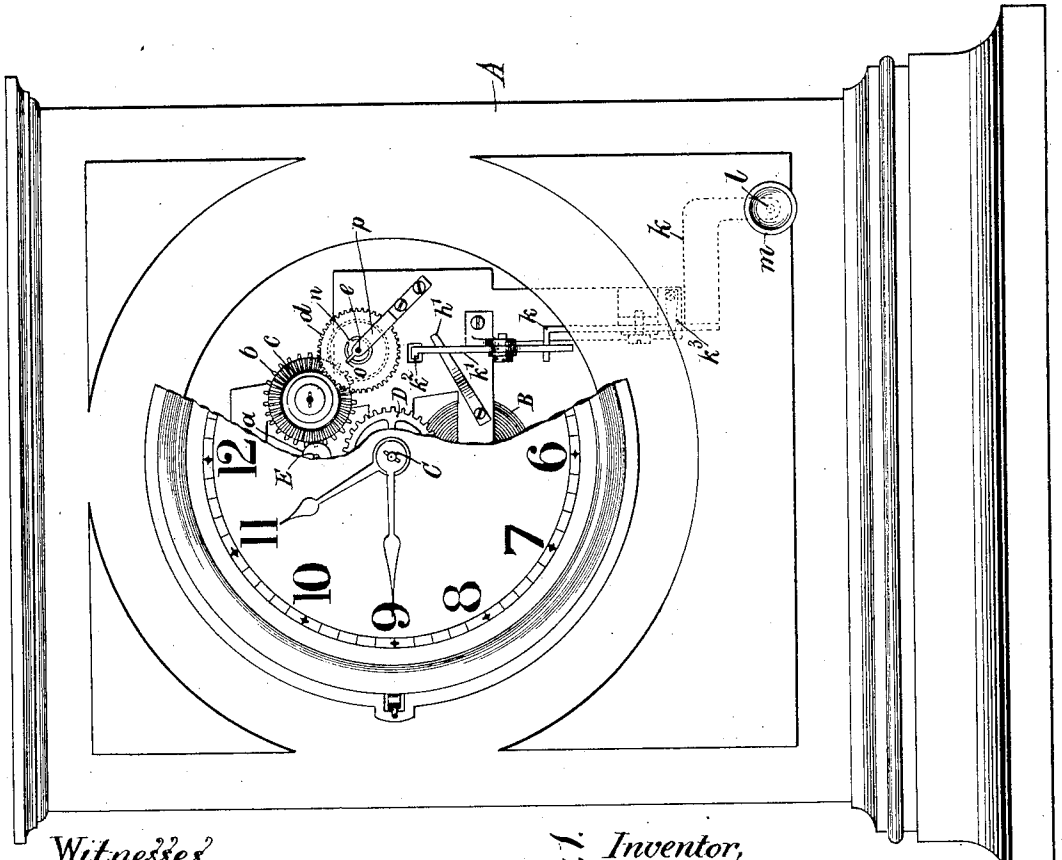


Fig. 1.

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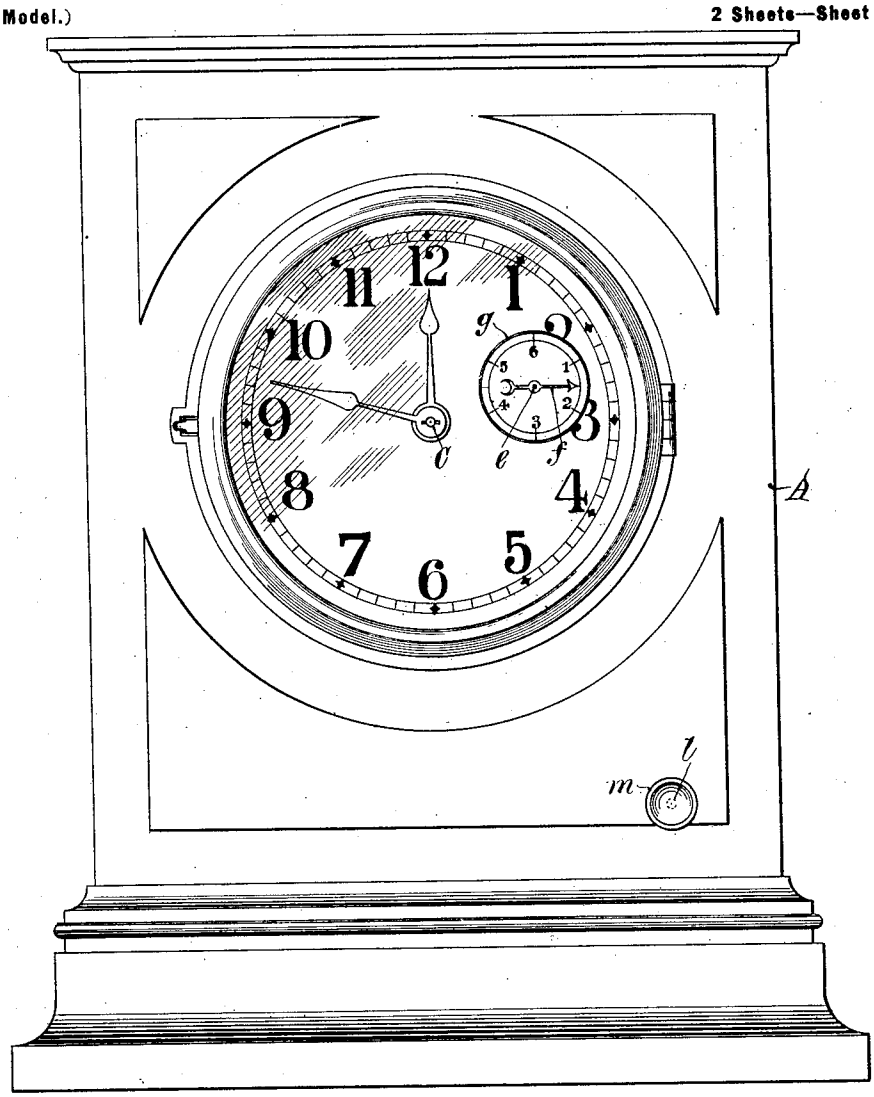


Fig. 3.

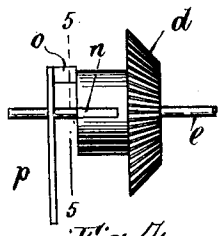


Fig. 4.

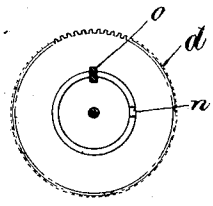


Fig. 5.

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UNITED STATES PATENT OFFICE.

ROBERT WILLIAM JOHN SUTHERLAND, OF CAERPHILLY, ENGLAND.

TIME-INDICATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 659,329, dated October 9, 1900.

Application filed May 14, 1900. Serial No. 16,675. (No model.)

To all whom it may concern:

Be it known that I, ROBERT WILLIAM JOHN SUTHERLAND, of Cheyne Villa, Caerphilly, in the county of Glamorgan, England, have invented certain new and useful Improvements in Time-Indicators for Use in Connection with a Telephonic Service; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in time-indicators for use in connection with a telephonic service for indicating the exact time a telephone is in actual use in order that the user can see how this time is progressing during the engagement of the instruments.

It is customary for telephonic intercommunication over long distances—such, for instance, as what are known as "trunk-calls"—that is, across country from one town or city to another as distinguished from across the same town or city in which both the calling user and the called user are situated—to be paid for by time and for the time per call to be limited to a few minutes. This method of regulating the use of the lines works admirably on the whole; but disputes frequently occur between the users and the telephone company as to the exact time the instruments are engaged. Hitherto, as far as my knowledge goes, there has been no special device for indicating and checking the exact time the instruments have been engaged and showing the users how the time is progressing during the period of their use.

The object of this invention is to provide a time indicating and checking device or appliance which can be attached to and work in conjunction with any ordinary clock or watch movement or other form of timepiece and which will indicate the exact number of minutes, seconds, or other division of time that may be necessary during which the telephone is in actual use. Thus in my invention mechanical devices such as make up any ordinary watch, clock, or other timepiece movement are employed, and to these I add a special device and indicating-hand or pointer. The said hand or pointer may be fixed as a center seconds-hand on the central main spindle, or it may be fixed on a special spindle apart from the main spindle as an ordinary seconds-hand, the number of minutes or other predetermined subdivisions of time being marked upon a circle on the dial. This circle is preferably subdivided into six equal parts, representing one minute each, and the hand is so timed or geared as to take six minutes to traverse the entire circle or make one revolution, and then it is automatically stopped at the zero-point by any suitable stop or arresting device.

I will now proceed to describe my invention in detail, reference being had to the accompanying drawings, which illustrate that modification of it wherein the indicating-hand is fastened on a special spindle apart from the central main spindle.

In the drawings, Figure 1 is a front elevation of my improved time-indicator, part of the glass window being broken away to show the novel mechanism. Fig. 2 is a side elevation of Fig. 1, part of the case being broken away to show the mechanism within. Fig. 3 is a front elevation of my improved time-indicator complete with indicating-hand, which latter is not seen in Fig. 1 because it comes away with the glass. Fig. 4 is a detail in side elevation of the special bevel-wheel, showing the slot in same and the end of the bracket bearing the projection or tongue which engages therein to stop the indicating-hand at the end of each revolution. Fig. 5 is a vertical section of Fig. 4, taken on the line 5 5.

In the drawings the motive power is supplied by a coiled spring, this being the preferable device; but of course weights or other sources of power may be employed to operate the mechanism if desired.

A is the case containing all the mechanism. Only part of the ordinary time-recording mechanism is shown.

B is the motive-power spring.

C is the main spindle.

D is the wheel which is mounted loosely on the main spindle and the sleeve of which carries the hour-hand. This wheel forms part of the train and is driven in the usual manner.

E is the spindle of the wheel which drives the spindle bearing the escape-wheel.

So far the arrangement is the same as in any ordinary timepiece, the novel mechanism

consisting of the following: The spindle of the wheel which drives the spindle on which the escape-wheel is fixed is provided with an additional pinion, (marked *a*,) with which is geared a toothed wheel *b*. Upon the face of this latter wheel is fixed a wheel *c*, having mitered teeth cut entirely around its periphery, or instead thereof the said gear-wheel *b* might be formed integral with the miter-wheel *c*. Gearing with this miter-wheel is another similar miter-wheel *d*, both these wheels being preferably provided with teeth of very fine pitch in order that any motion of the one when they are brought into engagement may be transmitted to the other without loss of time. The number of teeth in each of these wheels is practically the same. Instead of these fine teeth the periphery of one or both of the wheels may be provided with rougher bands or may be smooth or simply milled or roughened and so converted into friction-gear. These miter-wheels are not arranged at a right or other angle, as miter or bevel wheels generally are, but are arranged so as to lie in substantially one and the same plane and in such manner that when brought into gear the smaller diameter of the one wheel is adjacent to the larger diameter of the other, as shown in Figs. 1 and 2.

The spindle *e* of the miter-wheel *d* corresponds to that of the seconds-hand of an ordinary clock or watch—that is to say, not a center seconds-spindle, but a separate spindle mounted outside or eccentric to that carrying the hour and minute hands. This spindle *e* is provided with a hand or pointer *f*, (shown in Figs. 2 and 3,) which works over the six-minute or special circle *g* on the dial or face of the timepiece. The circle in question is divided and, if necessary, subdivided according to the predetermined time limit allowed for the use of the telephone. For instance, it may be divided into six equal divisions, as before stated and as shown in Fig. 3.

Normally the two miter-wheels *c* and *d* are held out of engagement with each other by means of one or more springs, although one of them (the driver *c*) is always in engagement with the pinion *a*, which is driven by one of the wheels of the train, and in order to bring the driven one, *d*, into engagement with the driver the spindle *e*, bearing the driven miter-wheel *d*, may be provided with an annular groove or bearing-pins *e'*, and one end of a spring *i*, forked at its end *j* to embrace this groove or bear against the pins *e'*, so that any movement of the said spring will give a longitudinal movement forward or backward, as the case may be, in its bearings to the said spindle, and consequently impart a similar movement to the miter-wheel *d*, fast thereon. Thus the driven miter-wheel *d* may be brought into engagement with the driving one, *c*, by merely pressing backward the said spring in a backward direction. A convenient method of thus pressing backward the said spring *i* is to pivot a lever, such as *k*, a short distance beneath the said spring, the upper end of this lever catching behind the tail end of an upper or second pivoted lever *k'*, having its upper end bent at or about a right angle therewith and which is normally pressed forward by a spring *h'*, keeping the nose k^2 of the lever *k'* just out of contact with the spring *i*, the other or lower end of the lever *k* having a projection or stem *l*, which projects through the case of the apparatus and bears at its free extremity a press or push button *m*, normally kept forward by a spring k^3, so that on pressing the said push-button the lever *k*, connected thereto, is pushed backward at its lower end, and consequently forward at its upper end, which being behind the tail end of the upper lever *k'* brings this tail end forward, and consequently throws the nose k^2 on its upper end backward against the spring *i*, thereby moving the spindle *e*, bearing the driven miter-wheel *d*, with it, and thus bringing the said wheel into engagement with the driving miter-wheel *c*, when instantly the rotary movement of wheel *c* is imparted to wheel *d*, and the six minutes or other predetermined period of time commences to be indicated by the revolution of the hand or pointer fixed on the spindle of the driven miter-wheel *d* over the special circle *g* on the dial. Now as the miter-wheels *c* and *d* are brought into gear by pressure on the push-button against the contraction of a spring or springs *h'* on the said pressure being released the springs would return the pressed levers *k* and *k'*, and consequently the spring *i* will again throw the wheels *c* and *d* out of gear, which would of course be undesirable, as the miter-wheels must be kept in gear during the full six minutes or other predetermined period of time. So in order to obviate this some suitable means must be provided whereby the driven miter-wheel *d* is simultaneously released from its zero-stop and prevented from returning. This may be effected by providing the driven miter-wheel *d* with a notch or groove *n*, (see Figs. 4 and 5,) into which normally a pin or tongue *o* on the bearing-bracket *p* of said wheel projects, so that on the said miter-wheel *d* being brought into gear with the other miter-wheel *c* the said notch is drawn away from the pin or tongue *o*, and thus releases the said pin or tongue, and as the driven miter-wheel commences to revolve immediately it is brought into gear it carries the said notch *n* out of alinement with the tongue, and thus the latter is prevented from again entering the notch and the wheel *d* held in gear until a complete revolution has been made, when the notch *n* and tongue *o* will again be in alinement, and the spring *i* will cause wheel *d* to spring back, bringing the groove *n* over the tongue *o*, thus again locking the said driven miter-wheel *d* as desired.

It must be understood that the construction above described is only one method of carrying out my invention as applied to the

movement of an ordinary spring-motor timepiece and that this construction may be varied in many details without departing from the spirit of or exceeding the scope of the invention. For example, the mechanism for driving the indicating-hand *f* can be composed of any train or series of wheels and these may be geared in any manner according to the speed of the master driving-wheel and the period of time. Again, the stop mechanism may be any well-known or suitable device.

The operation or use is obvious. On the calling user of the telephone getting the information that he is through to the called user he (the calling user) presses the button *n* of his time-indicator, whereupon the miter-wheel *d* is thrown into gear with the other miter-wheel *c* and the time commences to count against him, the indicating-hand *f* showing its progress. He can see during the whole time the progress of the indicating-hand, and thus is assisted in bringing his conversation to a close with the expiration of the time allowed. The finger is only kept for an instant on the push-button, as the wheel *d* immediately turns, and so prevents the tongue *o* from again entering the notch *n* until a complete revolution has been made.

In applying my invention to a watch which can be carried in the pocket the mechanism would be substantially as described above, but necessarily somewhat modified in shape and size to suit the restricted space.

When the indicating-hand *f* is fixed on the main spindle as a center seconds-hand, the miter-wheels can be located on the same spindle, which latter may be lengthened to afford room for them.

I claim—

1. A time-indicator for use in connection with a telephonic service, consisting of the combination with an ordinary timepiece or time-indicating mechanism, of bevel-gearing connecting the motor-train with the seconds-hand spindle adapted to communicate any desired speed to said spindle, the special indicating-hand fast on said spindle, the special divided circle on the general dial traversed by said hand, the spring keeping the gearing of the indicating-hand normally out of gear with the motor-train, the combination of levers and press-button for bringing said gear into engagement at will, and the device for maintaining the said gear during a given time and automatically disengaging the gear on the completion of that time consisting in the aforesaid spring, the notch in the sleeve of the indicating-hand gear and the tongue on the bracket which supports said wheel adapted to engage said notch at each revolution of the indicating-hand, as described.

2. In a time-indicator for use in connection with a telephonic service, the combination with time-indicating mechanism of the spring for keeping the gearing of the indicating-hand spindle normally out of engagement with the motor-train, the combination of levers and press-button for bringing said gear into engagement at will, and the device for maintaining the said gear during a given time and automatically disengaging the gear on the completion of that time consisting in the notch in the sleeve of the indicating-hand gear-wheel, a bracket and tongue on the bracket which supports said wheel adapted to engage said notch at each revolution of the indicating-hand, as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ROBERT WILLIAM JOHN SUTHERLAND.

Witnesses:

SAMUEL WESLEY ALLEN,

ARCHIBALD WINDOW.