G. A. BETULANDER.

IMPULSE TRANSMITTER FOR AUTOMATIC TELEPHONE SYSTEMS.

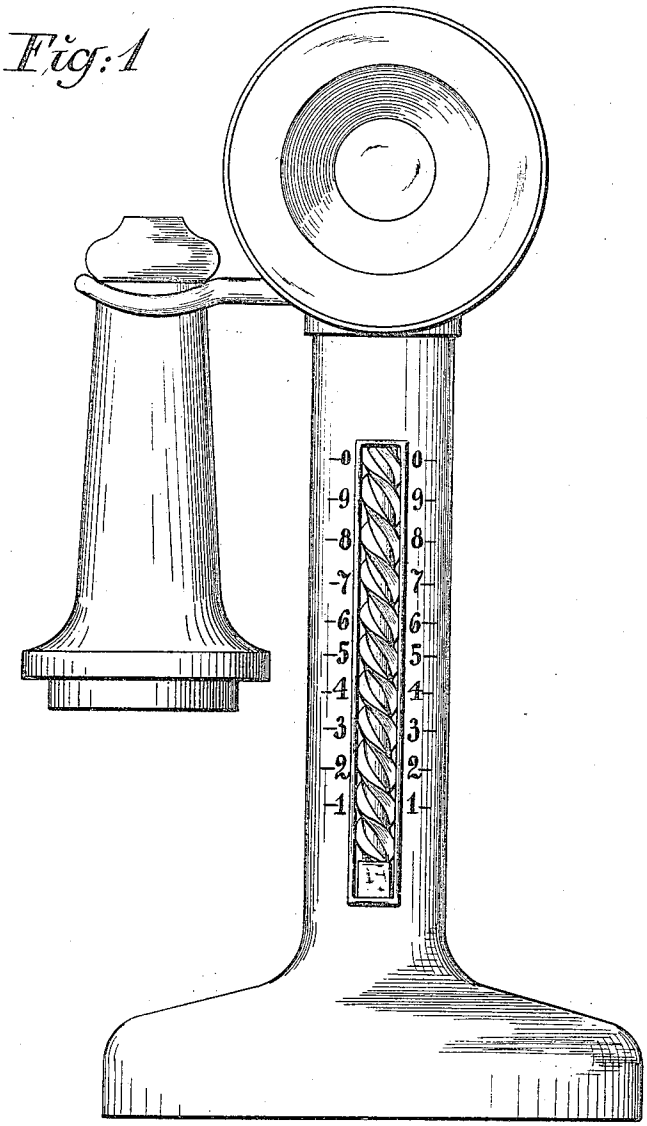
APPLICATION FILED JULY 13, 1915.

1,257,180.

Patented Feb. 19, 1918.

3 SHEETS—SHEET 1.

Fig: 1



Inventor:
Gustaf A. Betulander
by his attorneys
Brown & Seward

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3 SHEETS—SHEET 2.

Fig: 2

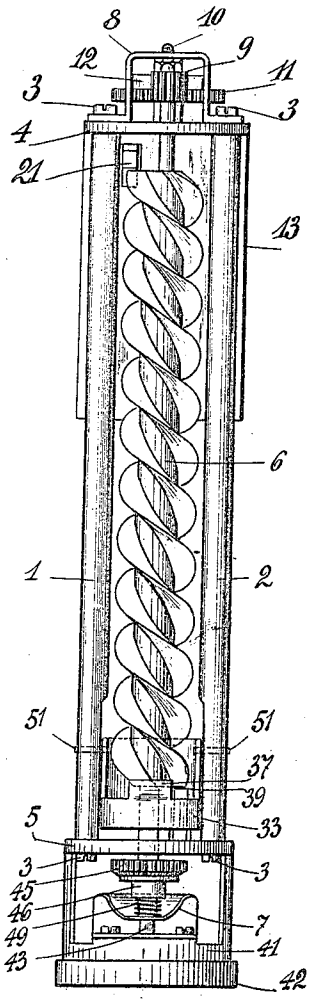
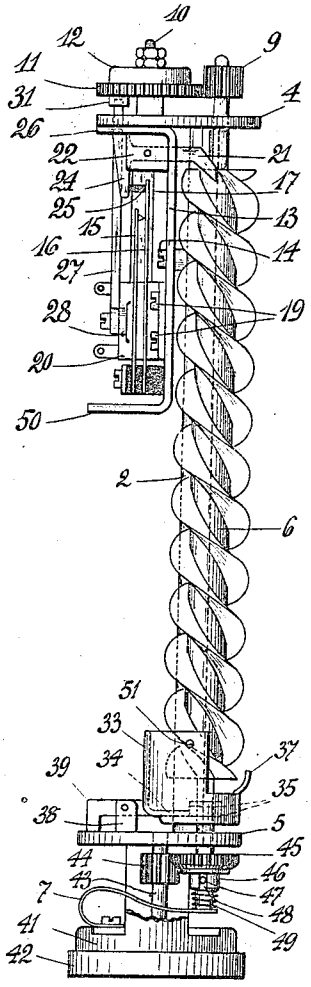


Fig: 3



Inventor:-

Gottlieb A. Betulander

by his attorneys

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3 SHEETS—SHEET 3.

Fig: 4

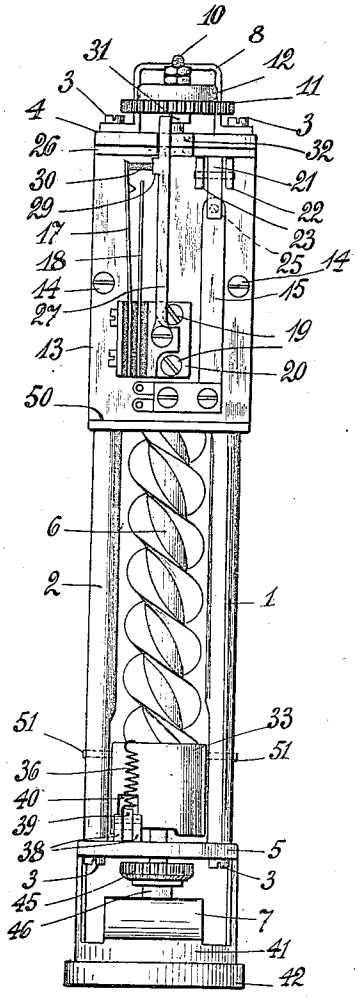
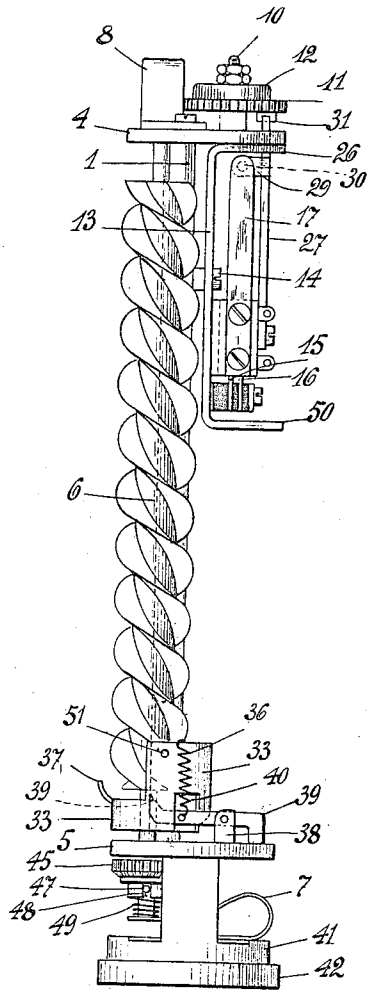


Fig: 5



Inventor:-

Witness: G. A. Betulander

by his attorney

E. Lawrence Bernard

UNITED STATES PATENT OFFICE.

GOTTHILF ANSGARIUS BETULANDER, OF SÖDERTÖRNS VILLASTAD, SWEDEN.

IMPULSE-TRANSMITTER FOR AUTOMATIC TELEPHONE SYSTEMS.

1,257,180. Specification of Letters Patent. Patented Feb. 19, 1918.

Application filed July 13, 1915. Serial No. 39,640.

To all whom it may concern:

Be it known that I, GOTTHILF ANSGARIUS BETULANDER, a subject of the King of Sweden, and a resident of Villa Castor, Södertörns Villastad, in the Kingdom of Sweden, have invented certain new and useful Improvements in Impulse-Transmitters for Automatic Telephone Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of the present invention is to provide an impulse transmitter for automatic telephone systems which substantially operates in the same manner as apparatus of the known finger dial type but in which the setting movement is rectilinear instead of circular. The invention chiefly consists in the use of a rotatable screw-spindle for transmitting the rectilinear setting movement into a rotary movement more convenient in respect of construction the threads of said spindle having such a pitch that the spindle can be caused to rotate by an axial pressure applied to the threads either directly by means of the finger or through the medium of any suitable implement. The setting of the impulse transmitter may therefore be effected simply by introducing the finger between two threads and moving it along the spindle to an abutment. Upon being released the spindle is rotated back to its initial position through the action of a spring the impulse mechanism being then operated to send the impulses. The number of impulses sent is, obviously, dependent on the point from which the spindle is operated.

The invention may preferably be applied to telephone instruments of the type shown in Figure 1 of the annexed drawings, or generally to instruments in which the rectilinear setting movement is more suitable with regard to the shape and space conditions of the instrument. An apparatus according to this invention may for instance with great advantage be fitted into the handle of a receiver or a microtelephone.

A form of the invention is illustrated in the annexed drawings. Fig. 1 shows the impulse transmitter as applied to a commonly known type of telephone instruments. Figs. 2, 3, 4 and 5 represent the impulse transmitter itself as seen from before, from the left side, from behind and from the right side respectively. In Figs. 3 and 5 some parts are removed for the purpose of showing more plainly parts located behind.

The mechanism is carried by a frame consisting of two longitudinally extending rods 1 and 2 and two disks 4 and 5 secured to the said rods by means of screws 3. A screw-spindle 6 provided with three threads is journaled in the disks 4 and 5 and is carried at its lower end by a plate spring 7 tending to lift the spindle so that its upper end will rest against a clamp 8 fixed to the disk 4. Fixed to the upper journal of the spindle is a toothed wheel 9 meshing with another toothed wheel 11 loosely mounted on a fixed shaft 10. The toothed wheel last mentioned is firmly connected with a spring drum 12 containing a spring adapted to rotate the spindle back to its initial position.

The contact mechanism of the apparatus is provided on a plate 13 attached to the rods 1 and 2 by screws 14. The contact mechanism comprises two sets of contact springs one consisting of two contact springs 15 and 16 adapted to effect the selective impulses, the other consisting of two contact springs 17 and 18 adapted to short-circuit the receiver during the sending of the impulses. The springs 15 and 16 are mounted with interposed insulation directly on the plate 13, while the springs 17 and 18 are mounted on an angle-piece 20 secured to the said plate by screws 19. The contact between the springs 15 and 16 is operated by means of a pawl 21 swingably journaled in two lugs 22 and 23 projecting from the plate 13. One end of said pawl normally projects downward immediately in the front of one thread of the spindle. At the opposite end the pawl is provided with an extension 24 adapted to actuate the contact spring 16 by means of an insulating part 25. The pawl 21 is normally forced against a flange 26 of the plate 13 through the action of the spring 16 the contact 15, 16 being then closed. The contact between the springs 17 and 18 is operated from the toothed wheel 11 by means of an arm 27 swingably mounted on a projection 28 of the angle-piece 20. The arm 27 is provided with an inwardly extending finger 29 adapted to actuate the contact spring 17 by means of an insulating part 30. The arm 27 is normally forced against the inner edge of a cut 32 made in the disk 4, by means of a pin 31 fixed to the wheel 11, and the spring inclosed in the spring drum 12 the contact 17, 18 being then broken.

At the lower end of the screw-spindle a short tube 33 inclosing the spindle is pro-

vided said tube being swingably journaled at its upper end in the two rods 1 and 2. At its lower end the tube has an inwardly projecting tongue 34 coöperating with a collar 35 on the lower journal of the spindle in such a manner that upon depressing the spindle the tongue is brought in a stopping position immediately above the said collar thereby keeping the spindle in depressed position. The tube 33 is, further, provided with an upwardly extending tongue 37 adapted to serve as an abutment for the finger in setting the apparatus. Swingably journaled in a support 38 attached to the lower disk 5, is a pawl 39 extending through an opening 40 of the tube 33 and under the threads of the spindle. The pawls 39 and 21 operate to stop the spindle in opposite directions. The pawl 39 is held in its normal position shown in the drawing by the spring 36 which is fastened with one end at the pawl and with the other end at the upper edge of the tube 33.

Fixed to the lower side of the disk 5 is a box 41 containing a governor and closed up by a cover 42. The governor shaft 43 is journaled in the cover 42 and in the disk 5 and has a toothed wheel 44 fixed to its upper end and meshing with another toothed wheel 45 loosely mounted on the lower journal of the spindle. The toothed wheel last mentioned is provided on its lower side with radial ratchet teeth meshing with teeth provided on the upper side of a ring 46 mounted on the journal of the spindle. The ring is connected to the journal by means of a pin 47 passing through the journal, and slots 48 made in the ring, in such a manner that the ring can slide but not be turned on the journal. By means of a helical spring 49 the ring 46 is forced against the lower side of the toothed wheel 45.

The apparatus shown in Figs. 2–5 is inserted in the cylindrical part of the telephone instrument as shown in Fig. 1 the edges of the disks 4 and 5 and of the plate 13 and its turned up ends 26 and 50 then shutting close to said cylindrical part. The casing of the instrument has a longitudinal opening for the screw-spindle said opening serving at the same time as a guide for the finger. At both sides of the opening figures are put on as shown in the drawing.

The apparatus operates in the following manner: After the receiver has been lifted the finger or a suitable implement (a pin or the like) is introduced between two threads of the spindle at the point designated by the wanted figure (see Fig. 1) and then moved down against the movable abutment 37. At first the spindle can not be rotated as the pawl 21 projects immediately before one of the threads. Through the pressure of the finger the spindle is therefore at first moved down until the upper edges of the threads have been lowered under the point of the pawl 21 the tongue 34 being then swung in over the collar 35. At the same time the lower edges of the threads have entered the range of action of the pawl 39. The spindle now bears with the collar 35 against the disk 5. By the continued movement of the finger toward the abutment 37 the spindle is, consequently, rotated without operating the pawl 21. Through the medium of the toothed wheels 9 and 11 the arm 27 is released the contact 17, 18 being thereby closed. Due to the ratchet coupling 45, 46 the governor is not operated during the setting movement of the spindle

When the finger strikes the movable abutment 37 the tube 33 is swung backward around pin 51 so that the tongue 34 is moved out of contact with the collar 35. Upon being released the spindle is therefore raised to its normal vertical position by the spring 7 and rotated back to its initial position by the spring inclosed in the spring drum 12. The speed of rotation is then regulated by the governor which is now turned around by means of the coupling 45, 46. During the returning movement of the spindle the pawl 21 is operated so that the contact 15, 16 is opened every time a thread of the spindle is passing the point of the pawl which occurs three times for every revolution of the spindle. When the spindle reaches its position of rest the arm 27 is moved back by the pin 31 whereby the contact 17, 18 is opened.

If the spindle should be released before the finger has reached the abutment 37 it is stopped in the corresponding position the tongue 34 preventing the raising and the pawl 39 the turning of the same. The object of this arrangement is to prevent the pawl from being operated during the setting of the apparatus due to any hesitation in manipulating the spindle. If this requirement is given up the construction may be considerably simplified as the tube 33 and the pawl 39 then may be dispensed with. In this instance the spindle preferably has no axial movement and, consequently, also the collar 35 and the spring 7 may be dispensed with. Instead of it the spindle gets a foot bearing at its lower end and the pawl 21 is made jointed in known manner so that the contact 15, 16 is operated only when the spindle is rotating back. The returning spring may, evidently, also be provided within the spindle itself instead of in a special spring drum on the toothed wheel 11.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an impulse transmitter having a rectilinear setting movement, a frame, an axially rotatable screw-threaded spindle adapted to transmit the rectilinear move-

ment into a suitable rotary movement and to be rotated by an axial pressure applied to the threads of the spindle in a suitable manner, said spindle being mounted in said frame, a contact device actuated by the movement of the spindle, and a guide for the implement or the like exercising said axial pressure.

2. In an impulse transmitter, having a rectilinear setting movement, a frame, an axially rotatable screw threaded spindle adapted to transmit the rectilinear movement into a suitable rotary movement and to be rotated by an axial pressure applied to the threads of the spindle in a suitable manner, said spindle being mounted in said frame, means for returning the spindle to its initial position, and a contact device actuated by the movement of the spindle.

3. In an impulse transmitter having a rectilinear setting movement, a frame, an axially rotatable screw threaded spindle adapted to transmit the rectilinear movement into a suitable rotary movement and to be rotated by an axial pressure applied to the threads of the spindle in a suitable manner, said spindle being mounted in said frame, means for returning the spindle to its initial position, means for stopping the said spindle, and a contact device actuated by the movement of the spindle.

4. In an impulse transmitter having a rectilinear setting movement, a frame, a longitudinally movable axially rotatable screw threaded spindle mounted in said frame, and a contact device actuated by the movement of the spindle.

5. In an impulse transmitter having a rectilinear setting movement, a frame, a longitudinally movable axially rotatable screw threaded spindle adapted to transmit the rectilinear movement into a suitable rotary movement and to be rotated by an axial pressure applied to the threads of the spindle in a suitable manner, said spindle being mounted in said frame, and a contact device actuated by the movement of the spindle.

6. In an impulse transmitter having a rectilinear setting movement, a frame, a standard inclosing the frame and having a slot through which access may be had to the inside of said standard, an axially rotatable screw threaded spindle adapted to transmit the rectilinear movement into a rotary movement and to be rotated by an axial pressure applied to the threads of the spindle through the slot in a suitable manner, said spindle being mounted in said frame, and a contact device actuated by the movement of the spindle.

In witness whereof I have hereunto signed my name.

GOTTHILF ANSGARIUS BETULANDER.