No. 685,685. Patented Oct. 29, 1901.

E. KRAHENBUHL.

POWER GENERATOR FOR TELEPHONES.

(Application filed July 7, 1899.)

(No Model.)

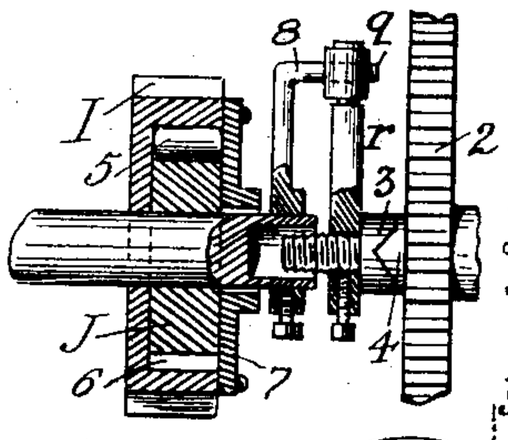
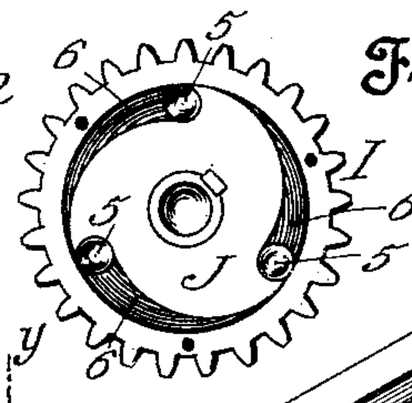
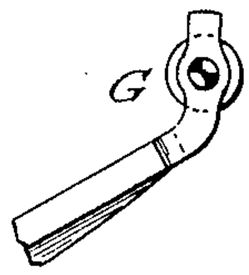


Fig. 5.





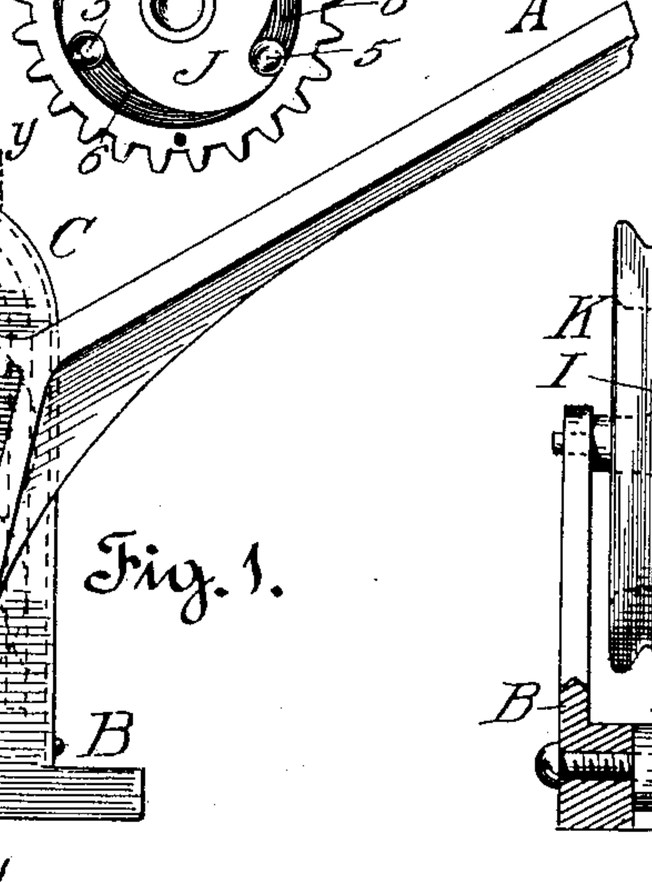


Fig. 6.

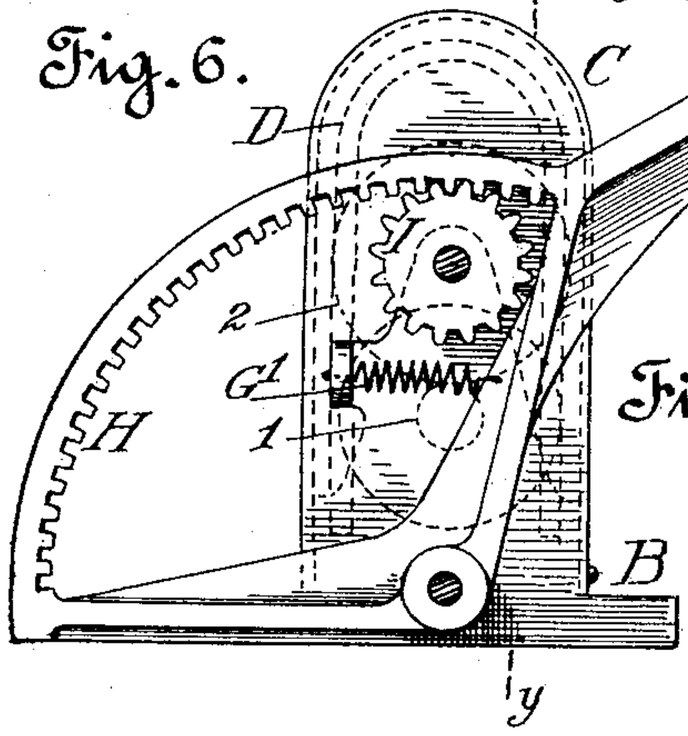


Fig. 1.

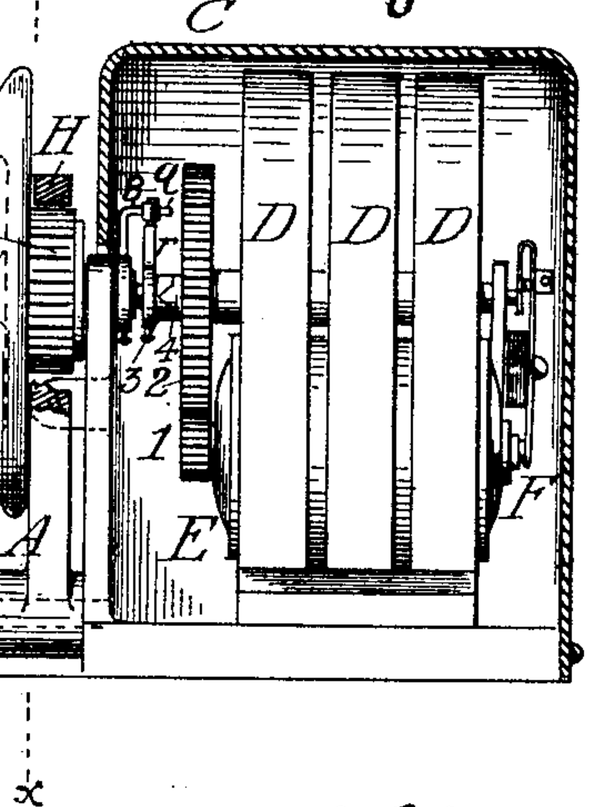


Fig. 2.

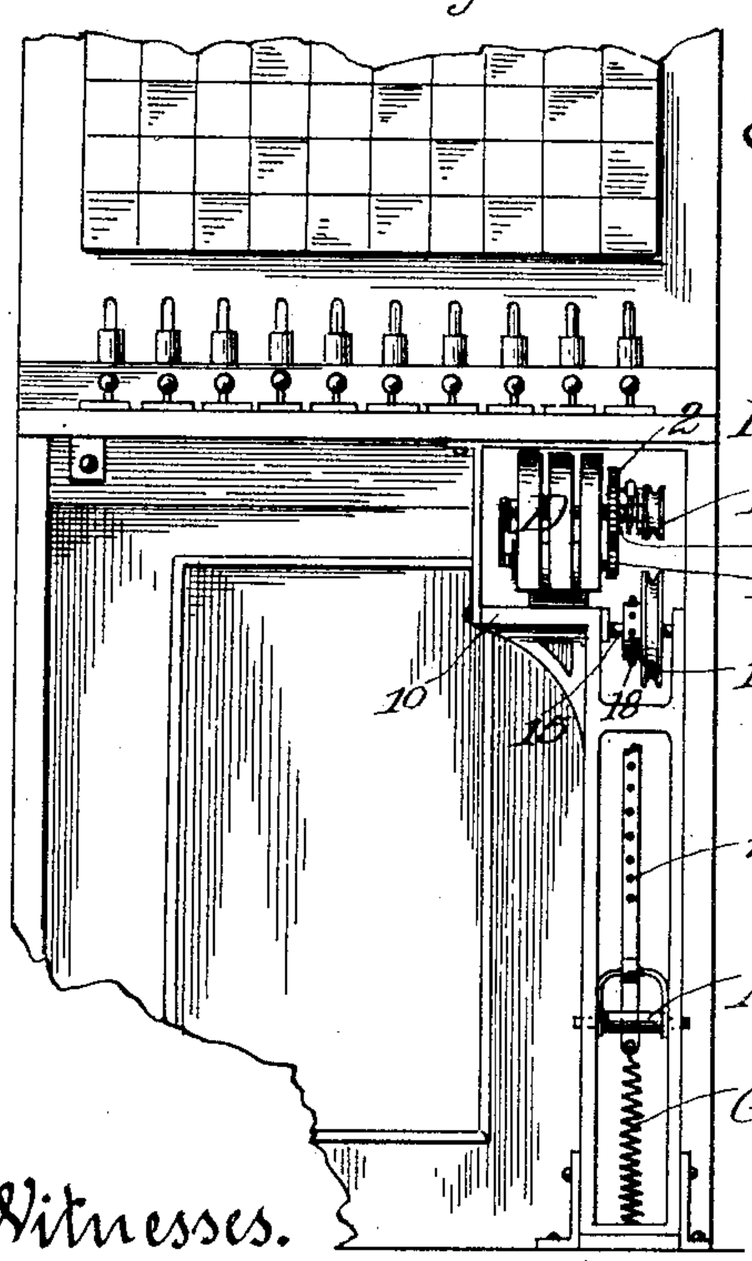


Fig. 3.

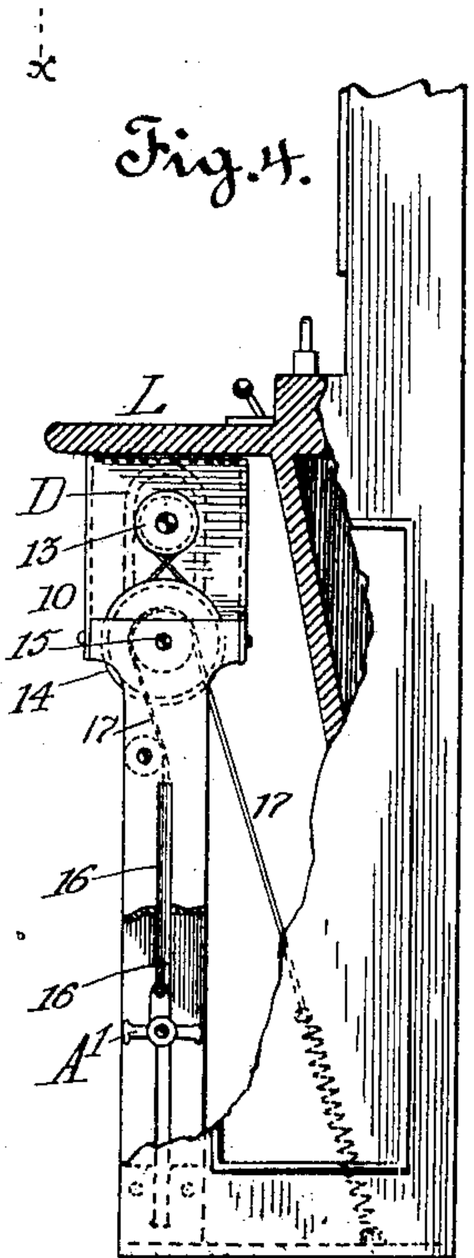


Fig. 4.

Witnesses.

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Inventor.

Ernest Krahenbuhl

by Spear & Seely Attorneys

UNITED STATES PATENT OFFICE.

ERNEST KRAHENBUHL, OF SAN RAFAEL, CALIFORNIA.

POWER-GENERATOR FOR TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 685,685, dated October 29, 1901.

Application filed July 7, 1899. Serial No. 723,090. (No model.)

To all whom it may concern:

Be it known that I, ERNEST KRAHENBUHL, a citizen of the Republic of Switzerland, (but having declared my intention of becoming a citizen of the United States,) residing at San Rafael, in the county of Marin and State of California, have invented certain new and useful Improvements in Power-Generators for Telephones, of which the following is a specification.

My invention relates to a means for driving small machinery by human power, and is particularly adapted for use at the switchboards of telephone-exchanges to furnish power for giving the bell-signals in localities where power or a current is not obtainable or is too expensive. In such switchboards as at present used the magneto-generator is usually supported by the switchboard-table in such a position as to be readily accessible to the operator and is provided with a crank or hand-wheel, which the operator is compelled to turn rapidly with one hand in order to furnish power for the bell-signals. With the other hand the operator is obliged to manipulate the switchboard-plugs and also to give the bell-signals, which operations are distinct and which under the present conditions can only be performed one after another, and consequently only for one subscriber at a time. This is a great hindrance when many calls occur at the same time. Further, the operation of turning the hand-crank rapidly and steadily, as is required to produce sufficient speed in the armature, is exceedingly laborious when long continued, especially for the young girls usually employed at the switchboards of such telephone-exchanges.

To permit the simultaneous manipulation of the switchboard-plugs with one hand and occasionally with both hands and that of as many signal push-buttons, consequently of as many independent ringings as the operator is efficient of giving with such finger of the other hand (or of both hands in case where many plugs of non-answering subscribers are on the switchboard) in a manner similar to that of the playing on the key-notes of a piano or type-writer, striking with each finger the required number of each subscriber wanted, sufficient signal push-buttons being provided, and also to do away with this awkward, difficult, and laborious way of applying power to the generator are the objects of my invention, and I accomplish my objects by connecting a foot-power mechanism to the generator of the switchboard of such exchange-offices, so that the operator can have both hands free and independent for their respective switchboard and bell-signal manipulation. Greater power can be exerted by the foot than by the hand with the same or a smaller muscular effort, and hence the gearing of said foot-power mechanism can be so arranged that a comparatively slow treadle motion will produce a quicker revolution of the armature and a better current with much less labor to the operator than is required to operate a hand-crank.

I am aware that foot-power has been applied by means of treadles to individual telephone-boxes for subscribers' use, for the purpose of simplifying the manipulations which were necessary in these primitive instruments (and which manipulations are otherwise no longer necessary nowadays) to ring up central and to keep in readiness to enter into voice connection or conversation, and on leaving the instrument the treadle returns automatically to its original position, ringing off and resuming connection with central at the same time. In these instruments the ringing feature is not independent and cannot be used for ringing independent signals as are required—viz., long, extra long, short, mixed, &c.—and much less several independent signals to different subscribers at the same time. It simply rings up for connection and off for disconnection by means of central. Consequently such combinations and attachments to telephone-boxes could not be applied to switchboard requirements and are distinct altogether from the purpose I have in view and the results I obtain.

My invention can be embodied in many different ways and means to accomplish its destined object and purpose, and I have in this specification described and in the accompanying drawings have illustrated some of such ways and means, to which, nevertheless, I do not limit myself, as my invention can be embodied in still other constructions. They are therefore described and shown as

practically illustrative of different applications of my invention, but not as its only embodiments.

In the accompanying drawings, Figure 1 is a sectional view on the line $x\,x$ of Fig. 2, showing one construction of driving means for a power-generator. Fig. 2 is a section of the same construction on line $y\,y$ of Fig. 1. Fig. 3 is a front elevation of another construction of driving means, illustrating a different relation to a switchboard. Fig. 4 is a side elevation of the mechanism of Fig. 3, the switchboard-frame being broken away. Fig. 5 is a detail view of the clutch. Fig. 6 is a cross-section of Fig. 5.

In Figs. 1 and 2 the generator is shown as supported on the floor and is supposed to be placed beneath the switchboard-table, so that the foot-treadle A is in convenient position for the operator. In Figs. 3 and 4 the generator is secured to and beneath the switchboard-table, and two adjustable clamps are shown secured to the floor and steadying the lower part of the stirrup-guides.

Referring to Figs. 1 and 2, B represents any suitable base, frame, or support, which may be provided with a hood or casing C, if desired. Mounted upon this base is the usual or any suitable magneto-generator, the one shown being composed of the horseshoe field-magnets D, rotary armature E, and commutator F. A pinion 1 on the armature-shaft derives motion from a gear 2, in whose hub is loosely adjusted a sliding shaft having its shoulders 3 corresponding to inclined shoulders 4 of the hub, so that when power is applied to this inner shaft it shifts for the time being, carrying along the gear 2 and breaking the circuit. The generator and its connections to the switchboard in themselves form no part of my invention and may be of any desired kind. I have therefore considered it unnecessary to illustrate such connections, although I have shown the switchboard in Figs. 3 and 4. The treadle A is pivoted to the base-frame, and its free end is provided with any suitable footpiece, such as the spool G. A retracting-spring G′ connects the treadle with the frame, so that when the treadle is released it is drawn back ready for another downward stroke. The treadle is provided with a rack-segment H, having interior teeth which engage with a pinion I, loose on the driving-shaft. Any desired kind of clutch can be used to transmit rotary motion in one direction to the driving-shaft. I have shown the pinion I made hollow to receive a recessed clutch-disk J, fixed upon said driving-shaft. The clutch-disk and the balls or rollers 5 within its tapered recesses 6 are held in place by a covering-plate 7, secured to the pinion, Fig. 6. At each downward stroke of the treadle the clutch connects the pinion to the driving-shaft and at each upward stroke the clutch is released. I have therefore provided a fly-wheel K on the driving-shaft to continue the motion of the shaft while the clutch is disengaged. This fly-wheel is shown as grooved to receive a band, so that in some cases it can be used to transmit power to a generator located at a distance instead of upon a shaft directly in connection. For instance, if the generator were supported by the switchboard above the treadle mechanism the armature-shaft could derive motion from the fly-wheel through a belt from the latter directly or by any desired intermediate gearing, and the periphery of the fly-wheel may carry teeth as well as having a groove. When the parts are arranged as shown, I prefer to secure an arm 8 upon the driving-shaft, whose extremity is hollowed, so as to facilitate the centering of the corresponding shaft. Said arm has a pin q, which bears against another arm r, secured to the head of the inner shaft, which inner shaft when power is applied to it partially slides within the hub of and carries along the generator-gear 2 or otherwise engages with it, and by means of which the gear 2 and armature-shaft derive a steady motion so long as the treadle is operated.

In the devices illustrated in Figs. 3 and 4 I have shown another embodiment of my invention. For convenience in understanding the relative location of the parts I have in these figures shown part of a table and switchboard. In this case the generator is supported by a bracket 10 beneath the table L and secured to the latter. The bracket is shown as placed beneath the front board of the table; but since the armature-shaft is driven by a belt it is evident that it can be placed at the rear of the table in case such position is more convenient for any reason. The bracket may also be located so that either foot may be used. The armature-shaft is provided with a pinion 1, which engages a gear 2 on a shaft 30 in the same manner as before described. The head of the inner sliding shaft, however, carries a band-pulley 13, from which a belt extends to a pulley 14, tight on the clutch-shaft 15, which in this case is the driving-shaft. This pulley serves as a fly-wheel. The treadle A′ is a stirrup having a suitable footpiece, guided in an extension of bracket 10, which is slotted at 16 to receive the ends of such footpiece. Connected to the treadle is a sprocket-chain, or, as preferred and shown, a perforated flexible band 17, which engages a sprocket-wheel 18, loose on the shaft 15. The other end of the band 17 extends downwardly and has a spring connection with the supporting-bracket. It must be understood without detailed description and illustration that the sprocket-wheel 18 is provided with a suitable clutch, such as that shown in Figs. 5 and 6, so that the shaft 15, bearing the combined pulley and fly-wheel 14, derives motion constantly in one direction.

It is obvious that other forms of treadles can be used, those shown being merely illus-

trative of suitable and practical foot-power devices for the purpose. As substitutes for the clutch shown other forms of clutches can be used, and the transmitting-shaft can derive a continuous rotary motion at both strokes of the treadle by the employment of such a device as a double-acting ratchet, well known to all skilled mechanics, instead of a single-acting clutch.

It is obvious that my device may be so constructed as to form a complete, compact, and portable instrument suitable for experimental or other purposes, always ready for immediate use and as such be manufactured as a complete article.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A portable attachment for operating electrical connections, comprising a frame or bracket, an electrical generator mounted in said bracket, and a foot-treadle also mounted in said bracket and connected to the generator-shaft.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 21st day of June, 1899.

ERNEST KRAHENBUHL.

Witnesses:
L. W. SEELY,
FANNY BURT.