

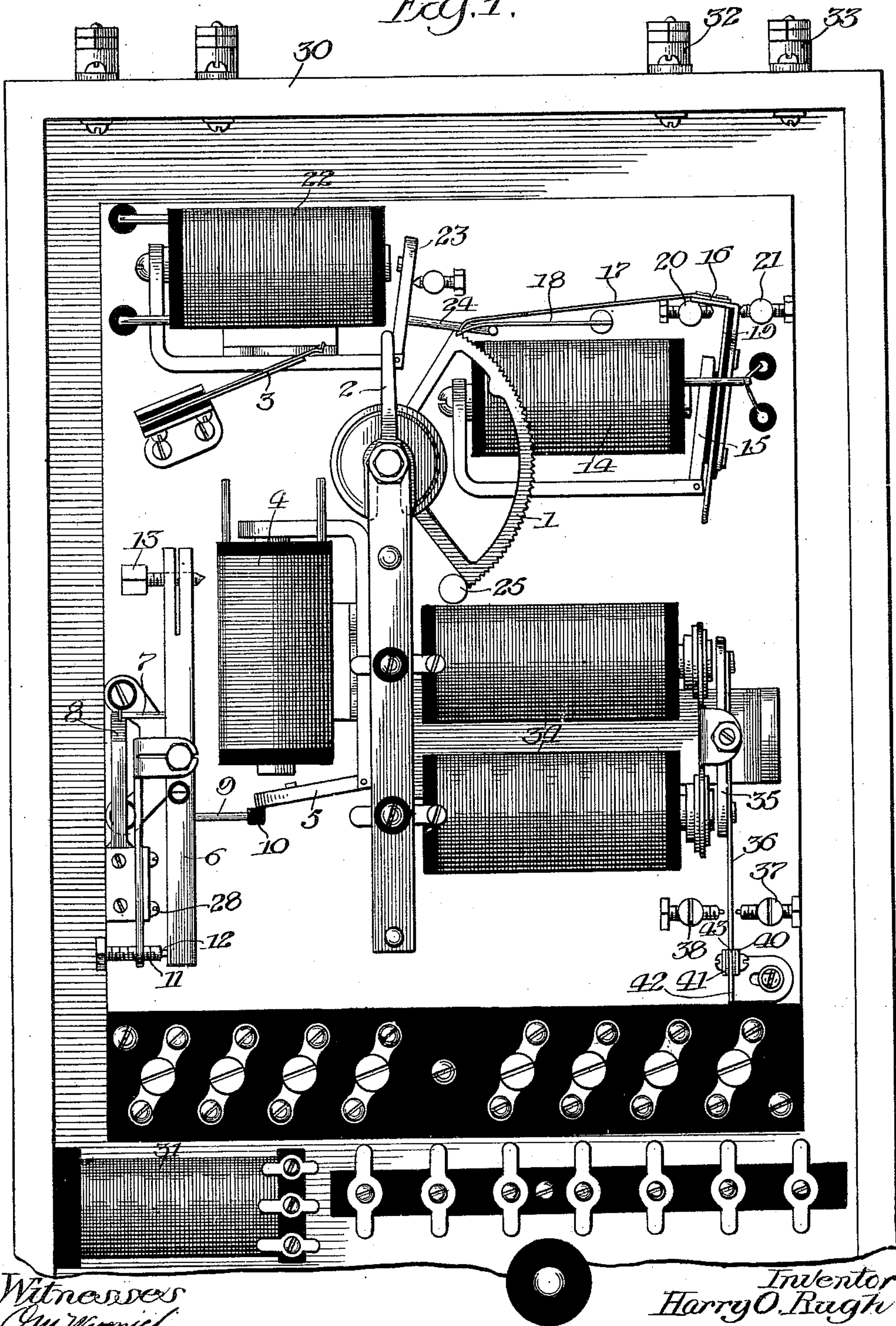
H. O. RUGH.  
SUBSTATION SELECTOR.  
APPLICATION FILED NOV. 13, 1909.

995,294.

Patented June 13, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
Chas. W. Wignall  
Frank Elliott

Inventor  
Harry O. Rugh  
by Max W. Fabel, Attor

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2 SHEETS—SHEET 2.

Fig. 2.

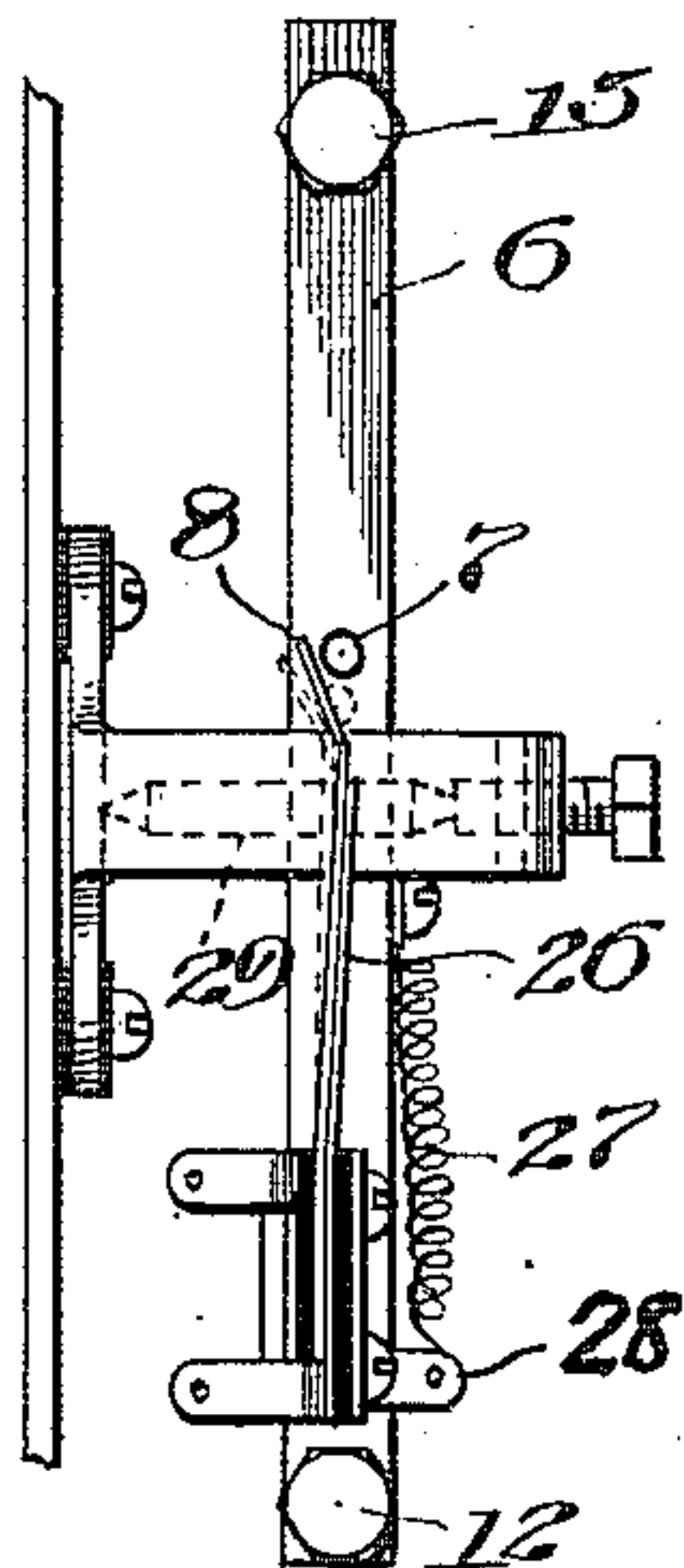


Fig. 3.

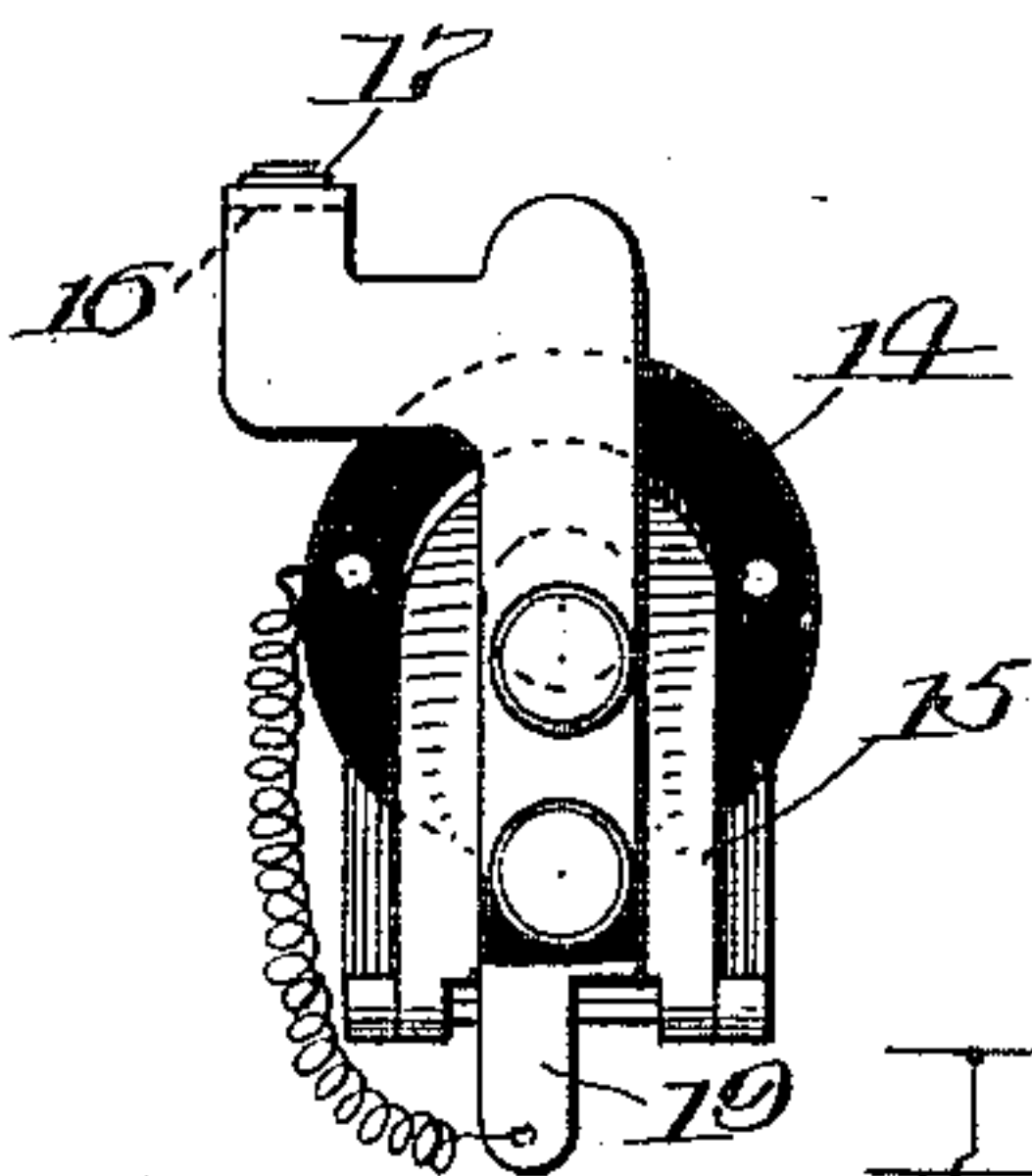


Fig. 5.

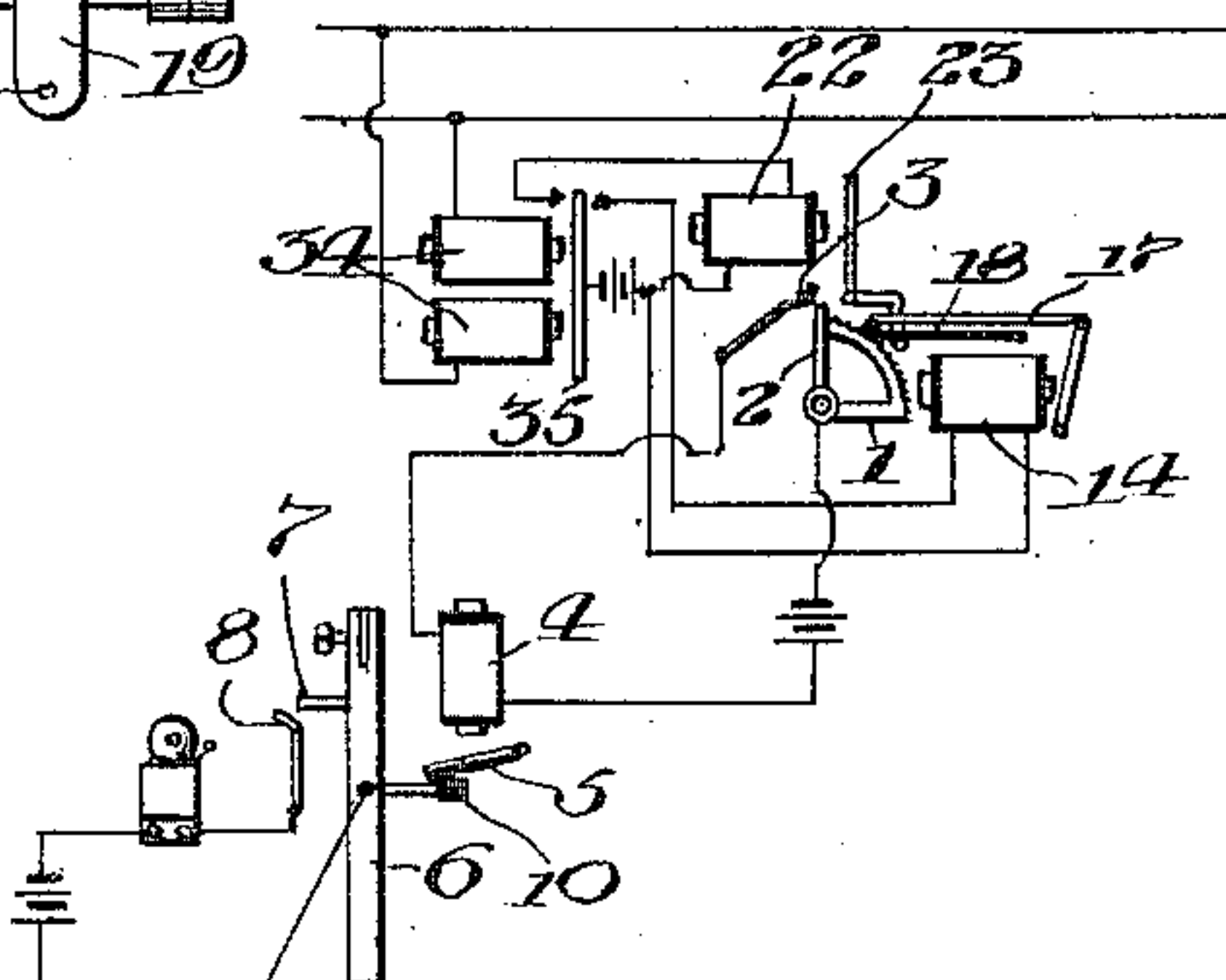
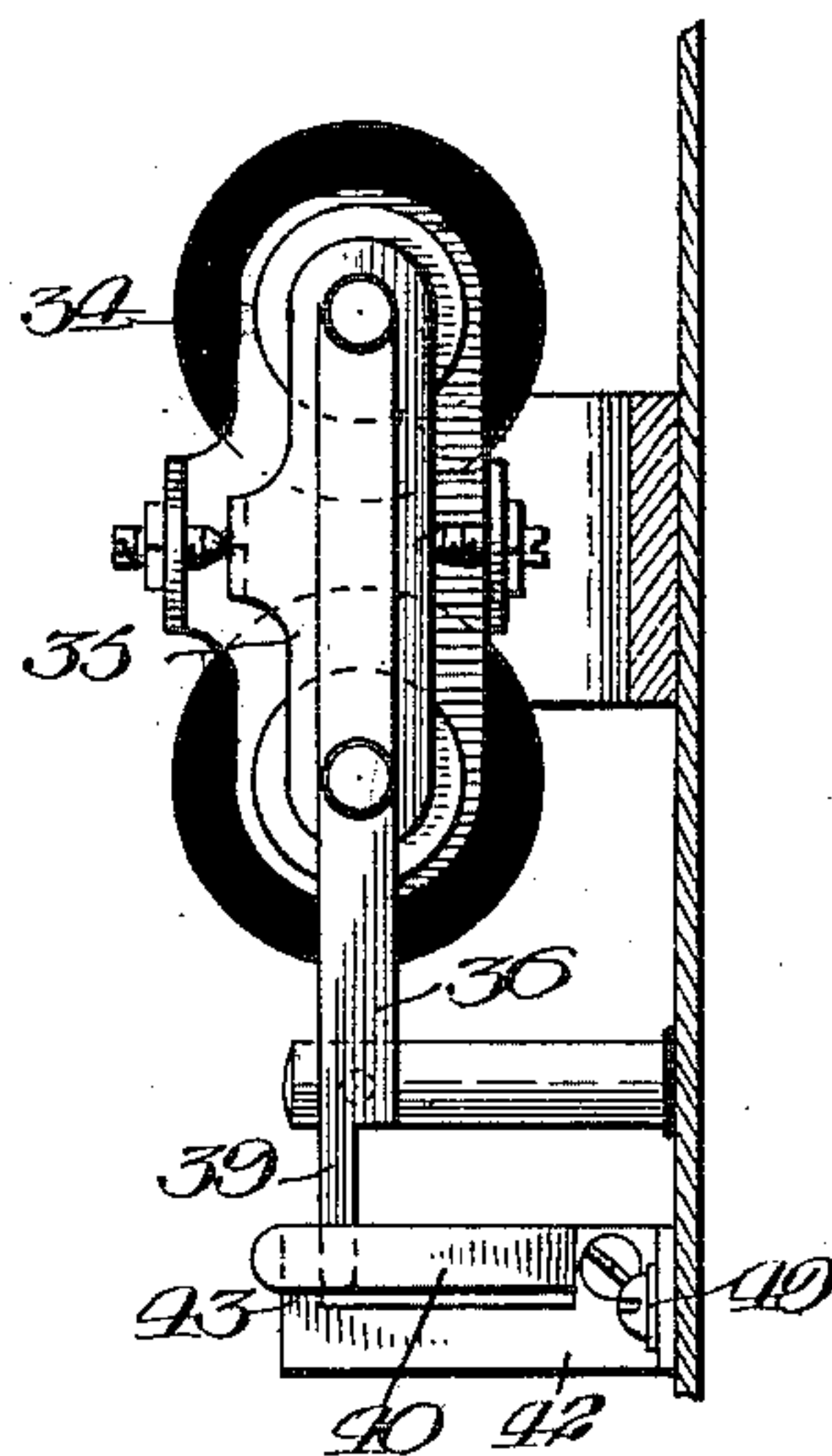


Fig. 4.



Witnesses  
O. M. Vermick  
Jean Elliott

Inventor  
Harry O. Rugh  
by May W. Zabel  
Atty



# UNITED STATES PATENT OFFICE.

HARRY O. RUGH, OF SANDWICH, ILLINOIS, ASSIGNOR TO SANDWICH ELECTRIC COMPANY, OF SANDWICH, ILLINOIS, A CORPORATION OF ILLINOIS.

## SUBSTATION-SELECTOR.

995,294.

Specification of Letters Patent. Patented June 13, 1911.

Application filed November 13, 1909. Serial No. 527,859.

*To all whom it may concern:*

Be it known that I, HARRY O. RUGH, citizen of the United States, residing at Sandwich, in the county of Dekalb and State of Illinois, have invented a certain new and useful Improvement in Substation-Selectors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to substation selectors which are used in connection with electric circuits when one station unites a plurality of substations with a central station. One of my improved substation selectors is placed at each station, and is adapted to operate a local signal. When the selection of the proper station desired has been made from the central station, the substation selector depends upon the receipt of impulses in the preferred embodiment shown herewith, and more particularly upon positive or negative impulses, although the character of the impulses may be varied, as is particularly applicable in connection with the central station call box illustrated in my application Serial No. 493,940, filed May 4, 1909.

My invention herein disclosed sets forth a number of the mechanical details involved, tending toward the perfection of the working parts involved in the construction of a substation selector of this kind. In the construction of selector systems of the type herein shown, it is of extreme importance that the mechanical features involved be properly taken care of, and it is after much experimentation that the construction herein disclosed has been found satisfactory, not only in theory, but also in practice.

I will describe the preferred embodiment of my invention, as herein shown, by reference to the accompanying drawings, in which—

Figure 1 represents a front view of the selector as it is mounted within its case. Fig. 2 is a detail view of the slow-moving element used in its operation. Fig. 3 is a detail view of the armature construction of one of the magnets; Fig. 4 is a detail view

of the operating relay, and Fig. 5 is a diagrammatic view of the circuit conditions.

Referring more particularly to Fig. 1, I show a step-up element 1, rotatably mounted, and having a pointer 2, which can be set to correspond to a desired number of impulses, which pointer is designed to operate in connection with a spring 3, the parts being so arranged that when the pointer 2 establishes a connection with a spring 3, a magnet 4 is energized to attract its armature 5, which thereupon, if the energization of the magnet 4 is of sufficient duration, permits a slow-moving element 6 to rotate in a contra-clockwise direction until a finger 7 establishes contact with a spring 8. When the impulses are sent rapidly, and the pointer 2 only momentarily touches the spring 3 as it passes it, then the slow-moving element 6 does not have time to close its contact, and no signal is received. The closing of the contacts 7 and 8 serves to establish a local signal circuit, the illustration of which will be obvious, but has been omitted for the sake of clearness.

The slow-moving element 6 consists of a bar substantially vertically arranged, and held out of its normal position of equilibrium by means of the finger 9, whose cap of insulation 10 is held in the position shown due to the weight of the armature 5 when not attracted. A stop 11 having an insulated portion 12 governs the movement of the bar 6. The bar or slow-moving element 6 is supported approximately at its middle point, and has a weighted screw 13, the adjustment of which determines its position of equilibrium.

The step-up element 1 is under the control of a magnet 14, having an armature 15, which armature has, secured to it, a plate 16, carrying a leaf spring 17, which leaf spring tends to press downwardly, and engage the teeth of the step-up element 1. A leaf spring pawl 18 normally holds the step-up element in any position to which it may be stepped up by the spring 17. The magnet 14 also carries a contact plate 19, which is designed to make electrical contact with a binding post 20. This binding post and



contact plate are of particular utility when two signals are under the control of the selector, as set forth more in detail in Patent No. 956,782, issued May 3, 1910. A binding post 21 limits the backward movement of the armature 15, and its associated contact-making devices. The step-by-step element 1 is also under the control of a second magnet 22, having an armature 23, carrying a finger 24, which finger projects under springs 17 and 18, and when said magnet 22 is energized, it withdraws the spring from engagement with the step-by-step element 1, and allows it to come back to its normal position, which is the one shown in the illustration, and in which it rests against a stop 25.

The construction of the contact-making devices of the magnet 14 will be more clearly apparent from the illustration shown in Fig. 3, in which the details are more clearly set forth. Likewise, Fig. 2 shows the slow-moving element 6 in side view, illustrating the position of the contact-making finger 7, in its association with the spring 8, which spring 8 rests against a stronger spring 26 to hold it in its limiting position forwardly. A coiled spring 27 establishes contact from the contact terminal 28 to the slow-moving element 6. The shaft 29 of the slow-moving element is pivoted as shown in dotted lines.

The case 30, within which all of the apparatus is mounted is shown without its cover, and also is shown broken away at its lower portion as said lower portion does not form a part of my invention, being simply designed to cover batteries. A transformer 31 is also provided within the casing, which is connected to the terminal posts 32 and 33, so that a telephone instrument may be connected therewith, which telephone instrument is designed for metallic service, and is then connected in bridge of a relay 34, having two coils, which I prefer to call a polar three-position relay, which relay is designed to have its armature 35 normally in the position shown, but capable of occupying two limiting positions, one on either side of the position shown. The relay 34 is adapted to receive impulses, and when the impulses are of a positive character, the armature 35 moves in a contra-clockwise direction, thereby establishing contact between the plate 36 and a binding post 37, the establishment of which contact serves to energize the relay 14. When negative impulses are sent through the relay 34, the armature 35 moves in clockwise direction, and the plate 36 establishes contact with a binding post 38, thereby energizing magnet 22 to restore the step-by-step element 1 to normal. In connection with the

relay 34, I have provided an improved armature construction, in which the plate 36 has a downwardly projecting finger 39, which is held in its central position by two springs 40 and 41, suitably mounted upon a standard 42, which standard has an upwardly projecting finger 43, to normally hold the springs 40 and 41 apart, and provide space for the finger 39.

It will be seen that instead of the necessity of having contact made through the bearings of the armature 35, contact with the frame of the machine is always established through the plate 49, carrying the standard 42, to which springs 40 and 41 are secured, one of which is always in contact with the finger 39.

I have described the operation of the various instrumentalities as they cooperate to produce the desired result,—namely, to selectively operate the step-by-step element 1 to call a predetermined station.

I do not limit myself to the precise arrangements as set forth above, but

What I claim as new and desire to secure by Letters Patent is:

1. A substation selector having a step-by-step element, a relay under the control of said element, said relay having an armature and a slow-acting circuit-changing element under its control, said element consisting of a centrally pivoted substantially vertical bar held away from its position of equilibrium by said armature, a finger projecting from said element having its armature engaging end insulated, and electrical contacting portions controlled by said bar.

2. A substation selector having a step-by-step element, a relay under the control of said element, said relay having an armature and a slow-acting circuit-changing element under its control, said element consisting of a centrally pivoted substantially vertical bar held away from its position of equilibrium by said armature, a finger projecting from said element having its armature-engaging end insulated, electrical contacting portions controlled by said bar, and an insulated stop for said bar.

3. A substation selector having a step-by-step element, a relay under the control of said element, said relay having an armature and a slow-acting circuit-changing element under its control, said element consisting of a centrally pivoted substantially vertical bar held away from its position of equilibrium by said armature, a finger projecting from said element having its armature-engaging end insulated, electrical contacting portions controlled by said bar, an insulated stop for said bar, and an adjustable weight for said bar.

4. A substation selector having a step-by-step element, a relay under the control of said element, said relay having an armature and a slow-acting circuit-changing element  
5 under its control, said element consisting of a centrally pivoted substantially vertical bar held away from its position of equilibrium by said armature, an armature engaging finger projecting from said element, and

electrical contacting portions controlled by 10 said bar.

In witness whereof, I hereunto subscribe my name this 2nd day of Nov. A. D., 1909.

HARRY O. RUGH.

Witnesses:

E. C. HENNIS,  
J. E. WHITE.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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