

(No Model.)

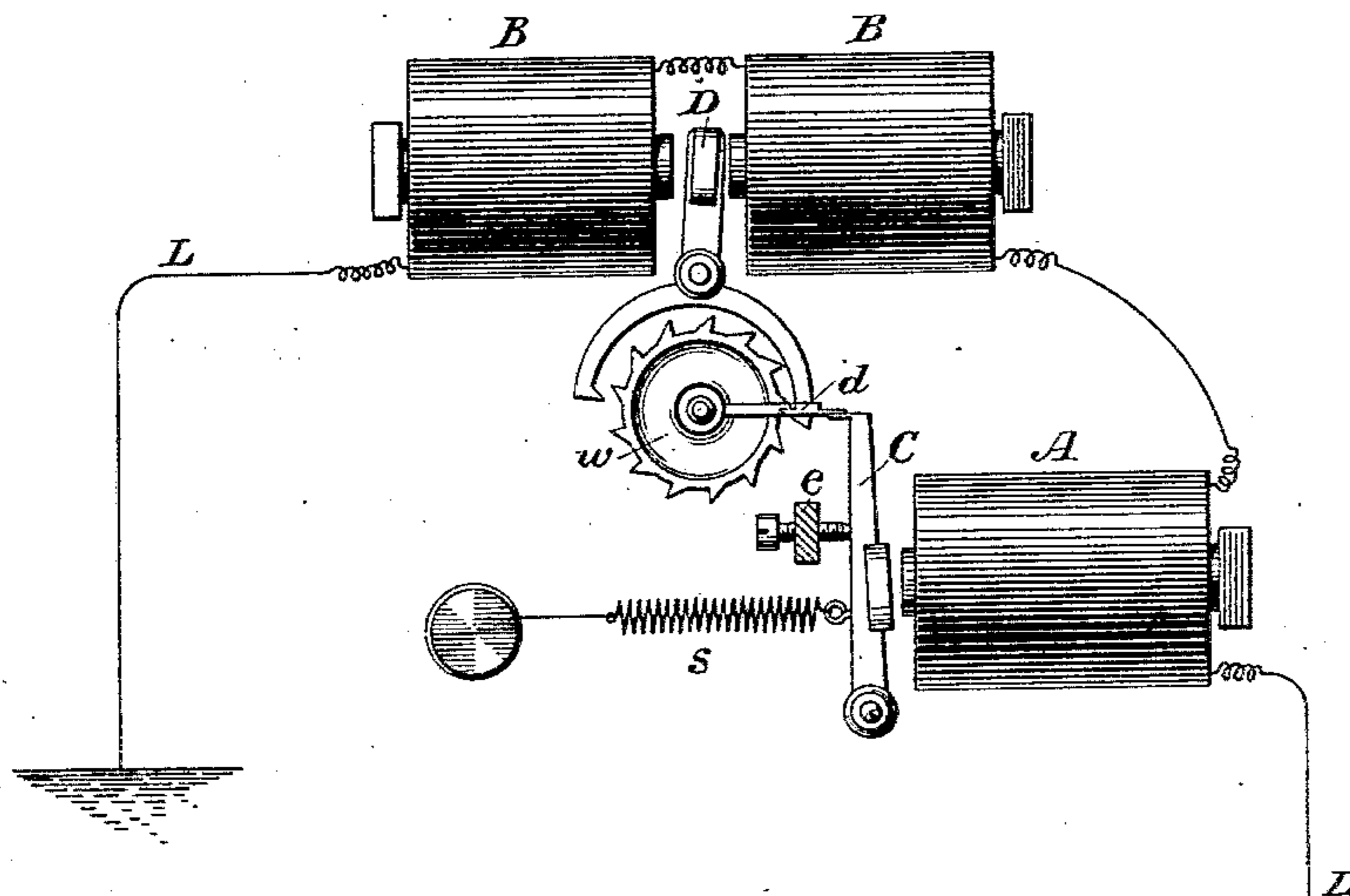
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UNISON APPARATUS FOR PRINTING TELEGRAPHS.

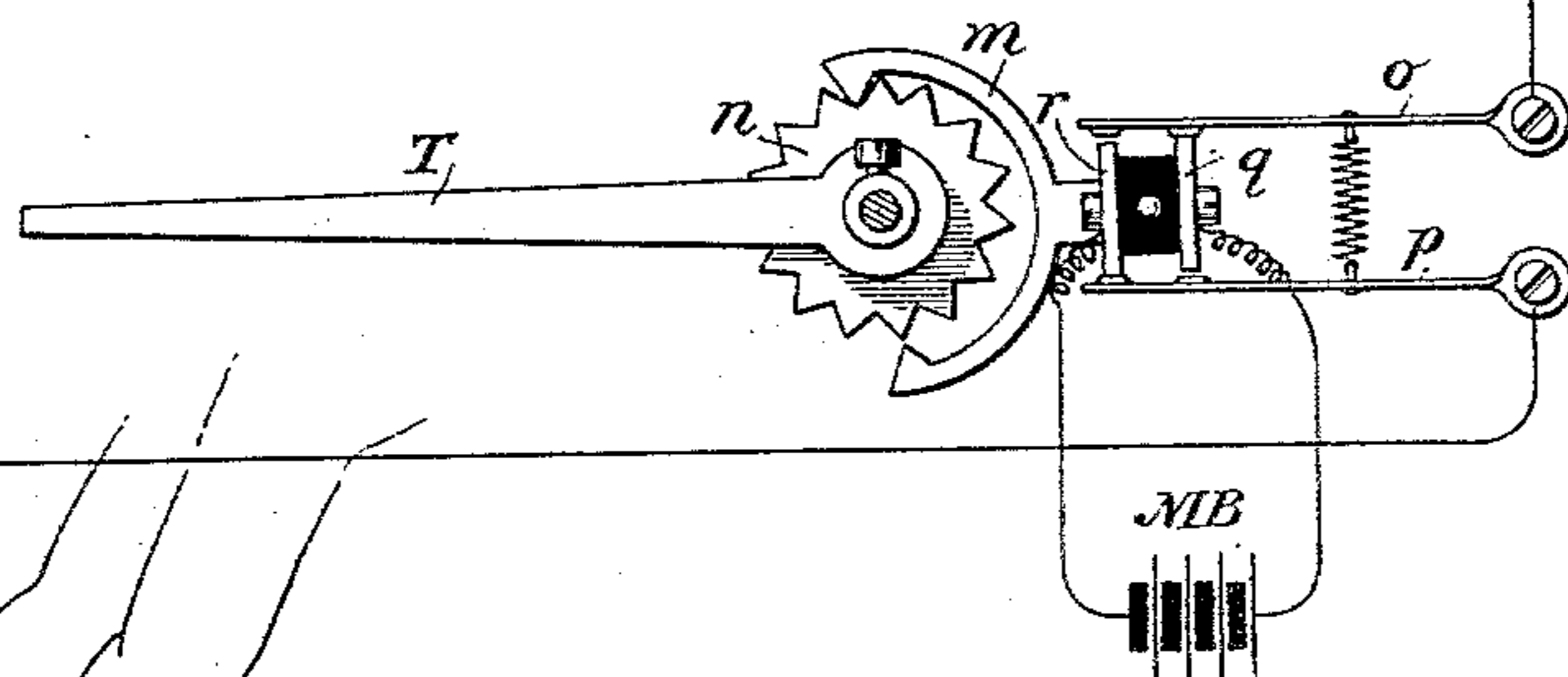
No. 304,007.

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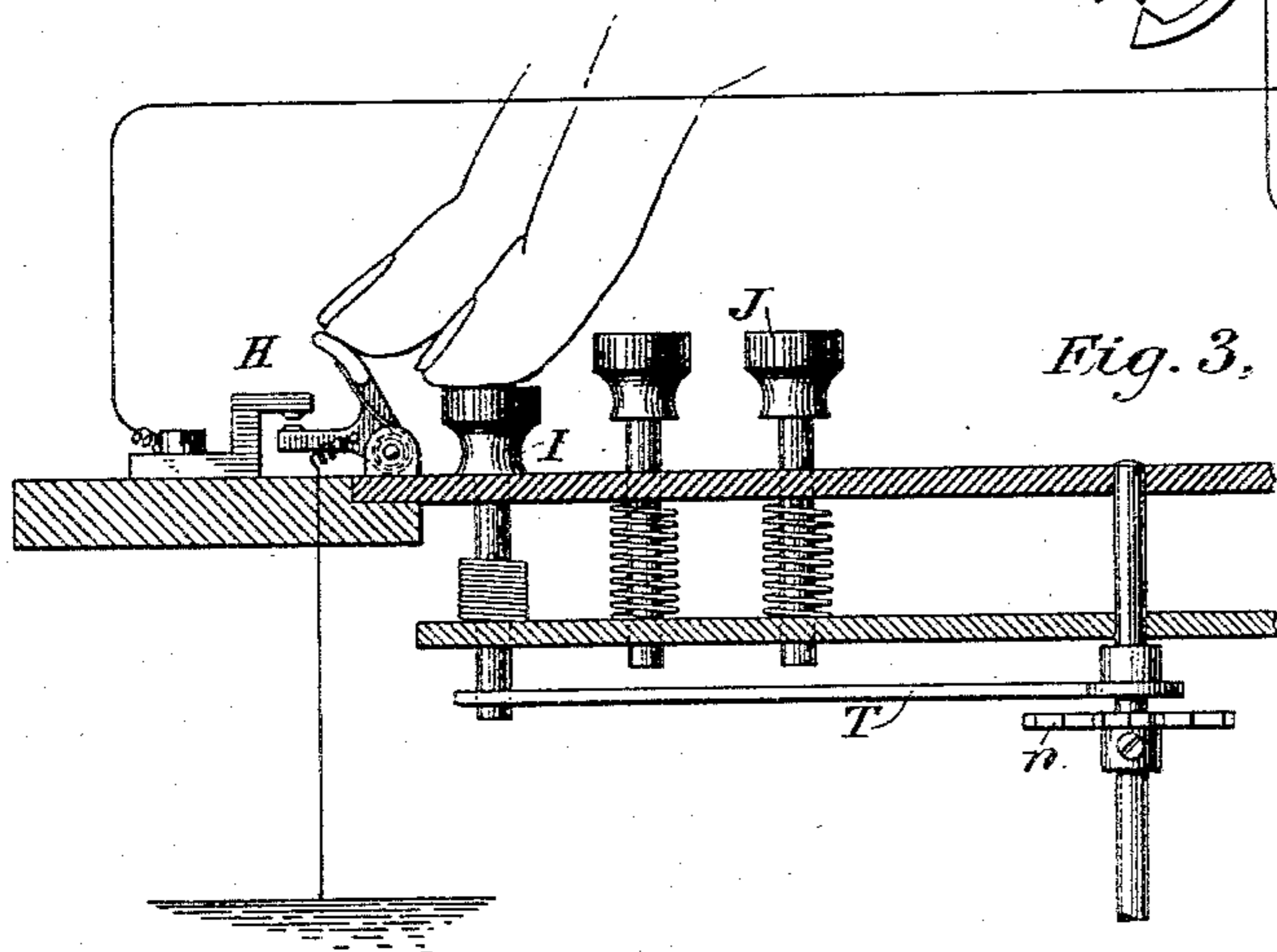
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses

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# UNITED STATES PATENT OFFICE.

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## UNISON APPARATUS FOR PRINTING-TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 304,007, dated August 26, 1884.

Application filed May 6, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, ADOLPHUS A. KNUDSON, of the city of Brooklyn, county of Kings, and State of New York, a citizen of the United States of America, have invented a new and useful Improvement in Unison Apparatus for Printing-Telegraphs, of which the following is a specification.

My invention consists in the employment of  
10 a radial rotating arm rigidly fixed upon a type-wheel shaft, and an armature-lever which, under varying current conditions of the main line, is adapted to rest in the path of the rotating unison-arm or be removed therefrom. The  
15 unison armature-lever is controlled by electro-magnetism derived from the main-line circuit and a retracting-spring. The retracting-spring is so adjusted that when said armature-lever is once attracted to the cores of the electro-magnet the unison armature-lever will be  
20 retained in that position as well by short electrical pulsations or quick reversals of current as by prolonged pulsations, and when the armature-lever has been attracted to the cores of its electro-magnet it will only be withdrawn  
25 by the retracting-spring upon a long cessation of current in the main-line circuit. The retracting-spring is also so adjusted that when the unison armature-lever is retracted from  
30 the cores of its electro-magnet it will not again be attracted until a prolonged impulse has been transmitted over the main line. When it is desired to effect unison, therefore, in the several printing-telegraph instruments of a series,  
35 a unison-switch is depressed, which breaks the main-line circuit. Thereupon the unison armature-lever is moved by its retracting-spring into a position to arrest the rotating unison-arm. When the unison armature-lever has  
40 been thus retracted, a series of electrical impulses is transmitted over the main line of sufficient number to bring the rotating unison-arm around into contact with the unison armature-lever. When it is thought that the  
45 rotating unison-arms have all been brought to a unison-point and there arrested, a unison-key at the transmitter is depressed, which also arrests the transmitter at a unison position. Upon depressing the unison-key and arresting  
50 the transmitter a prolonged current will be

sent to line, which will both lock the escapements of the receiving-instruments and at the same time withdraw the unison armature-levers from the path of the rotating unison-arms. The unison armature-levers being thus  
55 withdrawn from the rotating unison-arms, and the main-line circuit being again closed, the transmitter may be released by the unison-key, when the transmitter and type-wheels will, all in unison, resume their step-by-step  
60 rotation from their zero-points.

I will now describe my invention by reference to the accompanying drawings.

Figure 1 represents the escapement and unison apparatus of the receiving printing-telegraph instrument. Fig. 2 represents the pole-changing apparatus and rotating arm of the transmitter. Fig. 3 represents the unison-switch, unison-key, and a series of ordinary character-keys of the transmitter.

L is a main line embracing the coils of the escapement electro-magnets B B, the coils of unison-magnet A, the springs *o p* of the automatic pole-changer, and metallic plates *q r*, main-line battery M B, and unison-switch H.

T is the rotating arm of the transmitter, mounted upon a shaft with spur-wheel *n*, which is under the constant influence of a motor.

*m* is the pallet-yoke, to which are rigidly fixed the metallic plates *q r*, said plates being  
80 insulated from each other, and respectively connected to the opposite poles of the battery M B.

J, Fig. 3, represents one of the series of transmitting-keys for arresting the rotating  
85 arm T in different radial positions.

I is a unison-key for arresting transmitter-arm T in the unison position.

C is a unison armature-lever controlled by the unison electro-magnet A and retracting-spring *s*.

*e* is a back-stop for lever C.

*d* is the rotating unison-arm, rigidly fixed upon the same shaft with the escapement-wheel *w*, whose step-by-step motion is controlled by the armature D and an escapement of the ordinary form.

The operation of bringing the instruments to unison, and of enabling a resumption of their step-by-step rotation, all in unison with  
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the transmitter in the process of printing, is as follows: If it is assumed that the type-wheels of the receiving-instruments are not rotating in unison with the transmitter, the unison-switch H is depressed, as shown in Fig. 3, thereby breaking the main line L, and causing the unison armature-lever C to be retracted by spring s into the path of the rotating unison-arm d. At the same time the unison-key I may or may not be depressed to arrest transmitter-arm T. Under this condition the type-wheels of the receiving-instruments may remain stationary, and the unison armature-lever in a position to arrest the type-wheels upon the resumption of electrical impulse over the main line.

To bring the rotating unison-arm into a unison position, the transmitter is first started to rotate, and then the unison-switch H is released to close the main line. When the main line is closed, a series of short electrical impulses will be transmitted over the main line, and while the unison armature-lever C is not attracted to the cores of unison-magnet A, armature D is rapidly vibrated, and the rotating unison-arm d is rotated into contact with armature-lever C. A sufficient number of electrical impulses must be transmitted to line to cause all of the type-wheels to be given at least a complete rotation, in order to insure unison in all of the receiving-instruments upon the line.

It is obvious that while the unison armature-lever is retracted to a position to arrest the rotating unison-arm, a prolonged impulse must not be sent to line before said rotating unison-arm has been brought to its unison position, otherwise the armature-lever C would be attracted from its proper position for effecting unison. To avoid such difficulty it is therefore obvious that the transmitter must be started before the main line is again closed by the unison-switch, in order that only short electrical impulses may be transmitted before arm d has been brought to its unison position. After unison has been effected, it is only necessary that the unison-key I be depressed to arrest the transmitter at the unison-point. The arresting of the transmitter at the unison-point causes the transmission to line of a pro-

longed current, and at the same time withdraws the unison armature-lever from the path of the rotating unison-arm d. Upon the releasing of the unison-key I transmitter-arm T resumes rotation, thereby causing a series of electrical impulses to be transmitted to line, and a corresponding step-by-step rotation of the type-wheels in unison with the transmitter.

What I claim, and desire to secure by Letters Patent, is—

1. In a printing-telegraph instrument, the combination of a rotating unison-arm, a unison armature-lever, a unison-switch for opening and closing the main-line circuit, and a unison-key and transmitting-arm for the purpose of arresting the transmitter at unison, substantially as described.

2. In a printing-telegraph instrument, the combination of a single main line, a rotating unison-arm, a unison armature-lever, and a retracting-spring which can only withdraw said armature upon a prolonged cessation of current, and whose tension is only overcome by a prolonged current, a unison-switch for breaking the main-line circuit to permit the retraction of said unison armature-lever, and a transmitter placed in said line for sending a series of electrical impulses to line, as and for the purpose described.

3. In a printing-telegraph instrument, the combination of a single main line, a rotating unison-arm, a unison armature-lever, a retracting-spring therefor, so adjusted that said armature-lever will be retained attracted to the cores of its electro-magnet under the influence of short as well as prolonged electrical currents, and will remain retracted under the influence of short electrical impulses, and will be attracted from its back position by a prolonged impulse only, a circuit-closer for sending short impulses, and a manually-operated device to break the main circuit to effect a prolonged cessation of current, and to close it to send a prolonged impulse.

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Witnesses:

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