(No Model.) 4 Sheets—Sheet 1.

P. WENDELBOE.

MEANS FOR LIMITING TENSION OF DRIVING SPRINGS.

No. 525,037. Patented Aug. 28, 1894.

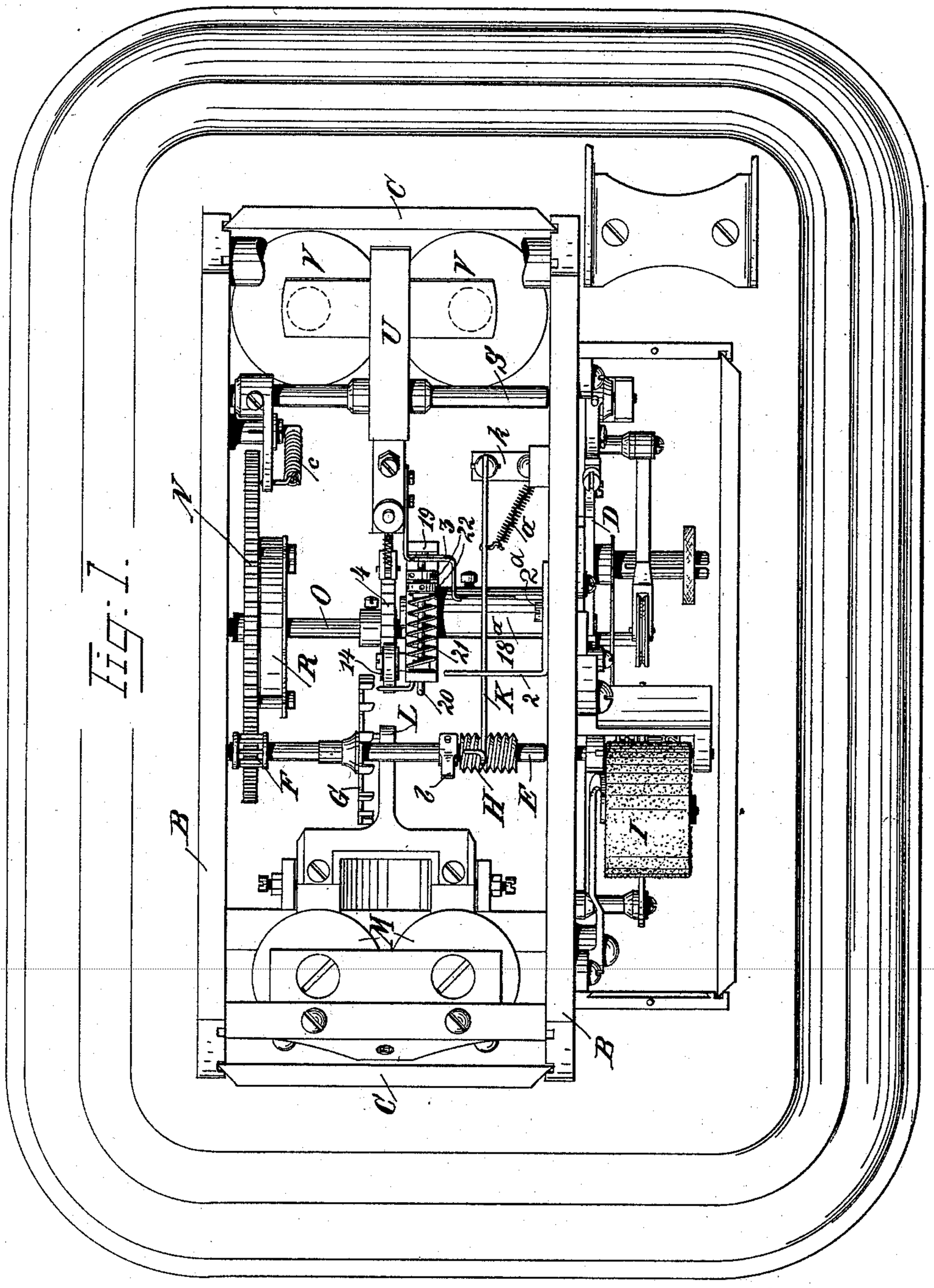


FIG. 1.

Witnesses
D. Lehi-Palmer.
O. Campbell.

Inventor
Paul Wendelboe
By his Attorneys
Wilcox, Barkley & Brodek

(No Model.) 4 Sheets—Sheet 2.

P. WENDELBOE.

MEANS FOR LIMITING TENSION OF DRIVING SPRINGS.

No. 525,037. Patented Aug. 28, 1894.

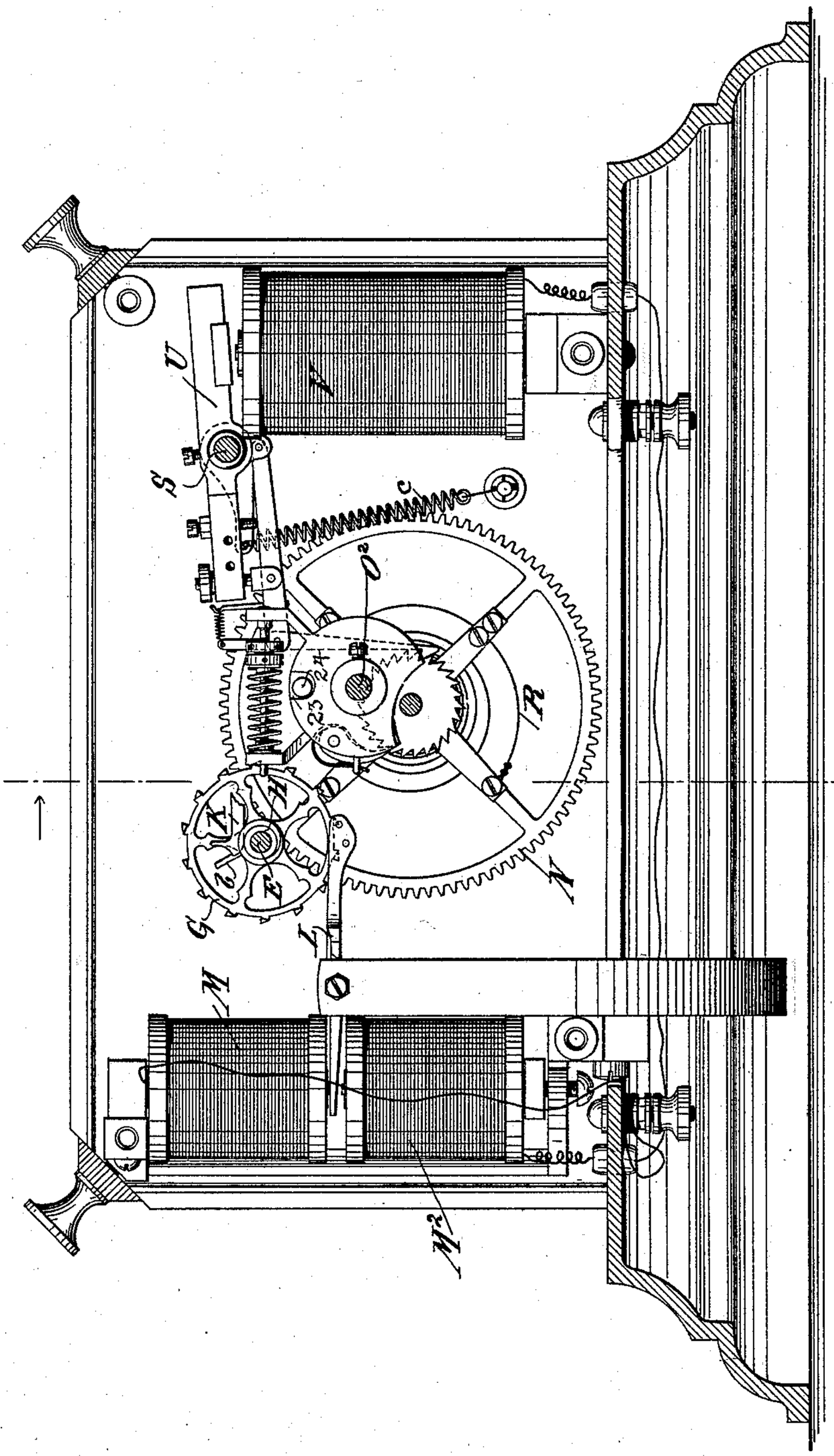


Fig: 2.

Witnesses
D. Pehr Palmedy
A. Campbell

Inventor
Paul Wendelboe
By his Attorneys
Wilcox, Barkley & Broderick.

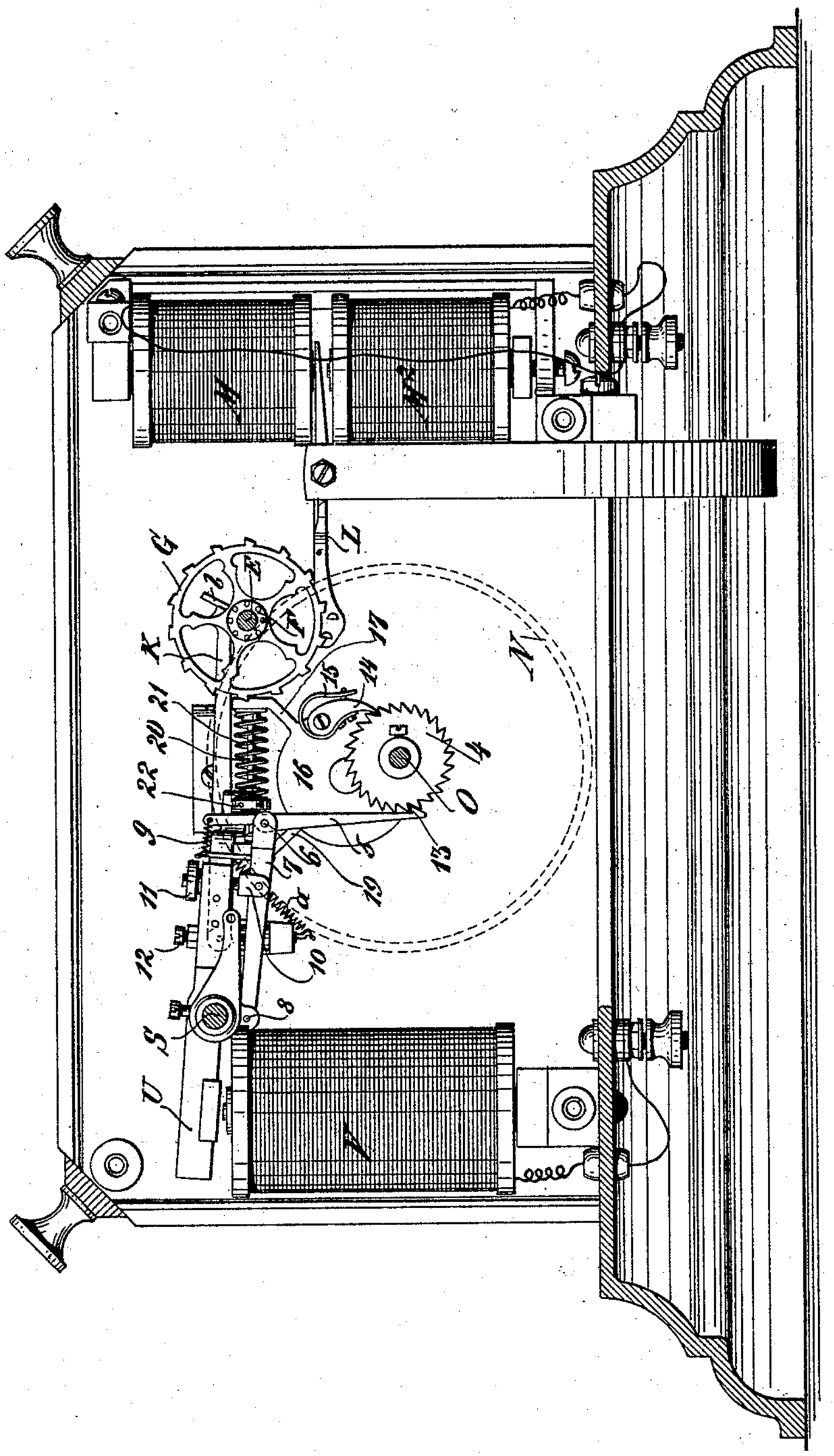
(No Model.) 4 Sheets—Sheet 3.

P. WENDELBOE.

MEANS FOR LIMITING TENSION OF DRIVING SPRINGS.

No. 525,037. Patented Aug. 28, 1894.

Fig. 4.



Witnesses
F. Peñi-Palmedo
O. Campbell.

Inventor
Paul Wendelboe
By his Attorneys
Wilcox, Barkley & Brodek

(No Model.) 4 Sheets—Sheet 4.

P. WENDELBOE.

MEANS FOR LIMITING TENSION OF DRIVING SPRINGS.

No. 525,037. Patented Aug. 28, 1894.

Fig. 4.

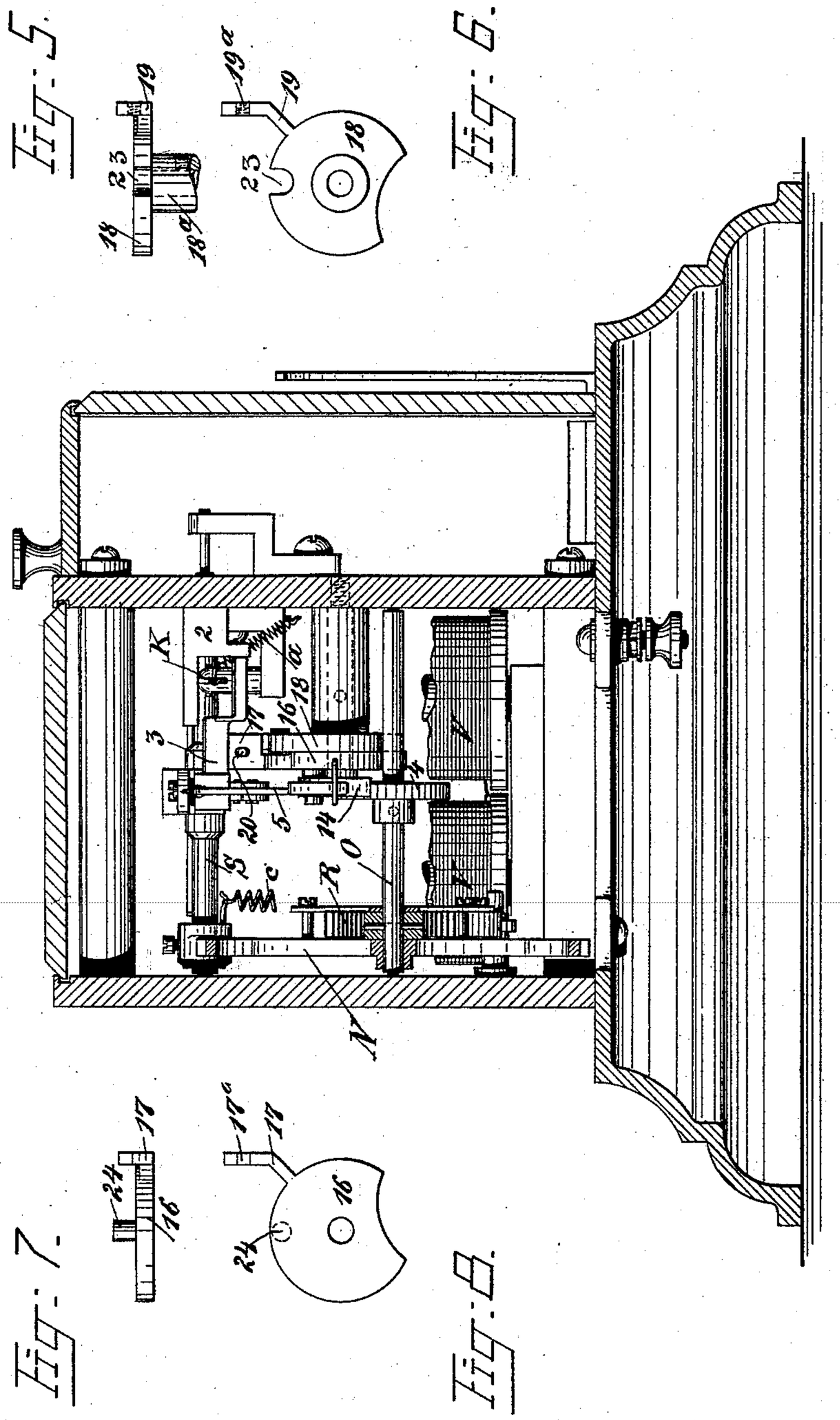


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Witnesses
S. Peter Palmer
A. Campbell

Inventor
Paul Wendelboe,
By his Attorneys
Wilcox, Barkley & Brodek

UNITED STATES PATENT OFFICE.

PAUL WENDELBOE, OF NEW YORK, N. Y., ASSIGNOR TO THE STOCK QUOTATION TELEGRAPH COMPANY, OF SAME PLACE.

MEANS FOR LIMITING TENSION OF DRIVING-SPRINGS.

SPECIFICATION forming part of Letters Patent No. 525,037, dated August 28, 1894.

Application filed February 27, 1894. Serial No. 501,704. (No model.)

To all whom it may concern:

Be it known that I, PAUL WENDELBOE, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Means for Limiting the Tension of Driving-Springs, of which the following is a specification.

This invention relates more particularly to that class of machines known as printing telegraph or ticker instruments, though it is equally applicable to all clock-work instruments which are driven by springs automatically wound from time to time. The objects are to prevent the over-winding of the drive-springs of such instruments while keeping them sufficiently wound to do the work required of them in an efficient manner, and the general improvement of such instruments.

The general plan of driving printing telegraph instruments has been to do so by means of weights or springs which must be wound up from time to time, a plan which entails constant attention to keep the machines in running order; another plan is to drive these machines by springs which are wound by mechanism operated by electro-magnets, such as the printing magnet, so-called, of such machines. While it is true that, taking long periods of time into account, the number of impulses for feeding the type-wheels bears a substantially fixed relation to the number of "printing" impulses, yet this number is but an average, and, as such, is subject to variations when short periods of time are taken into account. Hence, it is impossible to so adjust the spring-winding mechanism that there will not be at times a running down of the spring and at other times an over-winding thereof, leading to breakages and other annoyances. I am aware that efforts have been made to avoid these defects and to remedy them, but I am not aware that these have been successful.

To overcome these defects, therefore, this invention consists of the combination with such driving-spring and the step-by-step winding mechanism therefor, of detent-devices provided with a yielding member adapted to give or yield whenever the driving-spring exerts the greater power; that is, the detent-devices are adapted to make excursions to and fro whenever the driving-spring has been wound to a certain tension, so that no more winding thereof takes place until it has expended some of its strength in performing its function of driving certain mechanism.

The invention also includes certain other features or combinations, and is hereinafter more particularly described and then pointed out in the concluding claims.

The preferred form of the invention is shown in the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view showing the driving-spring, the step-by-step winding mechanism therefor, the yielding detent-devices, and the printing mechanism. Fig. 2 is an elevation, partly in section, showing the same from the front of Fig. 1. Fig. 3 is a like view from the back of Fig. 1, taken inside the driving-spring. Fig. 4 is a sectional end view on the plane indicated in Fig. 2 by the line 4—4, and showing the aforesaid spring, and the winding and detent mechanisms. Figs. 5 and 6 are respectively plan and side views of the stop and spring-supporting means for the detent-devices shown in Figs. 1, 2, 3, and 4. Figs. 7 and 8 are respectively plan and side views of the detent-carrier shown in Figs. 1, 2, 3, and 4.

The printing telegraph instrument shown in the drawings is, in its general features, not very different from that shown in Letters Patent numbered 354,001, dated December 6, 1886, and granted to Aloys Wirsching, which machine consists of a suitable base A upon which are fast two metal standards B to receive and support the working parts thereof; of the glass slides or ends C and a suitable cover, combined with the standards B, to form the casing inclosing the magnets and other parts, while the type wheel, platens and inking parts are inclosed by one of the standards B, the brackets or standards B^2, a glass slide C, and a suitable cover; of the type-wheel, the inking roller, the platens, which are carried by the lever D, and the other accessories of the printing devices which are or may be similar to the same parts in the patent aforesaid, and so need no extended description here. The

lever D is mounted in the usual manner on the end of the shaft S which carries the armature U of the electro-magnets V; the spring *c* normally holds the said armature in its raised position shown in Fig. 2. The type-wheel is mounted on the end of the shaft E, which also carries the usual worm H and stop *b* which coact with the arm K, and form the common "unison" device. This shaft E also carries the escapement wheel G and a barrel pinion F. The arm K is pivoted to the bracket *k* in the usual manner, and is drawn away from the stop *b* by the spring *a*. The teeth of the escapement wheel G coact with the pallets of lever L in the well-known manner. The lever L forms the armature of the polarized magnets M and M^2, moving toward one or the other according to the direction of the current therethrough. The pinion F meshes with the pinion N, which is loose on the shaft O. This pinion N is connected by the driving-spring R, the ends of which are fast to said pinion and shaft. The devices thus far described are or may be of usual and well-known construction.

According to the present invention, there is fixed upon the shaft O a ratchet wheel 4, with which the feed pawl 5 engages to wind the spring R, the working face of the pawl being separated by preference from the tooth with which it next coacts by a small space, as 13, for a purpose hereinafter set forth. The pawl 5 is pivotally connected at 6 to the lever 7, which is in turn pivoted at 8 to an arm of shaft S or of lever U. The distance between the free end of lever 7 and lever U, and consequently the distance between the working face of pawl 5 and the opposing tooth of the wheel 4, is made adjustable by means of the rod 10 which is pivotally connected with the lever 7 and which passes loosely through a hole or notch in the end of lever U, and the screw nut 11 which engages the threaded end of the rod 10; the set screw 12 engages a threaded hole in lever U and bears against the top of the lever 7; this construction allows of the ready adjustment of the lever 7 and the secure fixing thereof in any desired position. The spring 9, which is fast to pawl 5 and an arm of lever 7, keeps the pawl in contact with the wheel 4 at all times. Every time the magnets V are energized, the lever U is operated and pawl 5 moves the wheel 4 and shaft O to wind the spring R. In so far as the foregoing features of my invention are concerned, it is immaterial whether the detent-devices shown in the drawings and hereinafter described are used or are replaced by others working on a different principle; but I prefer to use the detent-devices now to be described. These consist of the detent 14 pivoted on the carrier 16, and the spring 15 holding the detent in its working position; of the said carrier 16, which is pivoted on the screw bolt O^2 projecting from one of the standards B; of the sleeve 18^a fixed on said bolt and having a flange 18 which is provided with the groove 23 and the arm 19; of the rod 20 having screw threads engaging a like threaded hole 19^a in the arm 19 and passing loosely through the slot 17^a in the arm 17 of the carrier 16; of the spiral spring 21 surrounding the rod 20 and abutting against the arm 17, and the screw nuts 22 which engage screw threads on the rod 20; and of the pin 24 on one face of the carrier 16 which engages the slot or groove 23 above described, and so limits the motion of the carrier. The pressure or tension of the spring 21 may be varied by adjusting the position of the nuts 22 on the rod 20. With this construction, the following functions occur:—If the power exerted by spring 21 at the point of engagement of pawl 14 with ratchet wheel 4 is greater than the power exerted by spring R at the same place, said pawl is held in its forward position (to the right and downward in Fig. 3), and the teeth of said wheel slip under it as pawl 5 turns said wheel. If at any time the power exerted by the spring R at the point of engagement of the detent 14 and wheel 4 is greater than that exerted by the spring 21 at the same point, it follows that the detent-carrier (and its detent) are moved back or to the left and upward in Fig. 3, the distance allowed by the slot or groove 23, and on the next pull by the pawl 5, the detent 14 will follow the ratchet 4 to the limit allowed by the slot 23; this see-sawing will continue until the power of the spring R at the said point falls below that of the spring 21 at the same point, when the detent 14 will remain in the position shown in Fig. 2.

The pivoted arm K of the "unison" device is raised from the worm H by the rigid bent arm 3 fast on the lever or armature U; the said arm K is stopped when so lifted and moved by spring *a*, by the stop-arm 2 which is secured to a standard B by the screw 2^a. This construction avoids the necessity for bending the arm 3 (the usual way) to get it in the right shape for lifting and stopping the arm K in the proper relation to the worm H, when getting "unison," and is far less liable to get out of order.

The reason for the space 13 between the working face of pawl 5 and the tooth of the wheel 4 with which it next coacts is that the armature-lever U requires less magnetic pull thereon than in the case where the pawl abuts against such tooth, and so permits of less current through the magnets V; also, the action is speedier and more certain in the construction shown.

This invention is not limited to the precise form thereof hereinbefore described and shown, for the same may be varied in many ways and details without departing from the spirit thereof.

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

1. In a printing telegraph or other clock-work instrument, the combination of a driv-

ing-spring, a step-by-step mechanism for winding the same, and detent-devices therefor provided with a resilient member arranged to give whenever the driving-spring exerts the greater power, substantially as described.

2. In a printing telegraph or other clockwork instrument, the combination of a driving-spring, a rotatory ratchet-wheel for winding the same, a step-by-step mechanism for rotating said wheel, a detent to prevent the backward rotation of said wheel, and a spring-pressed detent-carrier adapted to have a limited motion, whereby over-winding of the driving-spring is avoided, substantially as described.

3. In a printing telegraph or other clockwork instrument, the combination of a rotatory ratchet wheel, a driving-spring wound thereby, an electro-magnetically operated pawl for coaction with said wheel to turn the same, a detent coacting with said wheel to prevent reverse motion thereof, and a spring-pressed detent-carrier adapted to have a limited motion, whereby over-winding of the driving-spring is prevented, substantially as described.

4. In a printing telegraph or other clockwork instrument, the combination of a rotatory ratchet-wheel, a driving-spring wound thereby, a step-by-step mechanism for turning the wheel, a detent for preventing reverse motion of said wheel, a pivoted detent-carrier, a spring pressing said carrier toward one limit of its motion, and stops limiting the motion of said carrier, whereby overwinding of the driving-spring is avoided, substantially as described.

5. In a printing telegraph or other clockwork instrument, the combination of a rotatory ratchet-wheel, a driving-spring wound thereby, a driving pawl whose working face is normally separated or disengaged from the tooth with which it next coacts, an electro-magnetically operated lever, an adjustable connection between said pawl and said lever, whereby the amount of separation aforesaid can be varied or adjusted, and detent-devices for said wheel, substantially as described.

6. In a printing telegraph or other clockwork instrument, the combination of a rotatory ratchet-wheel, a driving-spring wound thereby, an electro-magnetically operated pawl for turning said wheel, the working face of said pawl being normally separated or disengaged from the tooth with which it next coacts, a detent pawl for said wheel, and a spring-pressed carrier therefor adapted to have a limited motion, whereby overwinding of the driving-spring is avoided, substantially as described.

7. In a printing telegraph or other clockwork instrument, the combination of a rotatory ratchet-wheel, a driving-spring wound thereby, a driving pawl normally separated or disengaged from the tooth of said wheel with which it next coacts, an electro-magnetically operated lever, an adjustable connection between said pawl and said lever whereby the position of the pawl relative to the teeth of the wheel may be adjusted, a detent-pawl for said wheel, and a spring-pressed carrier therefor adapted to have a limited movement, whereby overwinding of the driving-spring is avoided, substantially as described.

8. In a printing telegraph or other clockwork instrument, the combination of a rotatory ratchet-wheel, a driving-spring wound thereby, an electro-magnetically-operated step-by-step mechanism for turning said wheel, a detent for the wheel, a movable detent-carrier, stops allowing a limited movement of the carrier, a spiral spring for holding said carrier and its detent in one limit of their movement, and means for varying the tension of the spiral spring, whereby overwinding of the driving-spring is avoided, and the maximum strength thereof may be varied, substantially as described.

9. In a printing telegraph or other clockwork instrument, the combination of a rotatory ratchet-wheel, a driving-spring wound thereby, an electro-magnetically-operated step-by-step mechanism for turning said wheel, a detent for the wheel, a movable detent-carrier, stops allowing a limited movement of the carrier, a perforated arm on said carrier, a fixed rod passing loosely through the said arm, a spiral spring on said rod, and an adjustable screw-threaded nut engaging like threads on said rod, whereby overwinding of said driving spring is avoided, and the maximum strength thereof may be varied, substantially as described.

10. In a printing telegraph or other clockwork instrument, the combination of a driving-spring, a ratchet-wheel for winding the same, a pawl for operating said wheel, said pawl being normally disengaged or separated from the tooth with which it next coacts, a lever carrying said pawl, a second lever with which the pawl-carrying lever is pivotally connected, a screw-threaded rod pivotally connected with the pawl-carrier and loosely connected with said second lever, a nut on said rod, a screw passing through one and abutting against the other of said levers, whereby the relative positions of said pawl and tooth may be varied, and a detent for said wheel, substantially as described.

Signed at New York, in the county of New York and State of New York, this 6th day of February, A. D. 1894.

PAUL WENDELBOE.

Witnesses:

RICHARD W. BARKLEY,

CHARLES A. BRODEK.