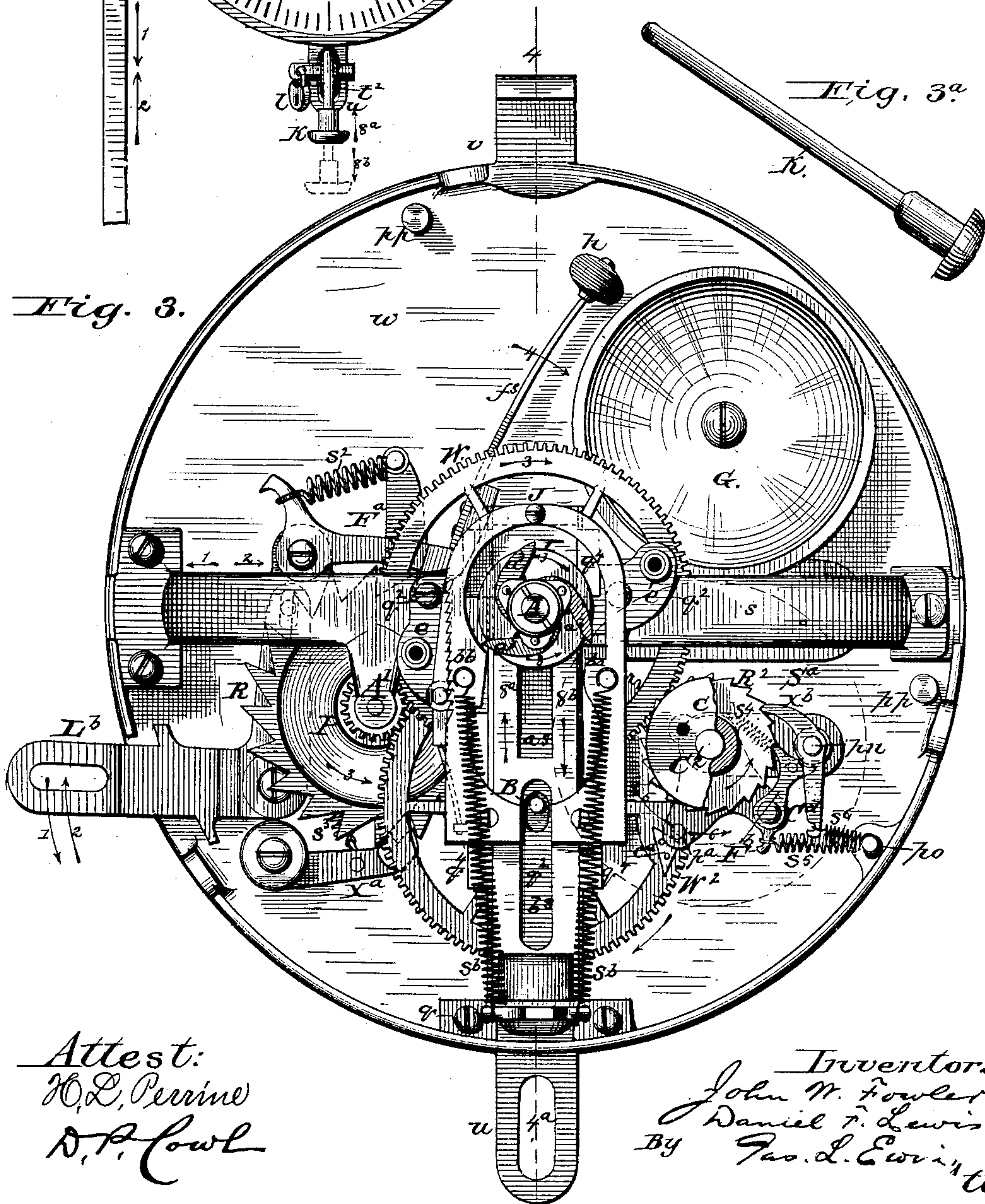
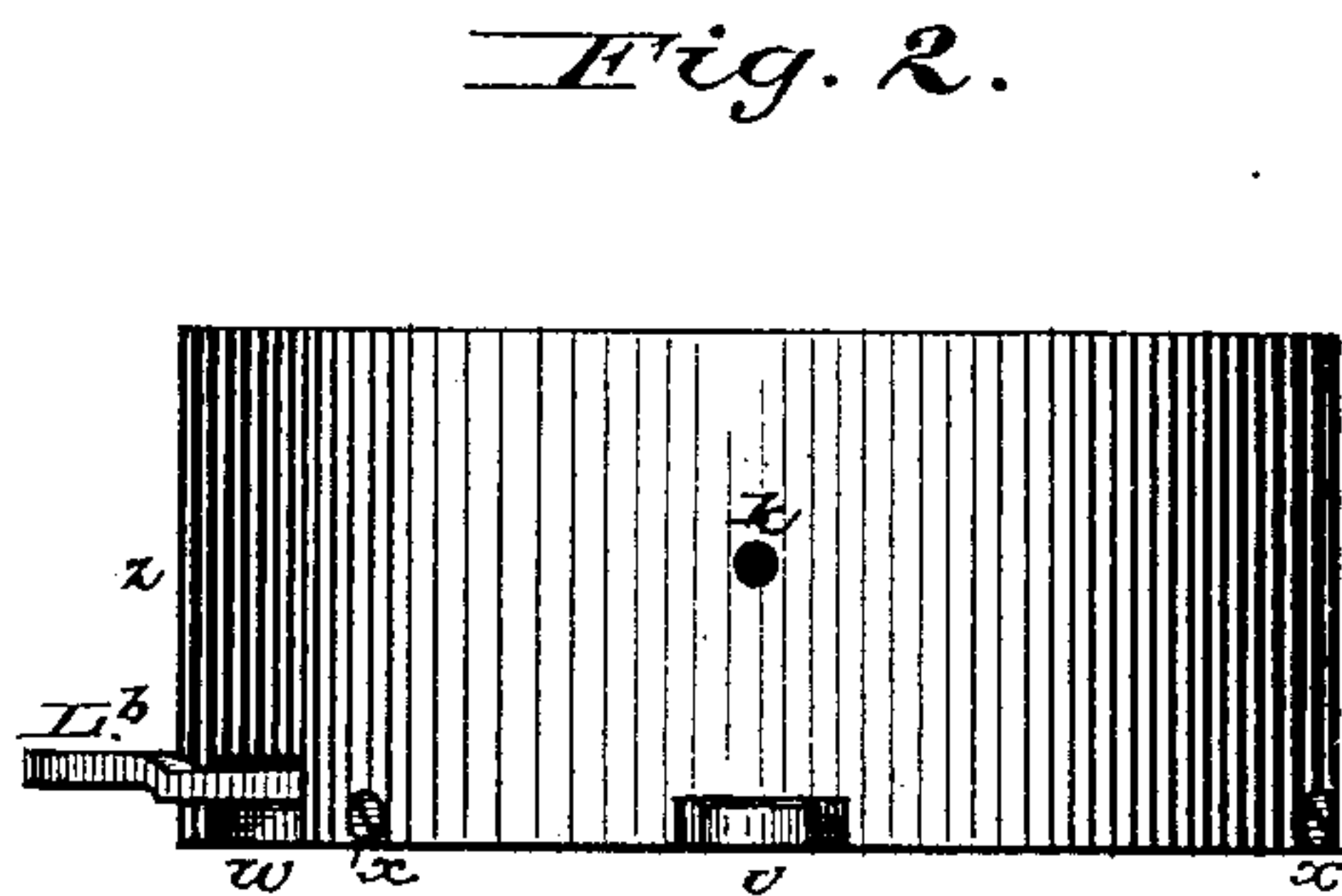
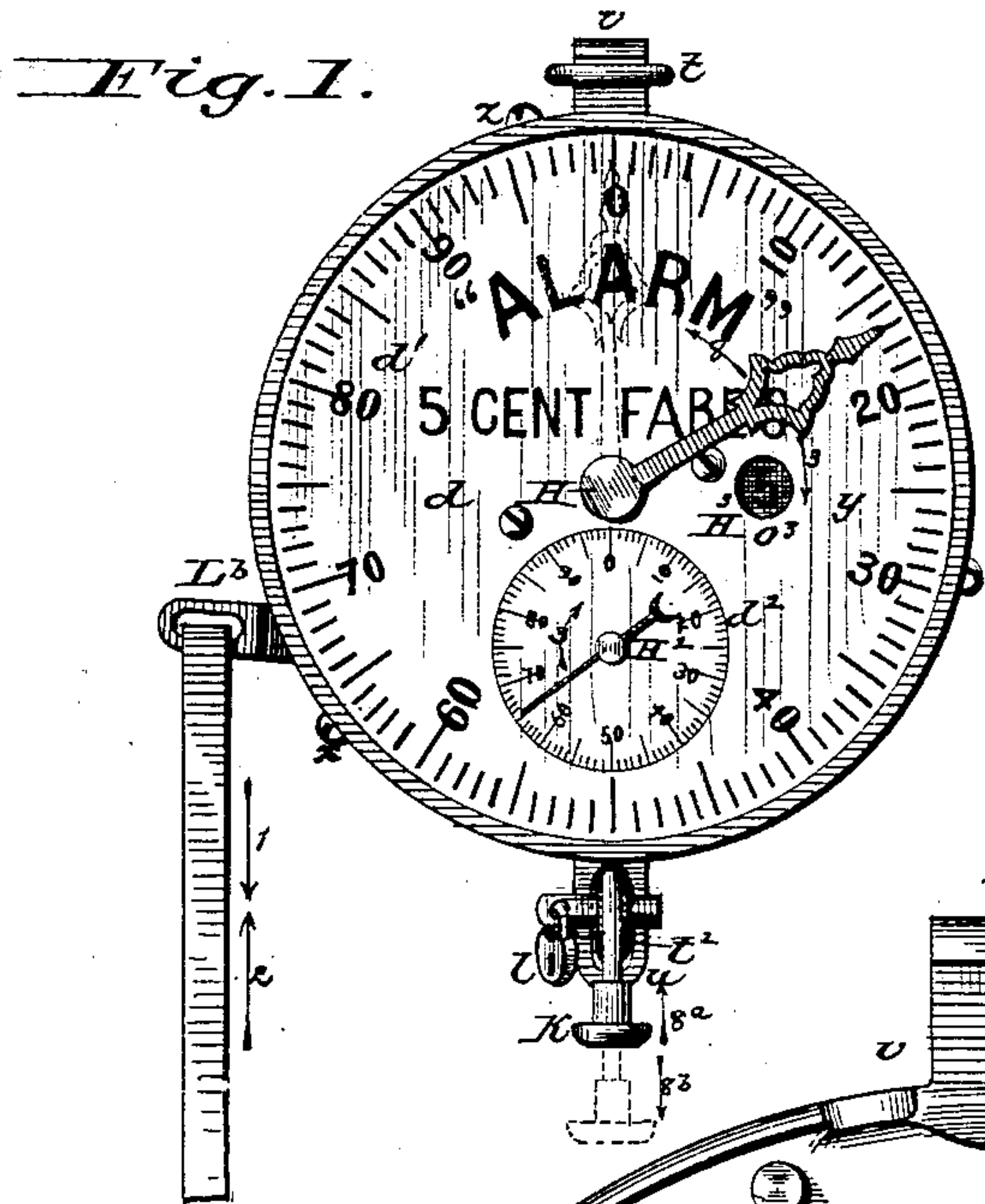


2 Sheets—Sheet 1.

J. W. FOWLER & D. F. LEWIS.
Passenger Register.

No. 231,161.

Patented Aug. 17, 1880.



Attest:
H. L. Perrine
D. F. Fowler

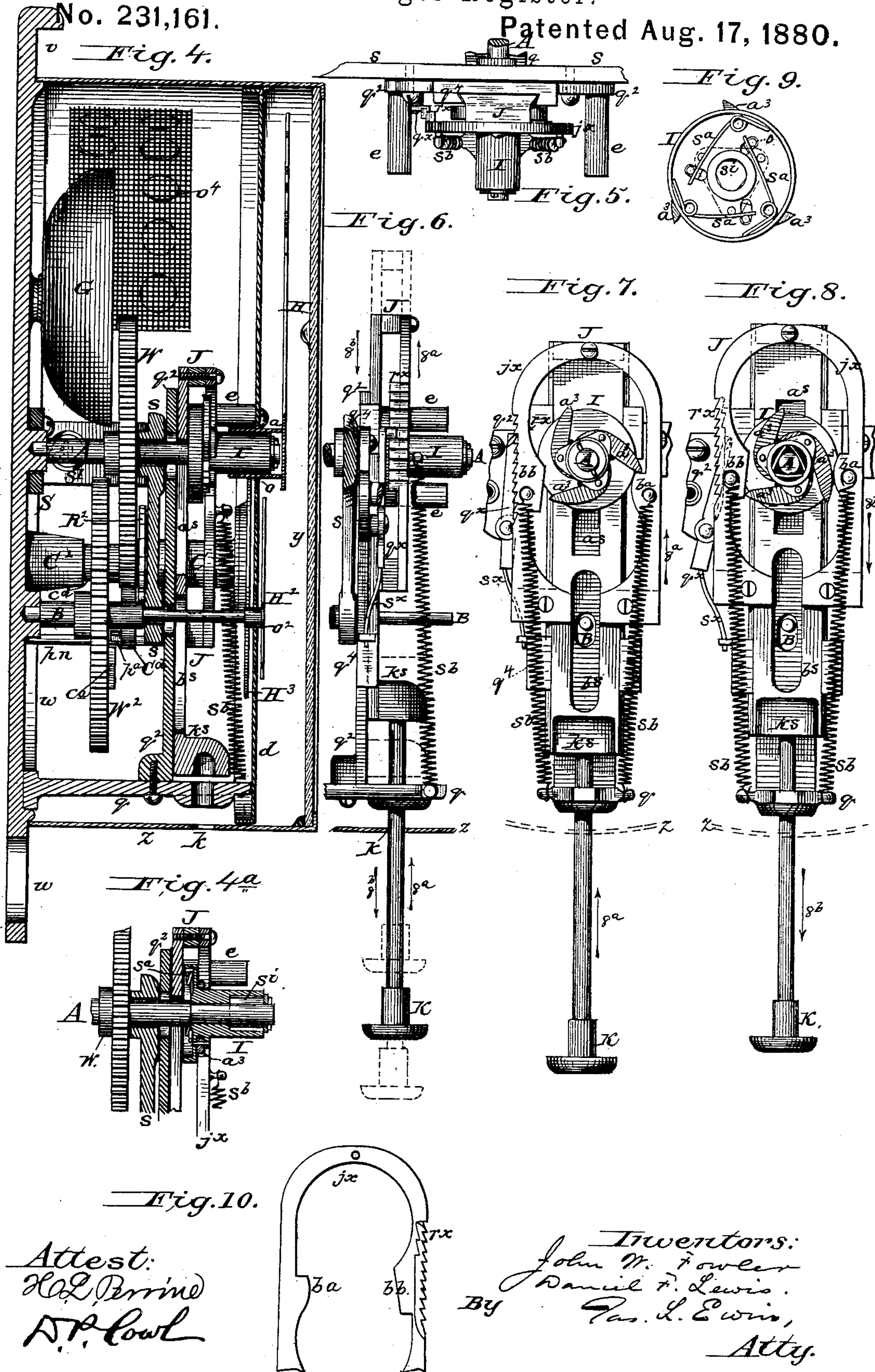
Inventors:
John W. Fowler
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J. W. FOWLER & D. F. LEWIS.
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2 Sheets—Sheet 2.

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Attest:
H. L. Perrine
A. P. Cowl

Inventors:
John W. Fowler
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UNITED STATES PATENT OFFICE.

JOHN W. FOWLER AND DANIEL F. LEWIS, OF BROOKLYN, NEW YORK.

PASSENGER-REGISTER.

SPECIFICATION forming part of Letters Patent No. 231,161, dated August 17, 1880.

Application filed April 2, 1879.

To all whom it may concern:

Be it known that we, JOHN W. FOWLER and DANIEL F. LEWIS, of the city of Brooklyn and county of Kings, in the State of New York, have invented a new and useful Improvement in Passenger-Registers; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This improvement relates, primarily, to what are known as "duplex" registers, in which a continuous register is combined with a trip-register, or one adapted to be set at zero at will, said improvement having reference to means for setting a rotary trip-hand or its equivalent at zero with superior facility and rapidity, and with the requisite provision against its fraudulent manipulation.

We have incorporated our new setting device in our passenger-register known as the "Alarm," patented April 24, 1877, July 30, 1878, and September 3, 1878, United States Patents No. 190,021, No. 206,553, and No. 207,728; but said setting device or features thereof may be embodied in any other register in which a rotary trip-hand or any equivalent thereof is adapted to be set at zero independently of the main actuating mechanism of the register.

Our present invention consists more particularly, first, in a setting-hub adapted to carry the trip-hand or its equivalent, and to receive motion in one direction only independently of the remainder of the registering mechanism; secondly, in a peculiar combination of parts, including a radial setting-slide for transmitting motion to said hub at each inward stroke of said slide; thirdly, in a peculiar combination of parts for reciprocating said slide with facility; fourthly, in provision for transmitting motion to said hub during each retraction of said slide; fifthly, in means for rendering the motion last referred to of decreasing speed, to facilitate stopping the trip-hand or its equivalent at zero, and to prevent undue strain; sixthly, in a combination of parts to facilitate setting the trip-hand or its equivalent at zero in assembling the parts; seventhly, in a pecu-

liar combination of parts for insuring the completion of a given setting motion of the trip-hand or its equivalent at each inward stroke of said slide; eighthly, in a peculiar combination of parts for insuring the movement of the trip-hand or its equivalent to zero by an outward stroke of said setting-slide; ninthly, in a peculiar frictional device, through which the said hub receives its motion during the registering operation; and, tenthly, in a peculiar combination of parts for transmitting said registering motion to the trip-hand or its equivalent, all as hereinafter more fully set forth.

By "any equivalent" of a rotary trip-hand we mean any rotary or oscillatory index-hand, which for any purpose is adapted to be set at zero at will independently of the main actuating mechanism of the register in which it is used, and also rotary or oscillatory dials and indicator-wheels adapted to be so set at zero for the same or other purposes.

Figure 1 of the accompanying drawings is a small face view of an alarm passenger-register illustrating our present invention, and Fig. 2 is a view of its lower edge. Fig. 3 is a face view of the same, on a larger scale, with the case and dials removed and the parts at rest, and Fig. 3^a is an elevation of the setting-key on this scale. Fig. 4 is a vertical section on the line $x x^a$, Fig. 3, showing the dials and case in position; and Fig. 4^a is a partial section in the same plane, showing the setting-hub in section. Fig. 5 is a top view of the setting device. Fig. 6 is an edge view of the same, and Figs. 7 and 8 are face views thereof on the same scale as Figs. 3, 3^a, 4, 4^a, the parts being shown in different positions to illustrate the operation, as hereinafter described. Fig. 9 is a back view of the setting-hub on a larger scale, and Fig. 10 is a like view of the face-plate of the setting-slide on the same scale as Fig. 8.

Like letters of reference indicate corresponding parts in the several figures, and arrows indicating the motions are numbered alike in all places.

Apart from the setting device aforesaid and certain details of construction, our improved register, as shown in Figs. 1, 2, 3, and 4, is correctly described in the specification of our said Patent No. 206,553, to which reference is

hereby made, the same letters of reference being used in the drawings accompanying both specifications so far as the parts are alike or substantially alike.

5 The principal modifications or improvements in details of construction above referred to are as follows: The flat spring-shank f^s of the combined feed-pawl and hammer F^a is riveted to the head of the pawl instead of being cast
10 in, and a simple spiral spring, s^2 , takes the place of the former tail-spring. The double detent-pawl X^a is made of a more substantial pattern, and is likewise provided with a spiral spring, s^3 , in lieu of a tail-spring. The
15 trip-hand shaft A is constructed with a shoulder in front of the spider s , and its outer end is perforated to receive a transverse key-pin, as shown in Fig. 4^a. The carrying-cam c^a of the continuous register is arranged on the face
20 of the unit-wheel W^2 , which facilitates assembling the parts and gives more convenient access to the hundreds-carrying mechanism. The hub of the bell-crank C^d rests upon the base of the stud-shaft C^2 , behind the ratchet-
25 wheel R^2 , its pin p^a projecting backward in the path of said cam c^a . The feed-pawl F^b is furnished with a spiral spring, s^4 , and the sleeve-shaft C is cast with a simple dial-supporting disk at its front end.

30 The main actuating device in the illustration consists of a lateral lever, L^b , operated by downward pulls on a depending strap; but it will be understood that the improved register may be actuated in either of the ways described
35 in our said Patent No. 206,553, or in any preferred manner, without affecting the operation of our setting device or trip-hand mechanism, which will now be described.

40 Interposed between the trip-hand H and its shaft A is a setting-hub, I , which rests against the aforesaid shoulder of said shaft, and is retained thereon by a washer and key-pin. The inner end of said hub is a recessed circular disk and its outer end is a hollow cylinder,
45 the smaller bore of the latter fitting the outer end of the shaft A . The outer end of said bore accommodates three flat spring-plates, s^i , which must bend to admit the shaft between them, and consequently press against the lat-
50 ter with a frictional energy which is very efficient. Said friction-springs are shown exposed in the section of the hub, Fig. 4^a, and also in Fig. 8, where the said key-pin and washer are omitted. The frictional hub a of
55 the trip-hand embraces the outer end of the secured hub and is carried therewith by friction.

60 The hub I is carried with the shaft A by friction during the registering operation and transmits this motion to the trip-hand, but is also adapted to rotate independently of said shaft for the purpose of resetting the trip-
65 hand at zero. The latter motion is transmitted to said hub through three tangential arms, a^3 , acting successively, and pivoted so that motion can be imparted therethrough in only one direction. The pivots have been so arranged

as to render said arms rigid in a direction which insures turning the trip-hand backward to the zero-point. 70

The inner ends of the arms a^3 abut against said smaller cylindrical portion of the hub, and their outer ends are forced outward by wire springs s^a within the recessed back of the disk of said hub, acting against stud-pins which
75 project from the arms through slots in the face of said disk, as shown in Figs. 4^a and 9.

A key-hole, k , the same being a simple round aperture, is formed centrally in the lower edge of the sheet-metal case-drum z . A perpendicular key-hole bracket, q , is attached to the back plate, w , at its lower edge, and a supplemental frame-piece, q^2 , is supported parallel to the back plate by said bracket q and the spider or yoke-frame s , said frame-piece q^2 hav-
80 ing openings to accommodate the shafts A , B , and tapped socket-studs e , to receive the screws which attach the dial-plate d . Said frame-piece q^2 is further provided with two pairs of lugs, q^4 , between which a dovetail guideway is
85 planed. A radial slide, J , works in said guideway, and is constructed with slots a^s , b^s , to accommodate the shafts A and B , and said slot a^s is made to stop the slide at the respective limits of its motion. Normally said slide rests in its
90 lowest or outer position, as represented in Figs. 3 and 4. In said normal position of the slide J the hub I is free to rotate with the shaft A in the direction of arrows 3, the arms a^3 revolving without touching within the upper end of an
100 opening in the face-plate j^x of said slide, which face-plate is the effective portion of said slide, and is supported in the plane of said arms. At a lower point said face-plate j^x is provided with inwardly-projecting cams b^a , b^b , arranged
105 to come into effective contact with said arms a^3 when the slide is reciprocated, and an inwardly-thrusting key, K , and a pair of spiral retracting-springs, s^b , provide for so actuating said slide. Said springs s^b extend from lugs
110 on the bracket q to others in the face-plate of the slide J , and operate to draw said slide evenly outward, being aided by the gravity of the slide in its described arrangement.

The key K is a cylindrical rod, having at one end a handle adapted to be held between two fingers and to receive the pressure of the thumb in using it. It is shown detached in
115 Fig. 3^a and at work in Figs. 1, 6, 7, and 8.

A central socket, k^s , at the lower end of the slide J receives the point of the key, the same being in line with the key-hole k , as shown in
120 Fig. 4.

The respective movements of the slide J are indicated by arrows 8^a and 8^b , and the resultant backward rotation of the hub I and trip-
125 hand H is indicated by arrows 8.

The respective limits of the motion of the slide J are illustrated by dotted lines in Fig. 6, and its upstroke (indicated by arrow 8^a) is
130 illustrated by the full-line position in this figure and by Fig. 7. In this movement motion is imparted by the key K , through the key-socket k^s of said slide, to the latter, and through

the cam b^a and one of the arms a^3 to the setting-hub I and trip-hand H. The return-stroke of the slide J (indicated by arrow 8^b) is illustrated by Fig. 8. In this movement motion is imparted to the slide by the springs s^b , which are put under tension in the upstroke, and the motion is transmitted to the hub I and trip-hand H through the cam b^b and one of the arms a^3 . During the concluding portion of this movement the cam b^b acts by an inclined inner surface, as represented in Fig. 8, the effect being a slower motion of the trip-hand toward the end of each actuation, so as to relieve it from undue impulse, and thus to insure its arrest at the proper points. The action of each cam on one of the arms a^3 leaves another arm in proper position for the other cam.

In the illustration a complete rotation of the trip-hand H is effected by three reciprocations of the slide J, or three thrusts of the key K. Each first stroke of the slide moves the trip-hand to the end of a given one-sixth of the circumference of the dial d^1 . The trip-hand is shown in Fig. 1 in full lines as at the end of a first movement, and in dotted lines as at the end of the next succeeding movement effected by the return-stroke of the slide J, the extent of this being likewise one-sixth of the circumference. When the trip-hand has passed one of its three stopping-points only three or four spaces, the first upstroke will carry it to the end of the next sixth, and when the trip-hand is more than four and less than seventeen spaces beyond one of said points the first upstroke produces no effect, but the return or last stroke moves the hand to said point last passed. The end of one of said last movements is located at zero, as illustrated by Fig. 1, and consequently the trip-hand is turned backward and reset at zero by one or more thrusts of the key K, according to the number indicated by the trip-hand at the beginning of the setting operation.

To insure full strokes of the slide J, a guard-flange, r^x , is formed on the back of the face-plate j^x at one edge, the same being constructed with ratchet-teeth on its respective lateral surfaces, and a guard-pawl, q^x , is attached by a pivot to the face of the frame q^2 , and provided with a spring, s^x , which tends to keep the tooth of the pawl in line with the guard-flange, so as to engage with either side thereof, said tooth and the ends of said incline being beveled, as shown in Figs. 7 and 8, so as to direct the former. Ratchet-teeth are formed in the outer surface of the guard-flange r^x from end to end thereof, and from the beginning of each upstroke to its end the tooth of the pawl q^x is in mesh therewith, as illustrated by Figs. 6 and 7. This insures the completion of each upstroke, the slide J and hub I, and consequently the trip-hand H, being locked against any other movement until said stroke is completed. (See Fig. 7.)

The key can be withdrawn at any time; but if registrations are made with the trip-hand so

locked the continuous register will receive the registrations, and a discrepancy between the indication of the latter and the sum of the indications of the trip hand will thus be formed, insuring detection. The trip-hand remains so locked against forward motion until the slide J returns to its normal position, as in Figs. 3 and 4. During each return-stroke of the slide J the tooth of the pawl q^x rides against the inner side of the flange r^x , as shown by dotted lines in Fig. 8. Nothing can possibly be accomplished by reversing the movement of the slide during this stroke until the cam b^a is in a position to engage with another arm of the hub I. To prevent such reversal at this point a couple of ratchet-teeth are formed in said inner surface of said guard-flange at its upper end, being all that are required. As soon as the key is withdrawn after the completion of the upstroke the return-stroke of the slide is automatically completed.

Besides preventing and detecting attempts at fraudulent manipulation, the guards above described are important to prevent accidentally shortened strokes, which would disarrange the trip-hand with reference to zero. The same serve also to facilitate setting the trip-hand at zero in assembling the parts, so as to insure its proper return thereto by the setting device. This is also illustrated by Fig. 7. The slide J is moved upward until its cam b^a touches one of the arms a^3 , the latter having been left in normal position, as in Fig. 3, by reciprocating said slide, and said slide is supported in this position by the guard-pawl q^x . The dial-plate d being in position, the trip-hand H is now applied to the hub I to the left of zero, and being turned to the right as it is tightened, it is readily left in proper position.

As an additional guard against fraudulent manipulation, we propose to use, in combination with our said setting device, a "zero-stop" in the path of the trip-hand, substantially as described in J. W. Fowler's Patent No. 185,740; but as the trip-hand can only be stopped at $33\frac{1}{3}$ and $66\frac{2}{3}$, besides at zero, the accomplishment of fraud by false indication is practically impossible without the aid of a zero-stop, and the rapidity with which the trip-hand is set by our new device renders it superior to any previous device for its purpose.

We do not limit ourselves to details of mechanical construction not essential to the respective features of our invention herein-after claimed. Neither do we claim, broadly, a reciprocating setting device, being aware that a reciprocating rod has been used in combination with a ratchet-wheel. Neither do we claim as new the combination with a reciprocating slide (broadly considered) of a pawl and ratchet-teeth for insuring the completion of the respective strokes of such slide; but we know of no anticipation of our combination of such devices with a setting-slide independent of the registering mechanism and a setting-hub actuated by said slide, whereby we prevent leaving the trip-hand or

its equivalent at other than the predetermined point or points, and insure resetting to zero without the aid of a zero-stop. Neither do we claim herein anything shown or described in our previous patents aforesaid. Neither do we claim, broadly, the interposition of a friction spring or springs between the hub of a trip-hand or its equivalent and the shaft of said hand.

The following is what we now claim as new and of our own invention, and desire to secure by Letters Patent, namely:

1. A setting-hub interposed between a rotary trip-hand or its equivalent and its shaft, to carry the former, and adapted to be rotated independently of said shaft when the same is provided with folding arms as its means for receiving said independent motion, substantially as herein set forth.

2. The combination, in a register, of a setting-hub interposed between a rotary trip-hand or its equivalent and its shaft, and provided with folding arms, and a radial slide having a tappet-cam engaging with one of said arms, so as to partially turn said hub at each inward stroke of said slide, substantially as herein described.

3. The combination, in a register, of a setting-hub interposed between a rotary trip-hand or its equivalent and its shaft, and provided with folding arms, a radial slide having a tappet-cam to engage with said arms, and an inwardly-thrusting key or knob and outwardly-drawing retracting-springs (one or more) for reciprocating said slide, substantially as herein specified.

4. The combination, in a register, of a setting-hub interposed between a rotary trip-hand or its equivalent and its shaft, and provided with folding arms, and a radial slide having a pair of cams engaging alternately with said arms and operating to partially turn said hub at each half-stroke of said slide, substantially as herein described.

5. The combination, in a register, of a setting-hub interposed between a rotary trip-hand or its equivalent and its shaft, and provided with folding arms, and a radial slide moved in one direction by a retracting-spring, and having a slow-motion cam to engage with one of said arms during each retraction of

said slide, substantially as herein specified, for the purpose set forth.

6. The combination, in a register, of a setting-hub interposed between a rotary trip-hand or its equivalent and its shaft, and provided with folding arms, a radial slide having a tappet-cam engaging with one of said arms at each inward stroke of said slide, and a pawl and ratchet operating to support said slide against the backward pressure of said arm, substantially as herein described.

7. The combination, in a register, of a rotary shaft for the trip-hand, or its equivalent mechanism, for imparting a step-by-step registering motion to said shaft, a setting-hub interposed between the trip-hand or its equivalent and said shaft, a radial slide transmitting a given setting motion to said hub at each inward stroke of said slide, and a pawl and ratchet preventing a reversal of the motion of said slide until said stroke is completed, substantially as herein described.

8. The combination, in a register, of a rotary shaft for the trip-hand, or its equivalent mechanism, for imparting a step-by-step registering motion to said shaft, a setting-hub interposed between the trip-hand or its equivalent and said shaft, a radial slide transmitting a given setting motion to said hub at each outward stroke of said slide, and a pawl and ratchet insuring the completion of said stroke, substantially as herein specified.

9. The combination, in a register, of a rotary registering-shaft and a setting-hub applied to said shaft to carry a trip-hand or its equivalent, when said hub is concentrically recessed, and provided with inclosed spring-plates to press laterally against said shaft with the required force, as herein specified.

10. The combination, in a register, of a rotary registering-shaft, a setting-shaft applied to said shaft and provided with inclosed spring-plates to press laterally against said shaft with the required force, and a trip-hand or its equivalent attached by a frictional sleeve-hub to said setting-hub, as herein set forth.

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