

(No Model.)

3 Sheets—Sheet 1.

J. W. FOWLER & D. F. LEWIS.
PASSENGER REGISTER.

No. 280,925.

Patented July 10, 1883.

Fig. 1.

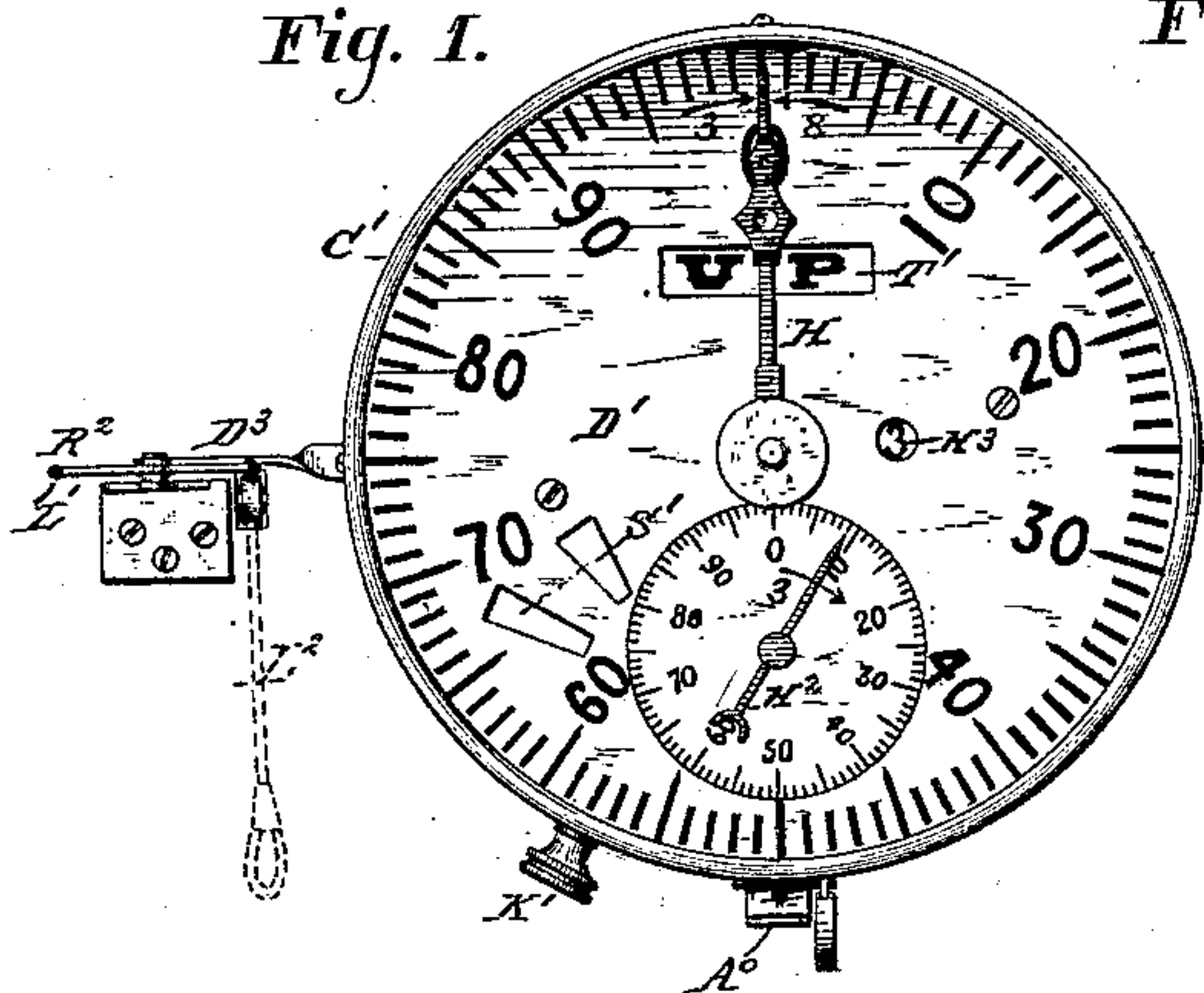


Fig. 2.

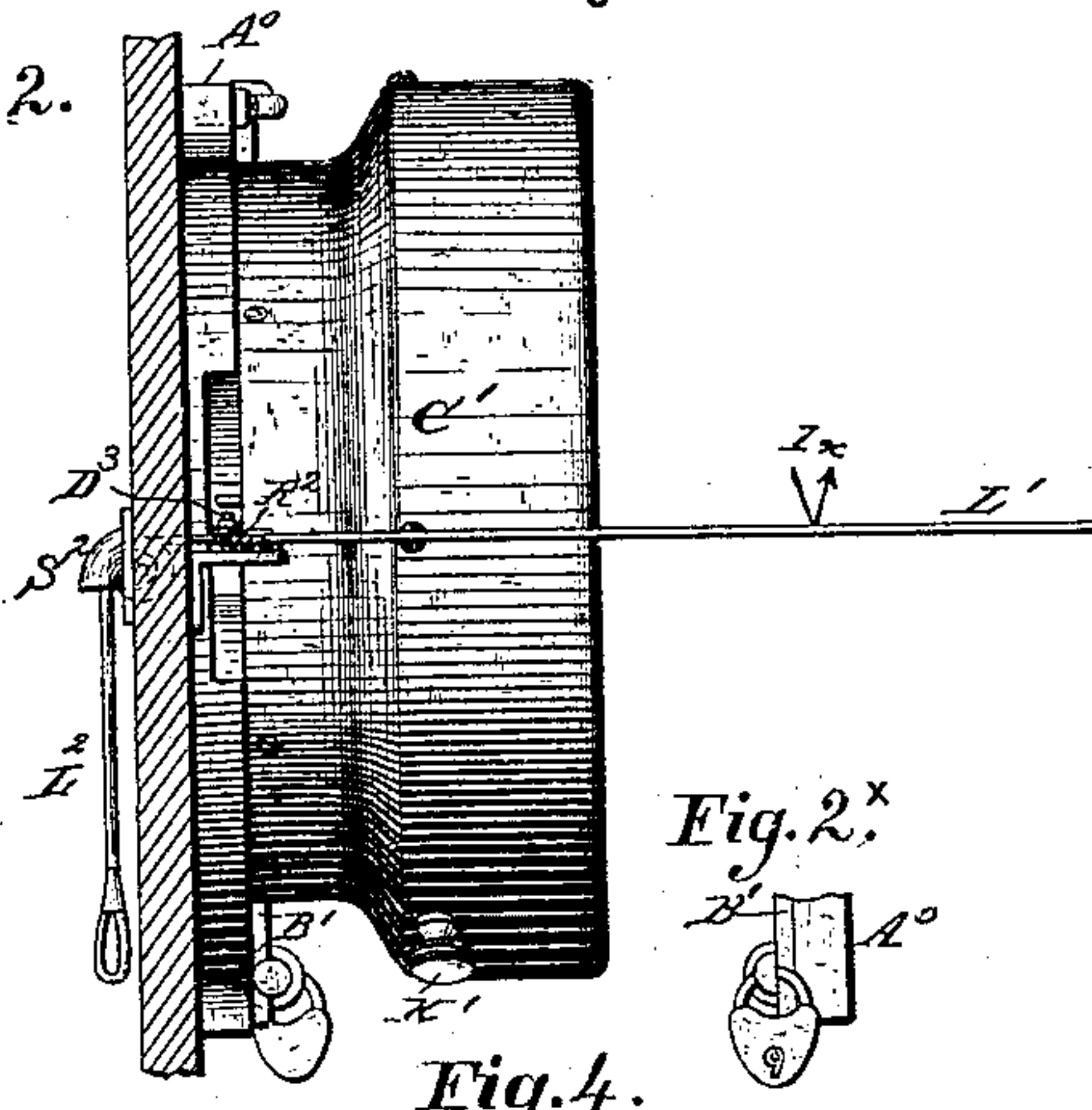


Fig. 4.

Fig. 3.

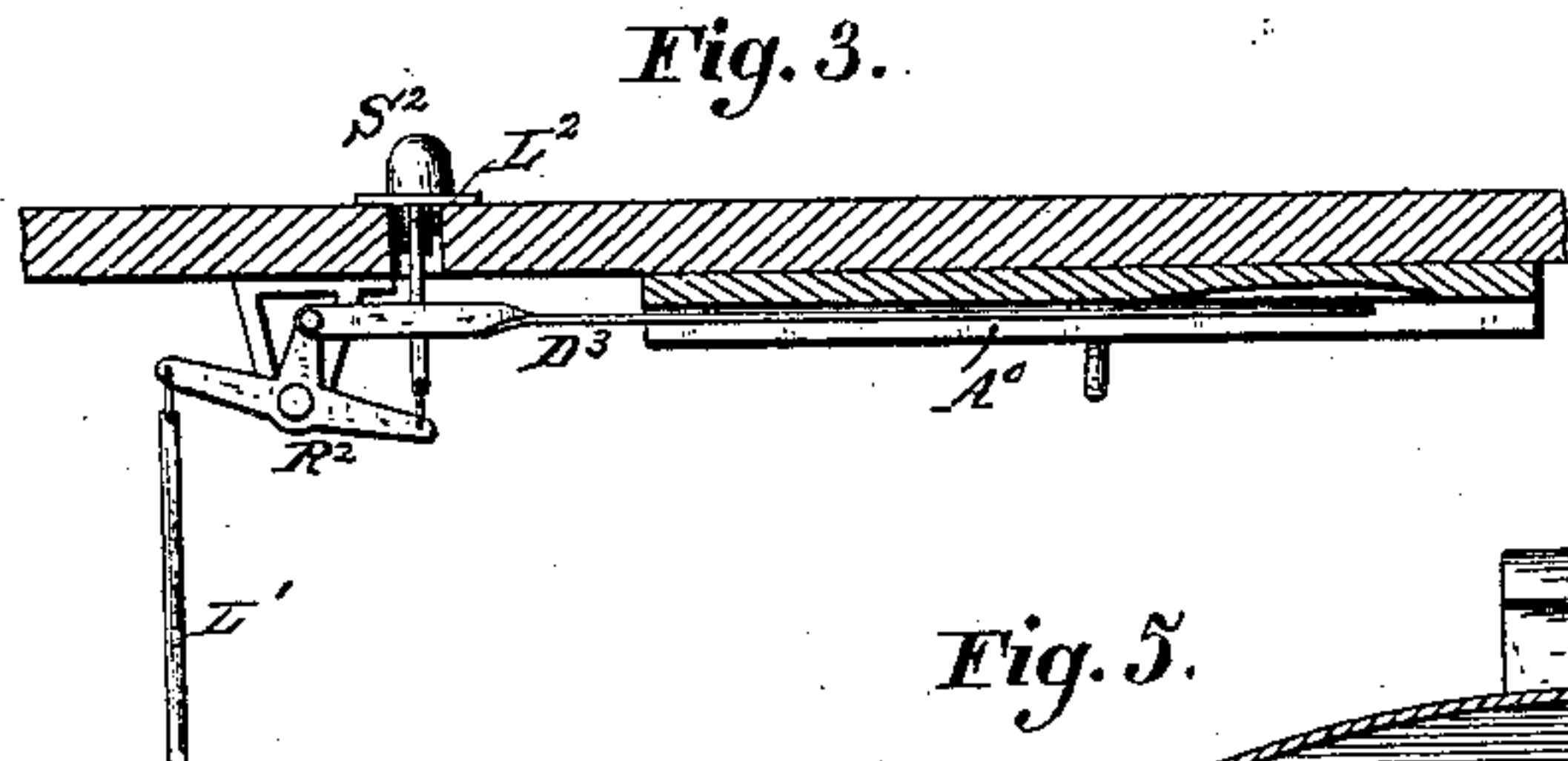
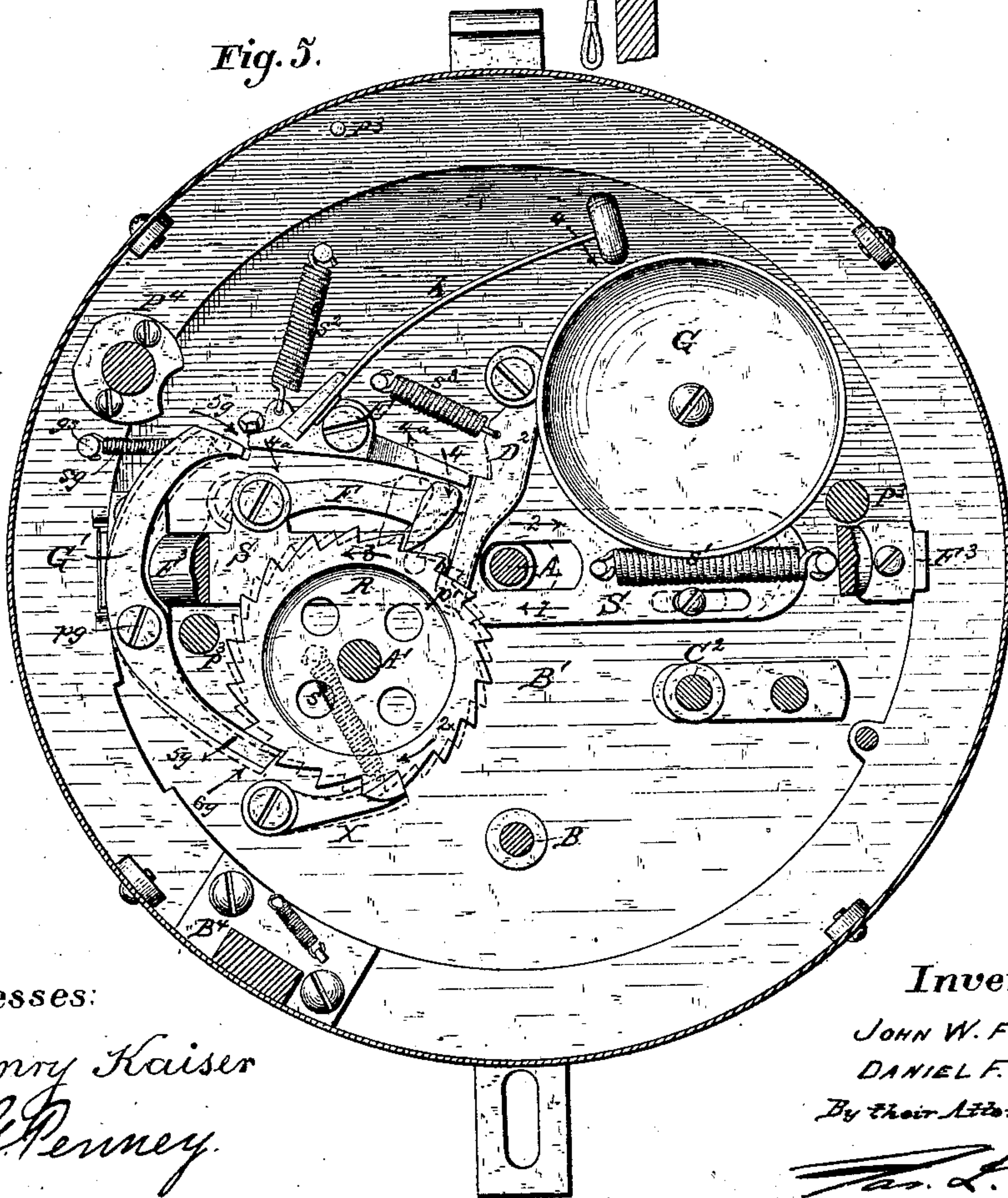
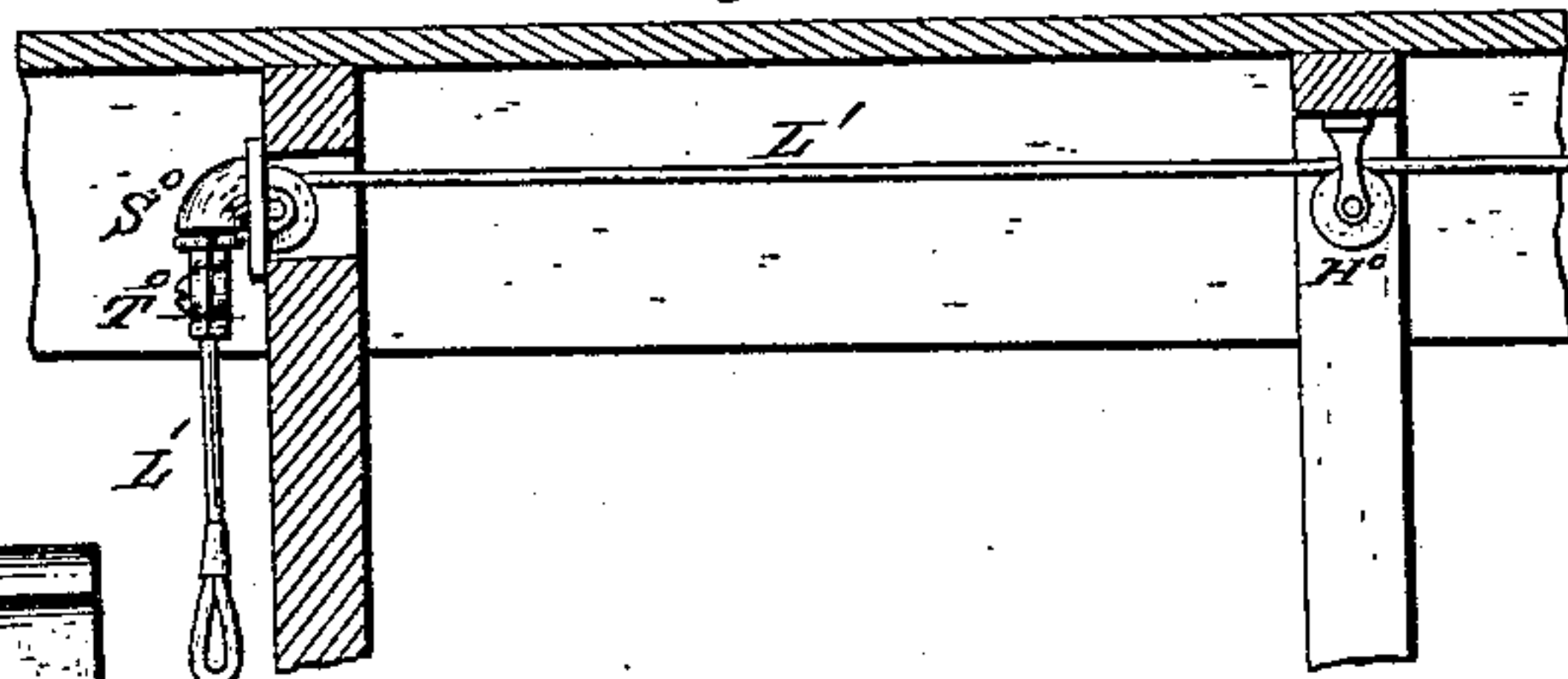


Fig. 5.



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By their Attorney,

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3 Sheets—Sheet 2.

No. 280,925.

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Fig. 6.

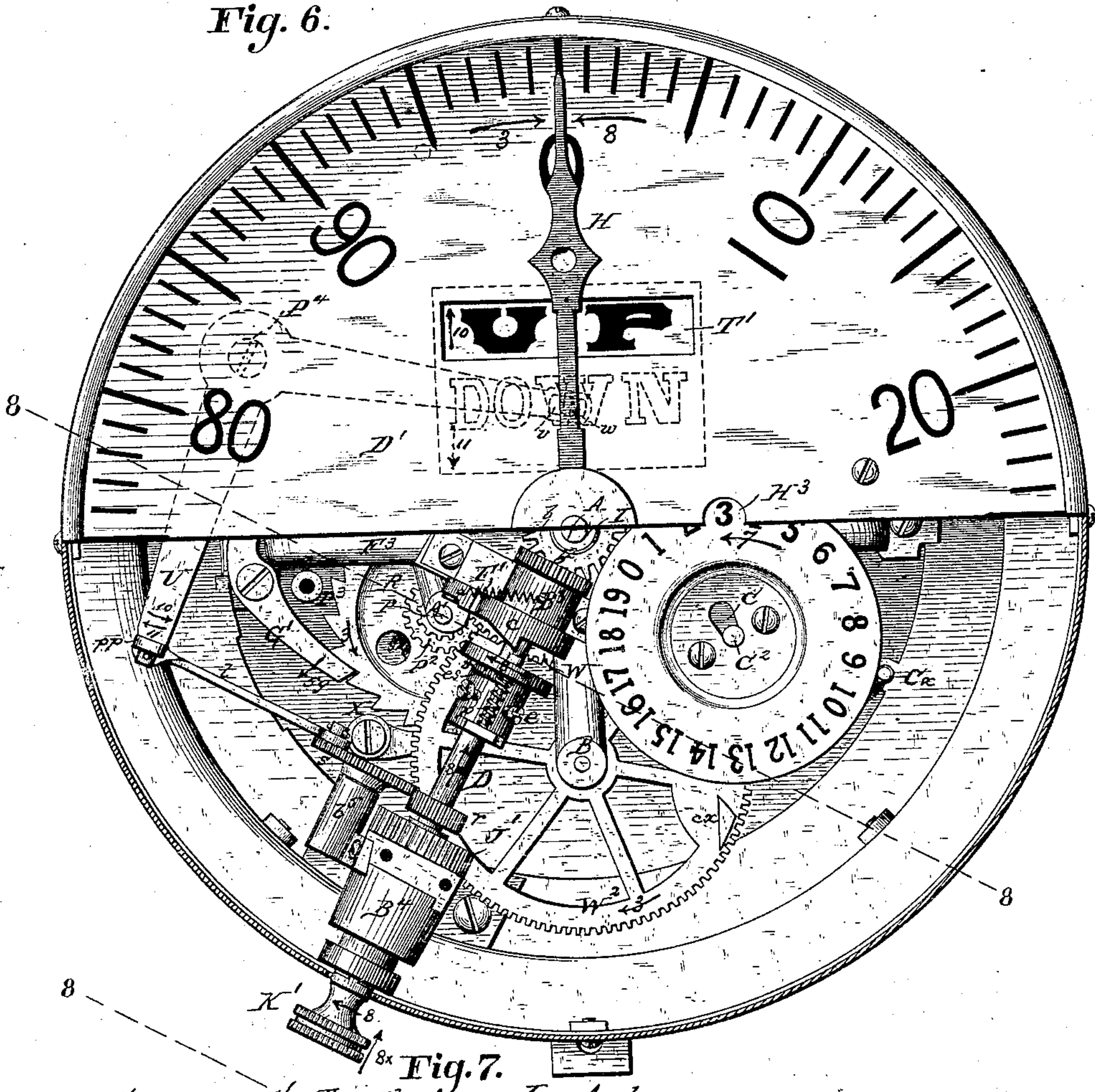
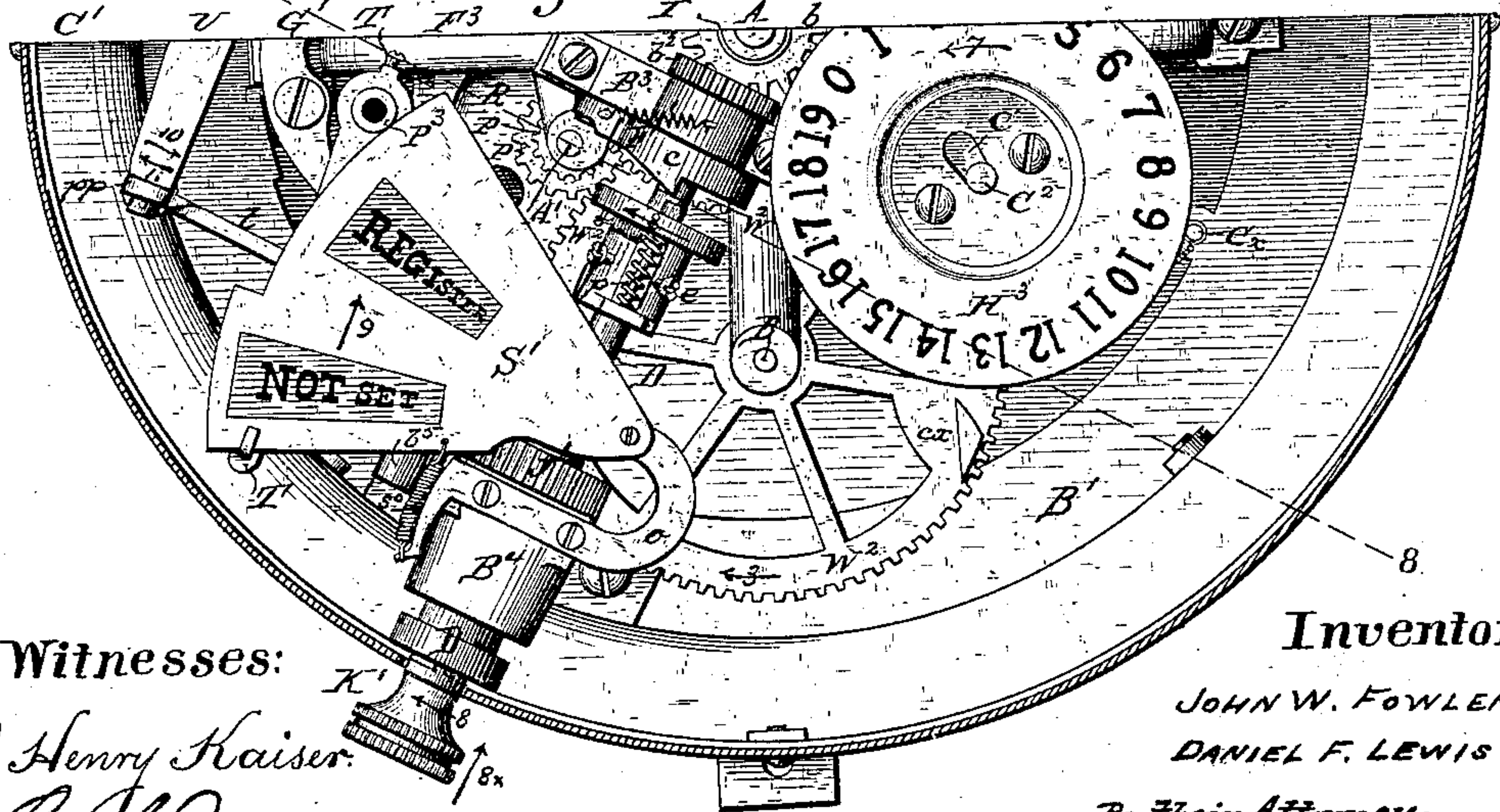


Fig. 7.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 8.

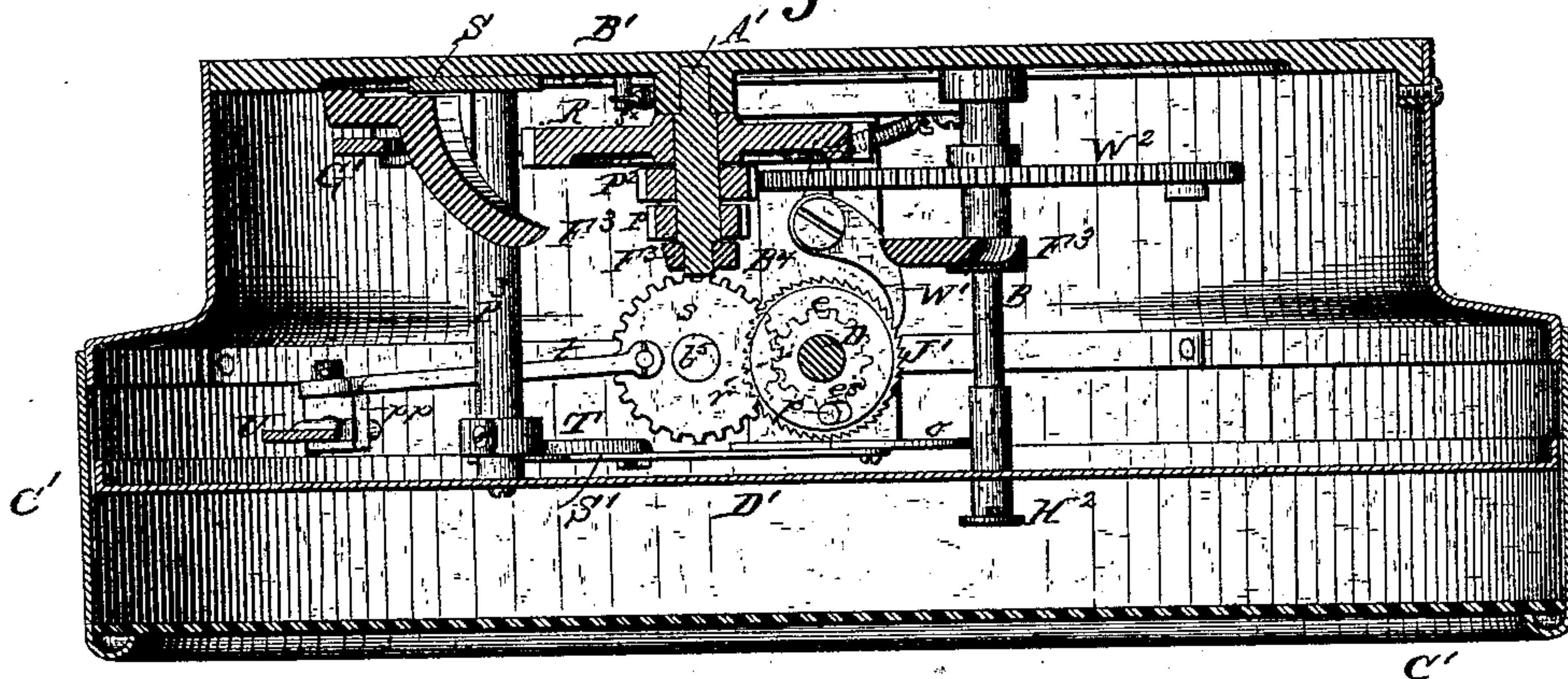


Fig. 9.

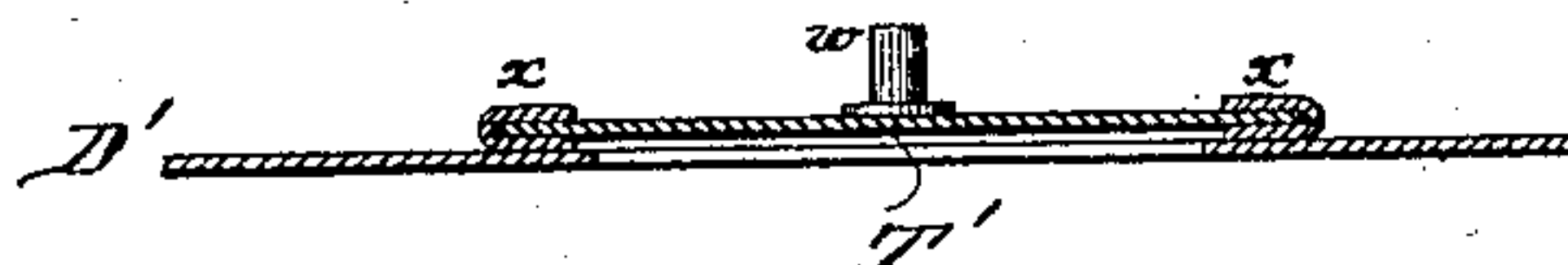


Fig. 10.

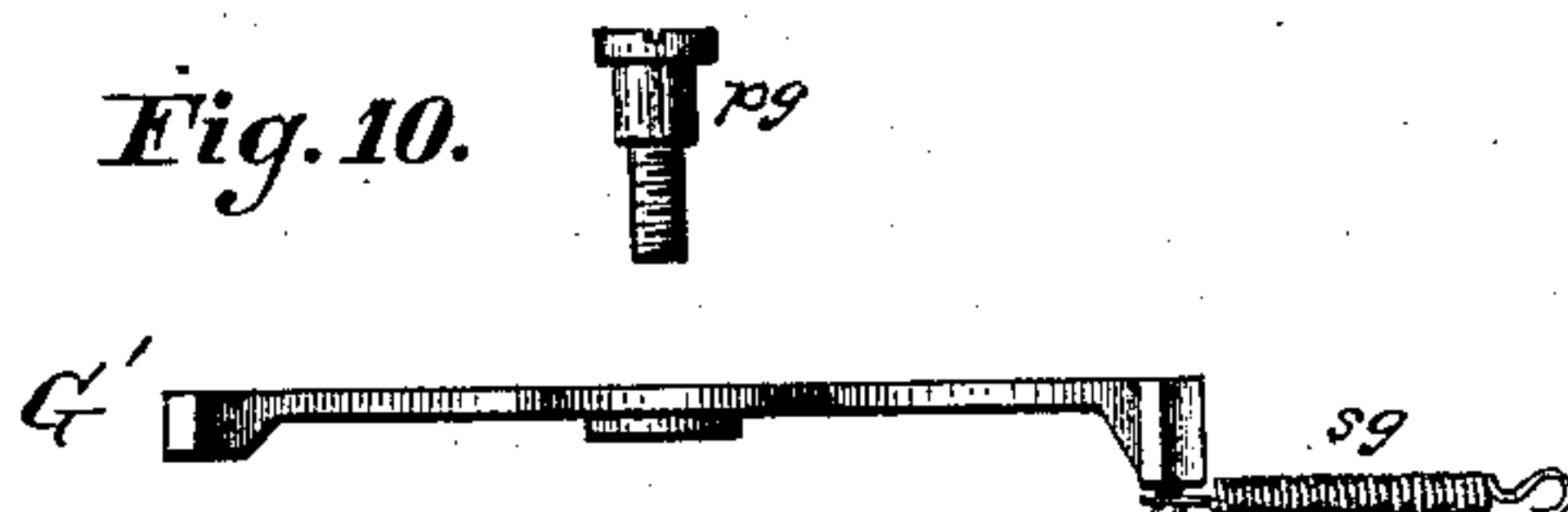


Fig. 11.

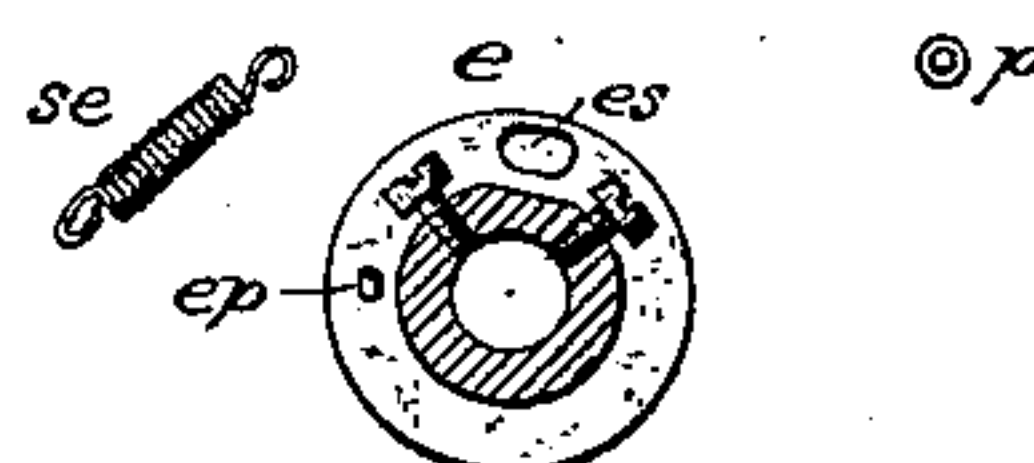
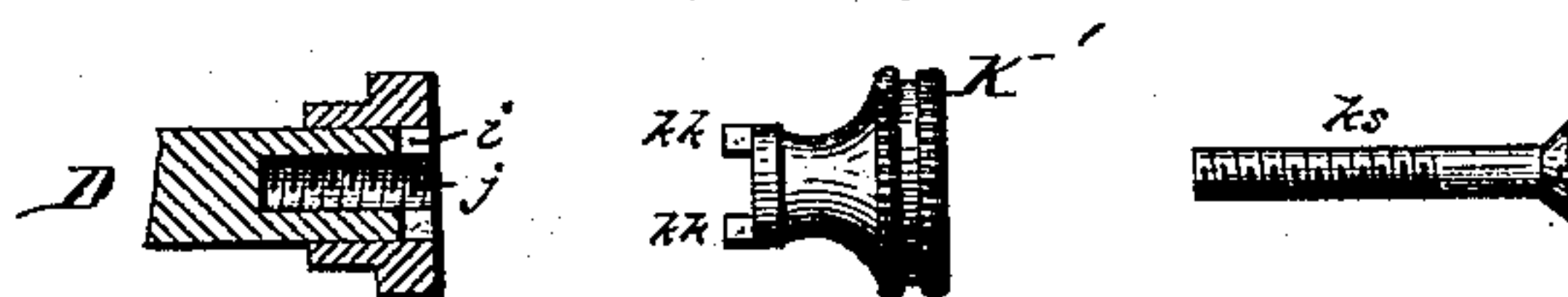


Fig. 12.



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UNITED STATES PATENT OFFICE.

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PASSENGER-REGISTER.

SPECIFICATION forming part of Letters Patent No. 280,925, dated July 10, 1883.

Application filed May 28, 1883. (No model.)

To all whom it may concern:

Be it known that we, JOHN W. FOWLER and DANIEL F. LEWIS, citizens of the United States, residing at Brooklyn, in the State of New York, have invented a new and useful Improvement in Passenger-Registers, of which the following is a specification.

This invention is additional to the series of inventions embodied in our "Alarm" passenger-registers or fare-registers, of different patterns, and described and claimed in United States Patents No. 185,740, dated December 26, 1876, No. 190,021, dated April 24, 1877, No. 207,728, dated September 3, 1878, No. 206,558, dated July 30, 1878, No. 231,161, dated August 17, 1880, Nos. 247,552 and 247,553, dated September 27, 1881, No. 271,977, dated February 6, 1883, and No. 273,675, dated March 6, 1883. It is more especially additional to our improvements in means for guarding the ringing of the bell within the register, so as to render reliable this audible indication of the registration of each passenger or fare, as described and claimed in said Patent No. 247,552; and our improvements in mechanism for setting or resetting the "trip-hand" by means of a rotary key or knob, and the combination therewith of a "trip-signal" operated by the same key or knob, as described and claimed in said Patents No. 271,977 and No. 273,675.

A distinguishing feature of the "Alarm" registers from the first has been the registration of each unit during a first stroke or pull, and the ringing of the bell to attest such registration during the succeeding return-stroke, as set forth in our said Patent No. 190,021. The most common avenue to fraudulent ringing was thus closed; but it was found that "experts" could sometimes cause the bell to ring without registering by suddenly releasing the "ringing device" after an incomplete first stroke, and also, with greater difficulty, cause the bell to ring twice for one registration by suddenly reversing the return-stroke before releasing the ringing device, as set forth in our said Patent No. 247,552. These modes of falsely ringing the bell were finally effectually guarded against by our improved bell mechanism described and claimed in this last-named patent and shown in our subsequent patents. The only means by which the most expert conductors have been able to ring the bells of

the registers containing said improved bell mechanism without registering one for each stroke of the bell, so far as we have been able to learn, is the "leather" ringing device, so termed from its ringing-cord of "round leather," which passes over pulleys within the car, and is adapted to be operated by the hand of the conductor from any point in the car or from either platform. Apart from its fraudulent use, hereinafter set forth, said ringing device is excellent and deservedly popular; and the primary object of the first part of our present invention is to render fraudulent ringing as practiced therewith impossible, without in any way complicating its legitimate use. Another object of this part of our invention is to use for said purpose a bell-guard which will coact with the independent bell-lever of said improved bell mechanism without interference with the main functions of the latter; and a third object of the same is to provide for introducing said bell-guard into "Alarm" registers already in use without difficult alterations of the machines.

The primary object of the second part of our present invention, relating to the said improved rotary setting mechanism and the operation of signals thereby, as set forth in said Patents No. 271,977 and No. 273,675, is to provide, without losing security against fraudulent manipulation, for operating a trip-signal (of any description) by means of the setting knob or key when no fares or exactly one hundred fares have been registered during a trip, which will sometimes occur. Previous to this improvement, the trip-signal could not be operated under such circumstances without first ringing the bell, and registering one, to release the setting mechanism. This would involve noting the fact that one was so registered, and additional work in correcting the record of the trips, which extra work and the explanations and delays attending the same it was important to avoid. Another object of this part of our invention is to utilize additionally our setting-signal mechanism set forth in said Patents No. 271,977 and No. 273,675, without complicating its construction and mode of operation; and a final object is to provide for attaching a knob as a substitute for a setting-key (as suggested in said Patent No. 273,675) in such a way that the machine may be fur-

nished with either the knob or the key at a moment's notice, and so that the former will be unyieldingly fastened when in place.

Our present invention consists in certain novel features of construction and combinations of parts, whereby we accomplish the objects above named, as hereinafter set forth and claimed.

Three sheets of drawings accompany this specification as part thereof, bearing views in detail of a "large-dial" Alarm passenger-register, and a "leather" ringing device connected therewith, illustrating this invention. Figure 1 of these drawings is a small face view of said register as hung in a street-car, showing those parts of said ringing device in the same plane and beyond this plane, looking toward the front platform. Fig. 2 is an edge view of said register, showing the means by which it is hung, and said parts of the ringing device seen in Fig. 1. Fig. 2^x is a fragmentary view in the opposite direction, supplemental to Fig. 2. Fig. 3 represents a top view of said parts of the ringing device, and a horizontal section of the "board" upon which the register is hung; and Fig. 4 represents a fragmentary vertical section of the upper part of the car, showing said ringing device as extended to the rear platform. The figures above named are drawn to one and the same scale. Figs. 5 to 12, inclusive, are views, on a larger scale, of the register proper and parts thereof, Fig. 5 being a sectional face view in the plane of the bell mechanism; Fig. 6, a face view with the lower half of the case in section in the plane of the setting-knob, and the setting-signal attachments omitted; Fig. 7, a sectional half-face view corresponding with the lower half of Fig. 6, showing the setting-signal attachments replaced; Fig. 8, a section through all in the plane indicated by the lines 8 8, Figs. 6 and 7, showing the parts below this plane, viewed at right angles to the plane of section; Fig. 9, a horizontal section through the dial-plate and trip-signal; Fig. 10, a detached view of the principal parts of the new bell-guard attachments; Fig. 11, a like view of parts of the setting-shaft clutch, partly in section, illustrating its alteration; and Fig. 12, a like view, partly in section, illustrating the knob attachment.

Like letters of reference indicate corresponding parts in the several figures, and the principal motions of the moving parts are indicated by arrows numbered alike in all places, and the same numbers and letters are used as upon the drawings of our said Patents No. 271,977 and No. 273,675, as regards all those parts which are alike or substantially alike in form or function, as shown in the several drawings.

Those parts of the register proper which are alike or substantially alike in construction and mode of operation, as shown in said drawings forming part of this specification, and those of said Patent No. 271,977, are, in brief, first, the back plate, B', case C', and dial-plate D', the latter, with the trip-dial thereon, rela-

tively large as compared with said back plate; second, the trip-hand H and second units-hand, H², revolving between said dial-plate and the glass face-plate of the case, with their dials on said dial-plate, and the hundreds-dial H³ below the dial-plate, exposing its indications through an index-hole; third, the spider-frame F³ and bracket B⁴, attached to the face of said back plate, and the stud-shaft C², posts P³, and minor projections on said back plate; fourth, the main slide S, with its pawl F, and retracting-spring s', and stud-pins p', one of the latter projecting through a slot in the back plate as means for pulling the slide; fifth, the main ratchet-wheel R, its shaft A', and its detent-pawl X, with the spring s^x of the latter; sixth, the units-shafts A B, carrying said hands H H², with the gearing P W, P² W², connecting the same, respectively, with said shaft A', so that they rotate synchronously, step by step, in registering successive units; seventh, the bell G, Fig. 5, with the bell-lever E, carrying the bell-hammer h, and the striking-spring s², connected with said bell-lever, which coact with said main pawl F to strike the bell after each unit is registered, and the detent D², with its spring s³, for preventing more than one stroke of the bell during each return-stroke; eighth, the sleeve-shaft C, which is mounted on said stud-shaft C², and carries the hundreds-dial H³, with the means indicated at c^x C^x for operating this dial at the end of each revolution of the units-hand H², and for preventing false movements thereof; and, ninth, the rotary setting mechanism, comprising the radial rotary shaft D, Figs. 6, 7, 8, and 12, supported by said bracket B⁴ at its outer end, and at its inner end by a pillow-block, B³, attached to said spider-frame F³, the fraud-preventing ratchet-wheel, pawl, and zero-stop J' W' F', the setting-hub I, interposed between the trip-hand H and the shaft A, and the means for transmitting motion from said setting-shaft to said setting-hub, comprising the clutch-collar c, apart from features of construction hereinafter set forth, the clutch-collar c, and gears b² b, with the setting-signal S', Figs. 1 and 7, its supports o T, light retracting-spring s⁰, and other appurtenances apart from immaterial alterations.

The hanging-board A⁰ and its appurtenances, Figs. 1 to 3, inclusive, are substantially similar to those shown in said Patent No. 271,977, apart from details of the former, which preferably conforms more nearly to the outline of the back plate, B', and is recessed so as to admit the pulling-bar D³ at different angles, as now shown. The latter (D³) and the bell-crank ringing-lever R², thereto connected, with the support of the latter and the other parts of the ringing device seen in said figures, apart from the leather ringing-cord L', are also substantially identical with the parts so lettered in the drawings of said Patent No. 271,977.

The trip-signal T', Figs. 1, 6, and 9, the pinion r, spur-wheel s, connecting-rod t, and lever U, which connect the setting-shaft D

therewith, the slot-and-pin connection *vw* between the lever *U* and signal *T'*, and the post *P'*, bracket *b'*, and guides *x*, which support the same, with the setting-knob *K'*, Figs. 1, 2, 6, 7, and 12, broadly considered, are identical with those so lettered in said Patent No. 273,675, apart from features of construction and mode of operation hereinafter stated. Referring to the specifications of said Patents No. 271,977 and No. 273,675, and our previous specifications referred to in the former, for fuller descriptions of said parts and devices shown therein, with their modes of operation and advantages, we will proceed now to describe the said "leather" ringing device, and more particularly to set forth those novel features and combinations of parts hereinafter claimed.

The distinctive feature of said ringing device is a ringing-cord, *L'*, Figs. 1 to 4, inclusive, of "round leather," coupled to said ringing-lever *R'* by a double-ended hook or loop of wire, and, through the medium of said lever *R'*, said ringing-bar *D'*, and said pulling-stud on the back of the main slide *S*, connected with the latter, and therethrough with the bell-ringing and registering mechanisms within the case *C'*. Said pulling-stud projects through a slot in said back plate, *B'*, between a pair of guide-lugs on the latter, into said recess of the hanging board *A'*, where it interlocks with said ringing-bar, which has a hole to receive said stud, as set forth in our said Patent No. 271,977. From the ringing-lever *R'* said ringing-cord *L'* extends over pulleys in-hanger-sheaves *H'*, Fig. 4, attached to the carlings of the car-roof, and a hooded sheave, *S'*, Fig. 4, attached to the rear end of the car, to the rear platform, where it terminates in a pulling-loop, and is provided with a tension-piece, *T'*, as seen in Fig. 4. Said tension-piece consists of a longitudinally-divided sleeve having its parts united by a pair of screws, which provide for loosening it, so that the cord may be drawn therethrough to take up slack therein, and for tightening it again and again, as required, so that, coacting with said hooded sheave *S'*, it serves to keep the ringing-cord taut, as well as to keep its outer looped end from being drawn in, so that the latter hangs within convenient reach under the hood of the rear platform. The ringing-cord works best when so stretched, as it then responds instantly and uniformly to downward pressure between the hanging sheaves, and enables the conductor to register more quickly than he could otherwise. A short cord, *L''*, of the same round leather, connected in like manner to the ringing-lever *R'*, extends through a hooded sheave, *S''*, on the front end of the car, and terminates in a pulling-loop above the front platform, as clearly seen in Figs. 1, 2, and 3.

Owing to its direct connection with the main slide *S*, Fig. 5, as aforesaid, each pull on the ringing-lever *R'*, by means of either of the ringing-cords *L'* *L''*, is accompanied by a cor-

responding movement of said slide and the main pawl *F*, carried thereby, as indicated by arrows marked 1, and therewith a partial rotation of the main ratchet-wheel *R* and its shaft *A'*, Fig. 5, the pinions *P* *P'*, Figs. 6 and 7, carried by the latter, the spur-wheels *W* *W'*, which mesh therewith, and the shafts *A* *B*, on which the latter are fast, and which carry, respectively, the hands *H* *H'*. If the latter are moved one one-hundredth of a revolution, as they should be at each impulse, the detent-pawl *X*, Fig. 5, drops into a fresh interdental notch of the ratchet-wheel *R*, and a unit is registered on both units-dials, while the ratchet-wheel *R* is locked so as to coact with the bell mechanism in the return-stroke indicated by arrows 2, and when the pull is relaxed before the registering of a unit is accomplished the springs *s'* *s''* coact to turn the train backward, as indicated by arrow 2^x, Fig. 5, and set forth in said Patent No. 247,552; but the inertia of this train is unavoidably great as compared with that of the bell mechanism, especially in new machines, and the retracting-spring *s'* of the main slide *S*, acting directly on said main slide, and therethrough on said bell mechanism, tends to do its individual work instantaneously. Taking advantage of these facts and said sensitiveness of the long cord of a leather ringing device, fraudulent ringing has heretofore been accomplished, as aforesaid, by striking or pressing the taut ringing-cord *L'* and quickly freeing the hand therefrom, as illustrated by the bent arrow 1^x in Fig. 2. Supposing the ratchet-wheel *R* to have been turned, as in the registering movements indicated by arrows 3, as far as indicated by dotted lines in Fig. 5, and the newly-added bell-guard *G'* to be absent, with sufficient inertia present in the registering mechanism, the instantaneous retraction of the slide *S* by the spring *s'* causes the pawl *F* to rise on the opposing incline of the ratchet-wheel and to move the bell-lever *E*, as indicated by the arrow 4^a, Fig. 5, sufficiently for a stroke of the bell by the hammer *h*, (indicated by arrow 4,) which consequently follows when the ratchet-wheel, an instant later, returns, as indicated by said arrow 2^x, to the position of rest from which it was moved by the false stroke, while no registration has been accomplished. To prevent this, said bell-guard *G'* has been introduced. Apart from its pivotal screw *pg* and spiral retracting-spring *sg*, and the stud *gs*, Fig. 5, from which the latter is stretched, this attachment consists of a single part, preferably a malleable-iron casting, as best seen in Fig. 10. Said stud *gs* may be cast on the back plate, as in the example, or may be formed by a pin or screw driven into a drill-hole in an old back plate, while the pivot-screw *pg* takes the place of a shorter set-screw heretofore used at the same point to support the spider-frame *F'*. Consequently the same can be added to the bell mechanism hereinbefore described in any of our registers, while it in no way interferes with the operation of

the bell-lever E and detent D², being wholly clear of the former when the ratchet-wheel is locked, as seen in full lines in Fig. 5, and consequently clear of the same during the return-stroke and legitimate bell-ringing period.

5 Operated by the direct action of the teeth of said ratchet-wheel R, to which its lower end is fitted, the bell-guard G' responds to the least movement of the slide S, as indicated by

10 arrow 5³; and if such movement be sufficient to render fraudulent ringing otherwise possible, the upper end of the guard, which is concentric with the pivot *pg*, and works closely beneath the heel end of the bell-lever E, moves

15 beneath the latter, as shown in dotted lines in Fig. 5, and precludes any movement of the bell-hammer by means thereof, until said ratchet-wheel, with the registering-train, is fully restored to its condition of rest. Should the

20 slide be released before registering is accomplished, the pawl F is held down, and can simply assist in restoring the ratchet-wheel R, and therewith the remainder of the registering-train, to *statu quo*. Then, simultaneously with

25 the detent-pawl X, the bell-guard G' returns to normal position, as seen in full lines in Fig. 5. In like manner, at the end of each completed first stroke, the lower end of the guard G' enters a fresh interdental notch of the ratchet-wheel, ready for the succeeding registering

30 operation. These return movements of the guard (indicated by arrow 6²) are automatically effected by its spring, *sg*, which is put in tension during the effective movements of the guard by the ratchet-wheel. Suppose exactly

35 one hundred passengers have been registered and "rung for," as indicated by arrows 1, 2, 3, 4, and 7, during a single trip or "half-trip"—the "up" trip, for example, as indicated in

40 Figs. 1 and 6. The trip-hand H, being already at 0, cannot be moved by the setting-knob K', owing to the action of said ratchet, pawl, and zero-guard J' W' F', as set forth in said Patent No. 271,977; but the trip-signal T'

45 must be set for the "down" trip. Provision is made for setting the latter independently, under such circumstances, without endangering fraudulent manipulation, as aforesaid, by rendering the clutch *cc* of the setting mechanism "self-adjusting," as shown in Figs. 6, 7, 8

50 and 11. The alterations have been confined to the clutch-collar *c*. This comprises a main casting, *c*, a shouldered pin, *p*, (seen in end view in Fig. 11,) which is provided with a

55 spiral spring between its shoulder and the outer lug of the collar, as seen in Figs. 6 and 7, this spring tending to keep the large end of the pin projected, while it adapts the pin to be pressed in by the unyielding projection of the clutch-collar *c*, when said projection happens to be opposite the pin. Heretofore this

60 was only when one or two or 101 or 102 had been registered during a trip or half-trip. It now occurs also when the trip-hand H is at 0.

65 To this end said collar has been provided with a slot, *cs*, and a stud-pin, *ep*, and a second spiral spring, *se*, stretched between said stud

ep and said pin *p*, tends to draw the latter sidewise, so that it is in line with said projection on the collar *c* when the latter, revolving

70 with the trip-hand H, is at its zero-point, as shown in Figs. 6 and 7. Consequently if the knob K' be pushed in when the trip-hand is already at 0, said pin of the clutch-collar *c*,

75 instead of catching behind said projection on the collar *c*, and coacting with the zero-guard F' to lock the knob, is pushed back by said projection, and when the knob is turned as heretofore in the setting operation, as illustrated by arrows 8, said pin of the clutch-collar *c* rides off

80 said projection of the collar *c*, and the rotation of the knob is completed without obstruction. On the completion of a rotation, said pin of the collar *c* comes in contact with the square shoulder of said projection of the collar *c*, and further

85 motion, without first allowing the knob to be projected, is prevented, thus avoiding accidentally turning the knob too far, which would necessitate two more turns to expose a given indication of the trip-signal. Said pin and pro-

90 jection are also as effective as heretofore, in combination with the zero-guard F', as means for stopping the trip-hand at zero when it is set or reset, and fraudulent manipulation of the trip-hand is none the less effectively guarded

95 against by said ratchet, pawl, and zero-guard, and the setting-signal S' serves to guard the independent trip-signal-setting operation, as well as to guard the operation of simultaneously setting the trip-hand and trip-signal as

100 heretofore. The knob K', and therewith the setting-shaft D and ratchet-disk J', must be thrust inward to release the latter at the beginning of either setting operation, as indicated by arrows 8^x, and in so doing "Register

105 not set," Fig. 7, in the present example, is exposed through corresponding openings in the dial-plate, Fig. 1. The movement of the setting-signal is indicated by arrow 9, Fig. 7. Any preferred setting-signal indication may

110 be used, and the same may be exposed through one or more openings, conformed to the motion of the signal S'. The latter has been simplified as to shape, and its support *o* has been made to include the stud from which its

115 spring *s*⁰ is stretched, so that by loosening three screws the whole of the setting-signal attachments, including the arm T, Figs. 7 and 8, may be removed from the register, as seen by comparing Figs. 6 and 7.

120

The trip-signal T', the respective movements of which are indicated by arrows 10 11, Figs. 6 and 7, has also been improved in minor details as compared with those representations of its respective parts shown in said Patent No.

125 273,675, the lever U being made in a single part, as proposed in said patent, while a pivot-piece, *pp*, interposed between the rod *t* and said lever, obviates looseness of joints in a known way. Another change is illustrated

130 by Fig. 9, and consists in the use of guides *x* for the signal proper, of U shape in cross-section, which are readily made of sheet metal similar to that of which the body of the signal

is composed, and serve to keep the paper face of the signal from contact with the edges of the opening through which it is exposed, or with the back of the dial-plate.

5 The knob *K'*, Figs. 1, 2, 6, 7, and 12, is attached to the outer end of the setting-shaft *D*, as best seen in the figure last named. The shaft, in addition to its key socket or notch *i*, is provided with an axial screw-socket, *j*, and the knob is provided with a pair of projec-
10 tions, *kk*, fitted to said key-socket, and with an axial bore, countersunk at its outer end, which, together with said screw-socket *j*, receives a screw, *ks*. The latter precludes
15 lengthwise displacement of the knob, and said projections *kk* preclude torsional yielding, while a key of the construction set forth in said Patent No. 271,977 may be substituted for the knob without any alteration.

20 We do not limit ourselves to mechanical details herein set forth which are not essential to the respective features of our invention as hereinafter claimed, nor to the use of said features, or either of them, in a "large-dial" machine, or in our own registers, except as in our
25 claims limited.

We disclaim the within-described "leather" ringing device, *per se*, as no part of our present invention, the same having been publicly
30 used by us more than two years. We also disclaim, in favor of our previous patents hereinbefore referred to, all those features and combinations therein shown. Finally, we dis-
35 claim as old a bell-guard, broadly considered, as set forth in our said Patent No. 247,552, and means, broadly considered, for adapting a trip-signal to be operated by a setting knob
40 or key when the trip-hand is already at zero, the latter in view of the fact that the trip-signal described and claimed in our said Patent No. 247,553, and previous trip-signals therein referred to, are adapted to be so operated.

We claim as new and desire to patent under this specification—

45 1. In combination with a "leather" ringing device, as herein specified, a register having a spring-retracted main slide or its equivalent, a main ratchet-wheel receiving motion for the registering train or trains from said slide or
50 its equivalent, a bell mechanism operated in part by said ratchet-wheel, and a pivoted bell-guard coacting at its respective ends with said ratchet-wheel and with a moving part of said bell mechanism, and operated by the former
55 to lock the latter, so as to prevent putting the striking-spring in tension until the registering

movement is completed, substantially as herein set forth.

2. The bell-guard *G'*, in combination with a ratchet-wheel, *R*, forming part of a register- 60 ing-train, a slide, *S*, or its equivalent, carrying a pawl, *F*, the bell-lever *E*, carrying the bell-hammer, the bell *G*, a striking-spring, *s*², connected with said bell-lever, a pulling device applied to said slide or its equivalent, and
65 retracting-springs *s' sg*, applied to the latter and to said bell-guard, substantially as herein specified, for the purpose set forth.

3. The bell-guard *G'*, with its pivot-screw *pg* and retracting-spring *sg*, as shown, in combination with the main ratchet-wheel and bell-lever of our register as heretofore con-
70 structed, for the purpose set forth.

4. The combination in a register, substan- 75 tially as herein specified, of a rotary setting-shaft connected with a trip-hand or its equivalent, and with a trip-signal, a zero-guard preventing the rotation of said trip-hand or its equivalent by said setting-shaft when it is
80 stopped at zero, and a self-adjusting clutch, substantially as herein described, rendering the setting-shaft operative independently for setting the trip-signal.

5. The combination in a register, substan- 85 tially as herein specified, of a setting-shaft adapted to be thrust inward and rotated in one direction to unlock it and set a trip-hand or its equivalent and a trip-signal, a zero-guard preventing the rotation of said trip-hand or
90 its equivalent by said setting-shaft when it is stopped at zero, a self-adjusting clutch, substantially as herein described, whereby said setting-shaft is adapted to operate said trip-
95 signal independently, and a setting-signal operated by each inward thrust of the setting-shaft to guard each and every rotation of the latter, as herein set forth.

6. The combination in a register, substan- tially as herein specified, of the setting-shaft
100 *D*, adapted to be thrust inward and rotated, and constructed with the key-socket *i* and screw-socket *j*, the knob *K'*, constructed with the projections *kk* and an axial bore, and the screw *ks*, fitted to said bore and screw-socket, as shown, for the purpose set forth.

JNO. W. FOWLER.
DANIEL F. LEWIS.

Witnesses:

MONTGOMERY LINDSAY,
WM. M. COVERT.