

(No Model.)

4 Sheets—Sheet 1.

C. S. SERGEANT & L. J. HIRT.

FARE REGISTER AND RECORDER.

No. 523,446.

Patented July 24, 1894.

Fig 1.

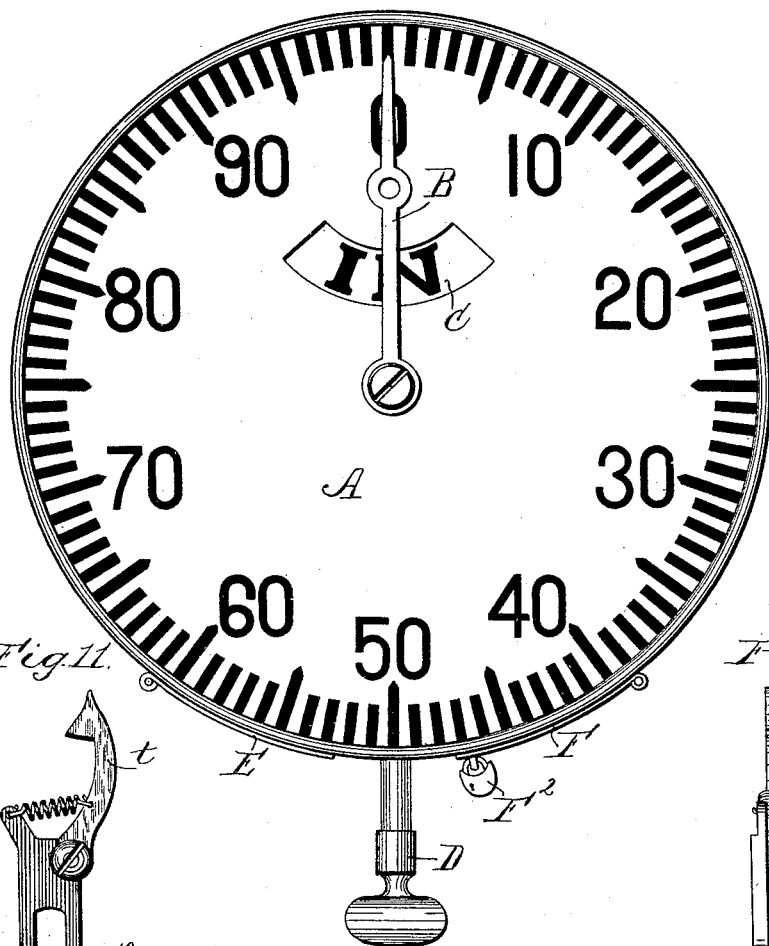


Fig 11.

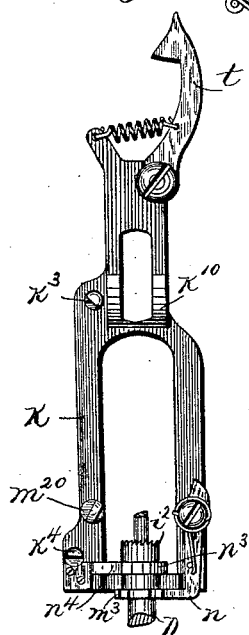


Fig 12.

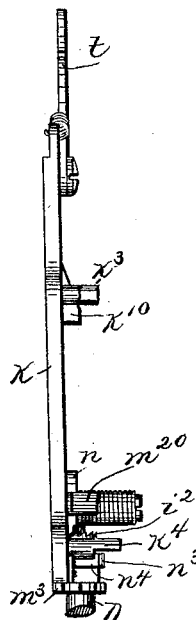


Fig 14.

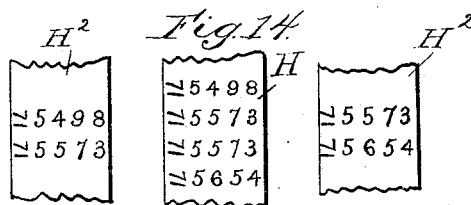
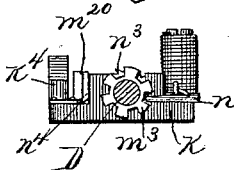


Fig 13.



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(No Model.)

4 Sheets—Sheet 2.

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Fig. 2.

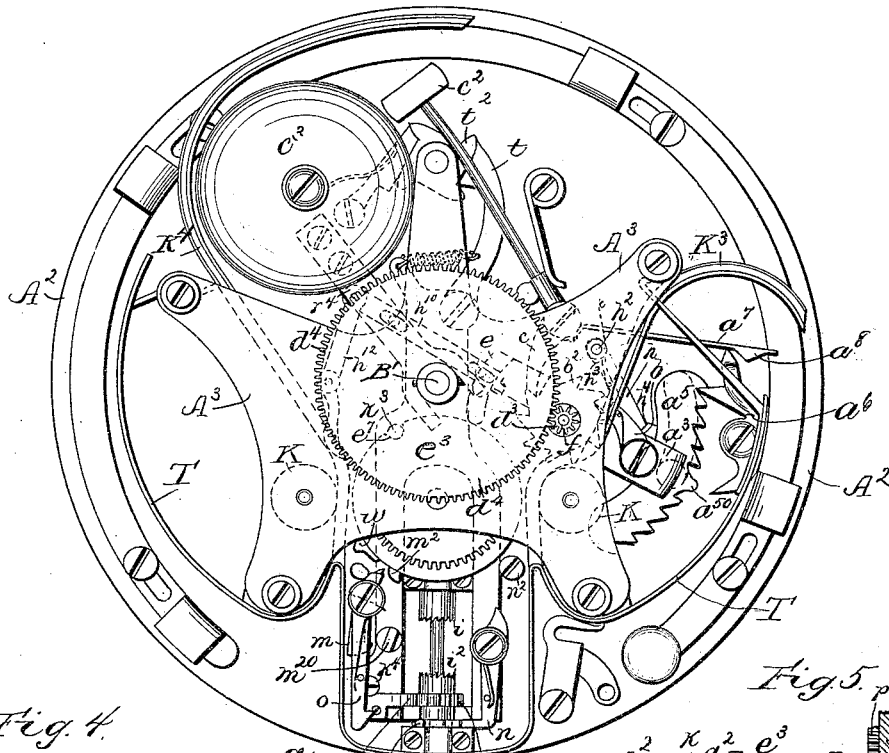


Fig. 4.

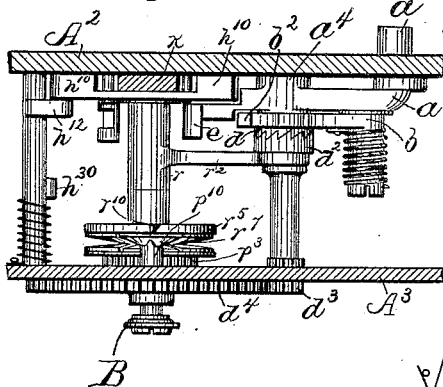


Fig. 5. p^3

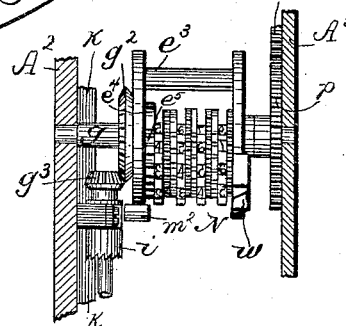
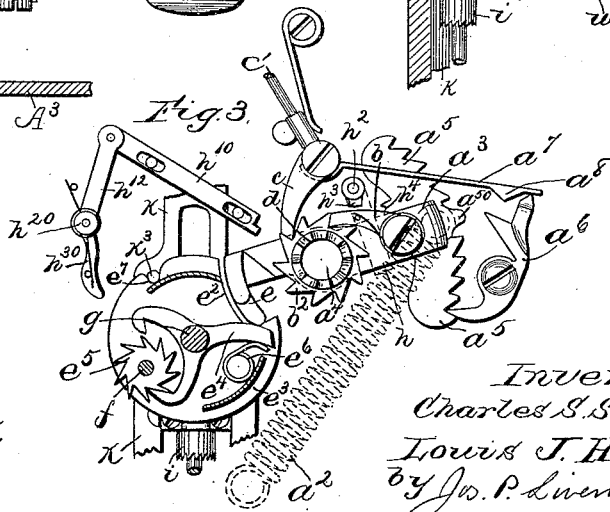


Fig. 3.



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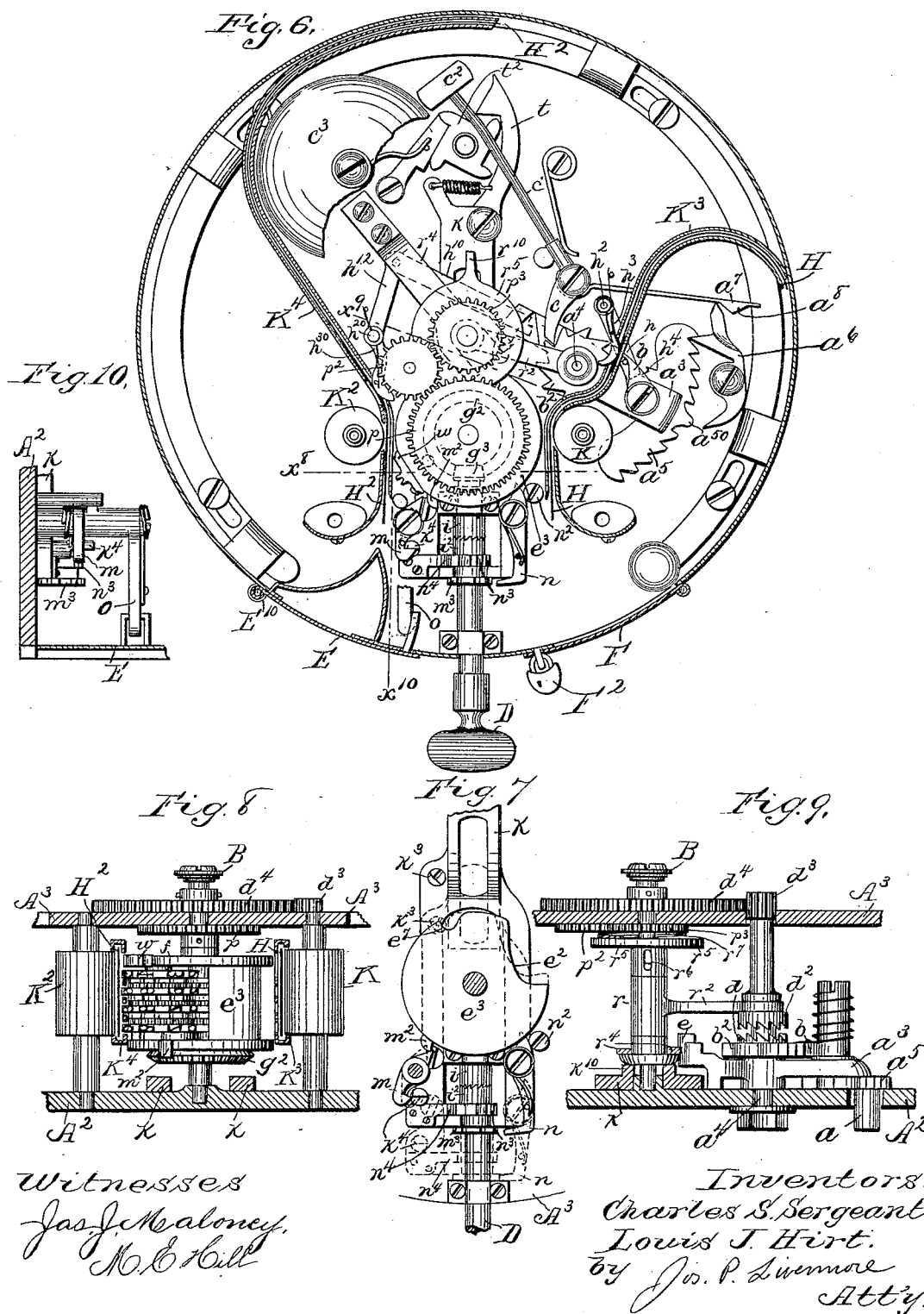
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4 Sheets—Sheet 3.

C. S. SERGEANT & L. J. HIRT.
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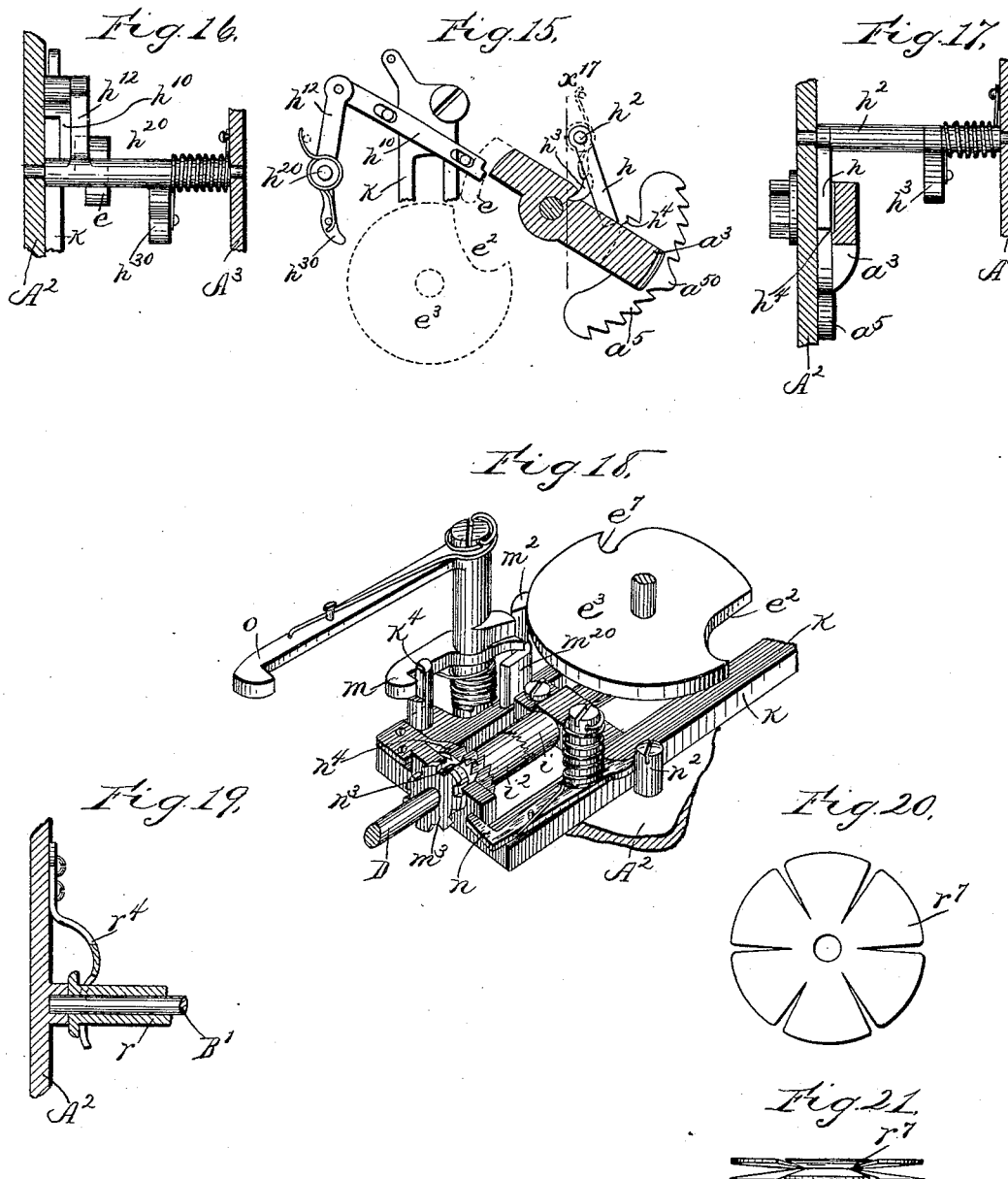
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UNITED STATES PATENT OFFICE.

CHARLES S. SERGEANT, OF WINCHESTER, AND LOUIS J. HIRT, OF BOSTON,
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FARE REGISTER AND RECORDER.

SPECIFICATION forming part of Letters Patent No. 523,446, dated July 24, 1894.

Application filed November 20, 1893, Serial No. 491,469. (No model.)

To all whom it may concern:

Be it known that we, CHARLES S. SERGEANT, of Winchester, county of Middlesex, and LOUIS J. HIRT, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Fare-Registers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Our invention relates to a fare register of that class in which the register is permanently located in the car and has a trip register in view of the occupants of the car, the mechanism of the register being operated by a part that may be attached to a pull cord extending through the car so as to be conveniently operated from any point thereof. The trip register comprised the usual pointer and dial over which it advances one space at each operation and thus registers the total number of fares taken on a trip, and the instrument is provided also with the usual alarm or bell that sounds at each operation; and it furthermore has inclosed within it, so as to be inaccessible while the apparatus is in working order, a counting mechanism which constitutes the total register and which advances at each operation of the trip register and thus is capable of affording a registration of the total amount or number of operations of the register during an indefinite period of time.

One of the main objects of the present invention is to provide means for recording at the end of each trip or half-trip the total number of operations up to that point upon two separate recording surfaces, herein shown as strips of paper, upon which the total number indicated by the counting mechanism of the total or permanent register may be imprinted or embossed by the proper operation of the counting mechanism at the end of the trip, or other desired period, at which operation the visible pointer that indicates in connection with the external dial of the trip register is set back to the zero point. One of the records thus produced, which will be hereinafter called the instrument record, is upon a strip so introduced into the case of the instrument as to be inaccessible except to the

inspector or some person having a suitable key or other means for obtaining access to the instrument, while the other, which may be called the individual record, is on a second strip that may be removed from the instrument whenever the number registered on the total register is recorded thereon and the pointer set back to the zero point. The record printing mechanism is also provided with some number or character which characterizes the instrument and is recorded upon both strips at the same time that the total number counted up to that point is recorded, and thus there are produced at the end of each trip duplicate records showing the total number counted up to the end of that trip and also the instrument from which the record is taken. By this construction, each conductor may use an individual strip for each car he may run throughout the day, removing his strip from the instrument and taking it with him if he is transferred from one car to another, and the records on his individual strips will show the number of fares for which he has operated the various registers, and at the end of the day or at any other desired time, the inspector may take the instrument records from the various instruments in use, the register records on each of which will correspond with the register records on the several individual strips that have been used in the corresponding instrument. This greatly simplifies the keeping of the accounts over the plans heretofore commonly adopted, obviating among other things the necessity of turning in a report when a conductor has finished his run on a given car as is now commonly done, either by requiring the conductor himself to take the reading and hand in the report, or by having a special force of inspectors whose sole duty it is to take off and report the state of the continuous register at the beginning and the end of each conductor's tour of duty with the same. The individual strips will commonly be provided with suitable provision for entering such data as for example the conductor's name, number of car, and date, and upon being transferred to a new car the conductor will commonly use a new individual strip and will turn in all the strips used by him at the end of the day or at other de-

sired times, although it is obvious that if preferred the same strip might be used in different instruments on different cars to which the conductor might be assigned.

5 The invention consists in the appliances for producing the individual and instrument records as just outlined, and it further consists in various combinations and details of construction that will be hereinafter described.

10 Figure 1 is a front elevation of a fare register embodying this invention; Fig. 2 a front elevation of the mechanism as seen with the dial and pointers removed; Fig. 3 a front elevation of the mechanism operated directly

15 by the handle or pull cord to indicate that a fare has been taken, the said mechanism causing the alarm to be sounded and the counting mechanism to be advanced one count; Fig. 4 a sectional plan of the mechanism operated by the handle or pull cord and the connection therefrom to the indicating

20 pointer; Fig. 5 a sectional detail showing the counting and recording mechanism in side elevation as seen looking from the left toward the right in Fig. 2; Fig. 6 a front elevation with a portion of the mechanism removed, showing the guides and the recording

25 strips and the mechanism by which the records are impressed thereon, the parts being in the position occupied at the beginning of the operation by which the record is produced upon the two strips; Fig. 7 a detail showing a portion of the mechanism shown in Fig. 4, in the position occupied just after the record

30 has been imprinted on the strips; Fig. 8 a sectional detail on line x^8 , Fig. 6, showing the counting mechanism as seen from below looking upward; Fig. 9 a sectional detail on line x^9 , Fig. 6, showing the mechanism for setting

35 back the pointer to the zero position in the operation by which the record is made, as seen looking upward from below; Fig. 10 a sectional detail on line x^{10} , Fig. 6, showing in side elevation the locking mechanism, to be referred to, for the door or opening through

40 which the individual strip is introduced; Figs. 11, 12, and 13 (Sheet 1) front, side, and end elevations respectively, of the slide to be referred to, forming a part of the mechanism

45 by which the indications are recorded; Fig. 14 a detail illustrating the records produced; Fig. 15 a front elevation partly in section of the actuator for the registering mechanism and locking devices co-operating therewith;

50 Fig. 16 a detail showing the mechanism of Fig. 15, in elevation as seen looking from the left; Fig. 17 a sectional elevation on line x^{17} , Fig. 15; Fig. 18 a perspective view of the resetting mechanism; Fig. 19 a detail of the

55 clutch mechanism to be referred to, and Figs. 20 and 21 a plan view and front elevation respectively, of a friction spring plate to be referred to.

In general appearance the instrument may be as shown in Fig. 1, similar to those now in common use in street railway cars having the operative parts inclosed in a case provided

with a dial A graduated to indicate the number of fares taken in a given trip, in connection with a pointer B, which is advanced one graduation at each operation of the instrument by the conductor; and also with a trip indicator C which may be operated at the end of each trip, when the pointer B is set back to the zero point for a fresh start, said indicator alternately showing the words "In" and "Out" or some other sign that may be chosen to indicate the direction of the trip for which the indicator is being operated.

The instrument commonly will be set up with the dial in vertical position like the face of a clock, and for convenience the terms "above" and "below" or similar terms relating to the position of the parts with relation to the horizontal or vertical will be used in accordance with the assumption that the instrument stands with the dial in vertical position, with the zero point at the top.

The instrument is also provided with a key or device D accessible to the conductor or person in charge of the instrument which co-operates with mechanism that will hereinafter described to set back the pointer B to zero, shift the trip indicator C, and make a permanent record of the number then registered upon the contained counting mechanism at the end of each trip or at such times as it is determined to begin a new count upon the visible dial A. The inclosing case is also provided with two movable covers or doors E, F, through which the recording strips may be introduced and removed, said covers being shown in this instance as hinged flaps upon the periphery of the case and the cover E being controlled by a lock which will be hereinafter described, operated by the mechanism actuated by the key D, in such manner that the said door E is unlocked and permitted to open when the recording mechanism is operated, as at the end of a trip, so that the individual record of the conductor in charge may be removed if the conductor should be assigned to another car and the individual record of the next conductor can be inserted. The other door F is locked independently of the mechanism of the register in such manner that it may be opened only by the inspector or person having charge of the instrument record, for the purpose of removing the instrument record at the end of the day, or at such time as may be determined upon. A conventional representation of such a lock is indicated at F², but it is obvious that it may be of any suitable construction, and operated by a key or otherwise as may be preferred.

For convenience in description, the mechanism that is operated by the conductor to produce a visual or audible indication or both for each fare taken may be called the trip register mechanism it being actuated by a suitable projection or handle a , see Fig. 9, at the rear of the case arranged to be operated in one direction by the usual pull cord, and in

the opposite direction by a spring a^2 , see Fig. 3; while the mechanism operated by the key D at the end of each trip will be called the total register recording and the resetting mechanism, although it is to be understood that each mechanism co-acts mechanically in certain respects with the other, and that each performs more than the mere operations of indicating visually and audibly in the one case, for each fare taken; and recording in the other case the total number of fares taken, up to the end of the trip, the former or trip register mechanism also operating to advance the number wheels of the total register, while the recording operation of the latter also resets the trip register.

The trip register mechanism operated by power applied to the projection a comprises a movable actuator shown as a lever a^3 contained in the case, and pivoted or fulcrumed at a^4 on the base A^2 thereof, and arranged to be oscillated from the position shown in Fig. 2, to that shown in Fig. 3, by the pull of the conductor, and in the reverse direction by the spring a^2 when the pull on the cord is relaxed. The said lever is provided with a double ratchet segment a^5 co-operating with a double pawl a^6 pivoted on the back plate a^2 of the instrument and acted upon by a spring a^7 so arranged as to cause either end of the double pawl to co-operate with the corresponding part of the ratchet segment a^5 , a suitable projection a^8 on said spring, preventing the pawl from shifting until positively moved from one position to the other, such shifting being produced at the proper time by a projection a^{50} in the double ratchet a^5 which just at the end of the movement of the lever in one direction shifts the pawl and causes its opposite end to co-operate with the opposite part of the double ratchet from that which was working previous to the shifting. This device is for the purpose of insuring that the lever a^3 shall make a complete stroke or movement in one direction before it can make its stroke in the opposite direction and thus prevents possibility of affecting the mechanism of the register controlled by it, by any partial movement of the lever.

With the parts in the position shown in Fig. 2, for example, the pawl has just been shifted by the projection a^{50} striking the lower projection of the pawl at the end of the downward or return movement of the lever a^3 . As it begins its upward or working stroke on the next operation of the pull cord the upper projection of the pawl engages with the upper part of the ratchet and will prevent any return movement thereof so that if the conductor pulls only part way and then releases the lever, it will not go back to its starting point upon such release, but will remain held by the pawl until pulled clear through its stroke, just at the end of which the projection a^{50} strikes the upper projection of the pawl and carries the part in engagement with the spring a^7 over the yielding projection a^8 thereof, thus

bringing the parts to the position shown in Fig. 3, in which the lever may make its return stroke under the action of the spring a^2 but is prevented from being pulled forward again from any point in its return stroke by the engagement of the lower projection of the pawl with the lower part of the ratchet. The lever therefore must make its full stroke in each direction when once operated and the mechanism controlled by it can be affected only by the full stroke and can be affected a second time only after the preceding full stroke in both directions has been completed.

The full stroke of the lever a^3 performs the following operations. First, causes the pointer B Fig. 1, to advance one step on the dial; second, causes the alarm to be sounded, and third, advances the counting mechanism or permanent register one number. The first two operations are produced by a pawl b pivoted on the end of the lever and co-operating with a ratchet b^2 , best shown in Figs. 2, 3, 4, and 6, which is advanced one tooth on the forward stroke of the lever. The teeth of the ratchet b^2 act on a pawl arm c of a lever c' carrying a bell hammer c^3 which thus strikes the bell c^3 as the tooth of the ratchet passes the arm c which also acts as a retaining pawl for the ratchet b^2 . The said ratchet b^2 is also provided with one clutch member d which is normally engaged with a co-operating clutch member d^2 (see Figs. 4 and 9) on a shaft connected with a pinion d^3 meshing with a gear d^4 see Figs. 2 and 4, fixed upon the arbor B' of the pointer B, the said pinion and gear being so proportioned that the rotation of the former produced by the movement of the ratchet b^2 for the space of one tooth when the clutch members d, d^2 , are engaged causes the pointer to advance one graduation on the dial A.

The clutch d, d^2 , is introduced between the ratchet b^2 and the pinion d^3 for the purpose of permitting the said clutch to be disengaged as will be hereinafter described, when the pointer is to be set back to zero, as the ratchet wheel b^2 cannot turn backward, and consequently the pointer and its gear d^4 could not be turned backward if the pinion d^3 were connected directly with the ratchet b^2 .

The lever a^3 of the indicating mechanism also operates the counting mechanism as best shown in Fig. 3, the said lever having a projection e that enters a recess e^2 in the base or rear plate A^2 of the frame piece or barrel e^3 (see Figs. 3, 5, 4, and 8) that constitutes a movable support for and contains a set of number wheels N connected by the usual gearing so that each succeeding number wheel of the set advances one-tenth of a rotation at the end of a complete rotation of a preceding wheel of the set. Such gearing is not herein shown in full as of itself it forms no part of the present invention.

The number wheels are arranged to rotate about an axis f (see Fig. 3) which is eccentric to the axis g upon which the barrel e^3 con-

taining the counting wheels turns so that the said counting wheels rotate about their axis f in setting up a number, and stand at any time each with one figure, type or die projecting farther than the others radially outward from the periphery of the barrel e^3 the said series of number wheels being carried with a revolving movement about the axis g of the barrel e^3 when the latter is turned as will be hereinafter described, for the purpose of printing off a record from the projecting numbers.

The most frequently moving or unit wheel of the series of number wheels is operated at every stroke of the lever a^3 by the projection e of said lever striking the arm e^4 , see Fig. 3, of an anchor lever the pallets of which co-operate with a ten-toothed wheel e^5 connected with the units wheel of the series of counting wheels N . The arm e^4 is acted upon by a spring e^6 in opposition to the action of the projection e of the lever a^3 and is thus oscillated back and forth about the shaft g of the counting-wheel barrel, upon which it is loosely pivoted, at each oscillation of the lever a^3 , the back and forth movement of the anchor advancing the wheel e^5 one tooth in the well-known manner. The arm e^4 of the anchor lever plays back and forth along the recess e^2 in which the projection e of the lever a^3 works and it will be understood from Fig. 3, that these parts can co-operate only when the barrel e^3 is in the position there shown with its recess e^2 properly located with relation to the lever a^3 . With the said lever in its normal position shown in Fig. 2, to which it is returned by the spring a^2 after each registering operation the projection e is wholly out of the recess e^2 and just beyond the periphery of the rear head of the barrel e^3 and as soon as the said barrel is turned slightly from the position shown in Fig. 3, in which the lever a^3 is shown in abnormal position, that is, at the end of the stroke by which the registering mechanism is operated, for the purpose of printing the record, as will be hereinafter described, its periphery obstructs the movement of the lever a^3 from the normal position, and locks the said lever, so that the indicating mechanism cannot be operated while the recording mechanism is being operated by the key D as will be described, as the operation of the recording mechanism rotates the barrel e^3 about its axis g . On the other hand, when the lever a^3 is in abnormal position, that is, in the recess e^2 as shown in Fig. 3, it obstructs the rotary movement of the barrel which can only take place therefore when the lever a^3 is retracted or in normal position with the projection e thereof out of the recess in the periphery of the counting wheel barrel, and under such conditions there is nothing to engage and operate the anchor arm e^4 so that the entire number wheel barrel rotates without turning the number wheels on their own axis f and consequently without changing the number that was left projecting farthest

from the axis of the barrel by the last operation of the lever a^3 .

When the number wheel barrel e^3 is rotated about its axis the longitudinal line of figure type on the periphery of the number wheels that projects farthest radially from the axis of the barrel engages with and makes an imprint on the instrument record strip II , see Fig. 6, the projecting number type impressing the said strip against a platen roll K , Figs. 6 and 8, and later in its rotation the type numbers similarly make an imprint on the individual registering strip II^2 , which is supported against the pressure of the type by the platen K^2 .

The type may be inked, but preferably will be constructed to make an embossed impression on the recording strips II , II^2 , and as the platens K , K^2 , are arranged to rotate, the paper or recording strip is fed along between the printing dies and the platen by their action on the strip in making the imprint, and thus presents a fresh surface for the imprint at the next rotation of the number wheel barrel.

The recording strips II , II^2 , may be introduced into guide tubes K^3 , K^4 , having suitable openings to permit the periphery of the platen rolls and the printing dies to act on the surface of the paper, and automatic stop devices are provided in conjunction with the said guide tubes and the strips contained therein to cause the indicating mechanism to be locked when either recording strip is absent so that the machine cannot be operated until both record strips are supplied. This locking mechanism consists of a swinging arm or bolt h responsive to the instrument strip II being connected with a rock shaft h^2 provided with a feeler or finger h^3 extending into an opening in the guide tube K^3 , said parts being acted upon by a spring that tends to press the feeler h^3 inward across the passage of the tube and if said movement is not obstructed by the feeler coming against the recording strip it will be sufficient to throw the bolt or stop arm h in front of a shoulder h^4 on the segment a^5 of the actuating lever a^3 of the registering mechanism as shown in Fig. 2, thus locking the said lever against movement. If, however, the strip II is inserted in the tube K^3 , it will throw the feeler h^3 out from across the passage of the tube and in such movement will turn the bolt h far enough to clear the shoulder h^4 as shown in Figs. 3 and 6, thus affording no obstruction to the movement of the lever a^3 . See also Figs. 15 and 17.

The locking mechanism controlled by the individual recording strip II^2 , is similar to that described except that the bolt h^{10} , (see Fig. 3) which operates to lock the lever a^2 has a sliding instead of a rocking movement and is operated in its sliding movement by a rocking arm h^{12} , see Figs. 15 and 16 connected with a rock shaft h^{10} , provided with a feeler h^{30} , co-operating with the strip II^2 in the same manner that the feeler h^3 co-operates with

the strip H. That is, the strip H^2 when present in the guide tube K^4 presses the feeler h^{30} out from the guide passage and in this position the bolt h^{10} is out of engagement with the lever a^3 but if the strip H^2 is absent so that the feeler is no longer supported, it will drop in across the passage in the guide tube K^3 , and by its movement will throw the bolt h^{10} , into engagement with the lever a^3 so as to prevent the latter from being moved. Thus the lever a^3 and the entire registering mechanism operated by it are prevented from operating except when both recording strips are present in the machine.

The number wheel barrel e^3 is rotated so as to cause the counting wheels to make the imprint on the recording strips at the proper time by mechanism including a beveled gear g^2 fixed to said barrel at the rear thereof and meshing with a pinion g^3 (see Fig. 5) on the recording and resetting shaft, the said pinion turning in bearings supported on the frame plate A^2 and provided with one member i of a clutch. Rotation of the clutch member i and consequently of the number wheel barrel is produced by a co-operating clutch member i^2 normally disengaged from the clutch member i as shown in Fig. 2, the said clutch member i^2 being connected with the key D by which it is turned after engagement with the clutch i for the purpose of rotating the number-wheel barrel and recording the number indicated by the number wheels N. thereon on the strips. The engagement and disengagement of the clutch i, i^2 , and other operations necessary for the proper control of the movement of the number-wheel drum and parts co-operating therewith are effected by the longitudinal movement of a slide k connected with said key D. The said slide k is in the form of a flat plate (see Figs. 11 and 12) lying against the base plate A^2 of the instrument and provided with longitudinal slots or openings embracing the bearing piece for the clutch member i and pinion g^3 and also the bearing for the rear end of the arbor B' of the pointer B. In normal position with the key D pulled down, or outward from the periphery of the case of the instrument as shown in Figs. 1 and 2, a projection k^3 on said slide enters the notch e^7 in the periphery of the base of the number wheel barrel e^3 as best shown in Fig. 3, and thus locks the said barrel in proper position for its recess e^2 to receive the actuating projection e of the lever a^3 of the registering mechanism to operate the counting wheels.

At the end of a trip or whenever it is desired to take a record of the number indicated by the counting wheels the slide k is pressed upward by the operator thrusting the key D toward the case of the instrument and in this movement the projection k^3 is disengaged from the notch e^7 in the number-wheel barrel leaving it free to turn and the clutch i, i^2 , is engaged as shown in full lines Fig. 7, see also Fig. 18 so that rotation of the key D will be transmitted through the clutch to the pinion

g^3 , beveled gear g^2 , and number-wheel barrel e^3 . At the end of the inward sliding movement by which the clutch i, i^2 is thus engaged a projection k^4 near the lower part of the slide k is engaged with a hook pawl m (see Figs. 6, 10 and 18) pivoted on the base plate which thus locks the slide k in its upper position and with the clutch members i, i^2 , engaged as shown in Fig. 6, and the slide cannot be withdrawn until unlocked as will be described, such unlocking taking place only after the number-wheel barrel has made substantially a complete rotation so as to print on both recording strips.

The key D is prevented from rotating except when the clutch i, i^2 , is engaged by means of a pivoted locking finger n (see Figs. 2, 6, 7, 11, 13 and 18) carried by the slide and engaged by a stationary stop n^2 on the base plate just as the slide arrives at the highest point such engagement throwing the locking finger out from the toothed locking disk m^3 on the key shaft and thus releasing the same as shown in Figs. 6 and 18 and in full lines Fig. 7.

A ratchet n^3 on the key spindle or lower clutch member, and pawl n^4 on the slide k prevent rotation of the key except in the proper direction and with the parts in the position shown in Figs. 6 and 18, the key may be rotated and the number-wheel barrel turned in the direction opposite to that of the hands of a clock thus causing the projecting figure type or dies to first impress the strip H against the platen K and then the strip H^2 against the platen K^2 .

Near the end of the complete rotation of the number-wheel barrel a projection m^2 thereon engages the locking pawl m and turns it out of engagement with the projection k^4 of the slide, as shown in full lines Fig. 7, so that now the slide can be withdrawn to its normal position shown in Fig. 2, and at the same time also the said projection m^2 (or if desired another projection properly located) engages the pivoted locking hook o (Figs. 2, 6, 10 and 18) for the door E thus releasing the said door and permitting it to be opened to afford access to the individual recording strip H^2 , if it is desired to remove or replace the same. The rotation of the number-wheel barrel by the key D is thus arrested by the projection m^2 of the former bringing up on the locking pawl m for the slide which in turn brings up on a projection m^{20} on the slide, with the slide released and the door E unlocked, and the operator may now pull down the key D bringing the slide back to its normal position shown in Fig. 2, at the end of which movement the projection k^3 enters the recess e^7 which is so shaped that the said projection k^3 causes a slight farther rotation of the barrel from the full to the dotted line position Fig. 7, which movement carries the projection m^2 past the pawl m and lock o (the stop m^{20} now being withdrawn) leaving the said pawl m in position to engage the slide at its next upward movement and leaving lock o in position to hold

the door E until again released by turning the barrel to the position shown in full lines Fig. 7. The parts are shown in Fig. 18 in the position occupied just as the projection m^2 has arrived in position to engage with and operate the pawl m and lock o but before the latter have been moved by said projection. A projection m^{20} on the slide arrests the movement of the projection m^2 and number drum just after said projection m^2 has disengaged the catch m from the projection k^4 , and operated the lock o . The slight movement of the drum by the projection k^3 entering the recess e^7 as before mentioned carries the projection m^2 beyond the position occupied by the projection m^{20} , before the slide was withdrawn, so that when the slide is again moved up for the next operation the projection m^{20} will be at the rear of the projection m^2 with relation to its movement about the axis of the drum. By this construction the number-wheel barrel when once engaged must be fully operated before the key can be disengaged and the instrument again operated by the lever a^3 of the registering mechanism, as the barrel when stopped in the position shown in full lines Fig. 7, before the key is withdrawn will obstruct the projection e of the lever a^3 of the registering mechanism. The rotation of the number-wheel barrel also sets back the pointer B of the indicating mechanism by the following means:—A gear p connected to rotate with the number-wheel barrel meshes with an intermediate gear p^2 , meshing with a gear p^3 frictionally connected with the pointer arbor, these gears being so proportioned that a single rotation of the gear p will produce more than a full rotation of the gear p^3 , frictionally connected with the pointer, and will thus turn back the pointer from the farthest point to which it will be advanced in the interval between the operations of the recording mechanism. The backward movement of the pointer is arrested by a suitable stop p^{10} , fixed to the front plate A^3 (Fig. 4) when the pointer arrives at zero position and in the farther movement of the number wheel the gear p^3 merely slips on its frictional connection with the pointer.

In order to permit the pointer to be turned backward its gearing d^1, d^3 , must as before stated, be disconnected from their actuating pawl b^3 and this is effected by a cam projection k^{10} , (see Figs. 11 and 12) on the slide k , which, when the slide is pushed upward to engage the clutch i, i^2 , for the number-wheel barrel, engages the lower end of the sleeve r arranged to slide on the pointer arbor and connected by an arm r^2 with the clutch member d^3 so that when the slide is in the position shown in Fig. 6 the clutch d, d^2 , will be disengaged as shown in Fig. 9 leaving the pointer free to turn. When the slide k is withdrawn to its normal position shown in Fig. 2, the spring r^4 see Fig. 19 presses the clutch operating sleeve r downward and thus re-engages the clutch d, d^2 , so that the pointer

now responds to the operation of the lever a^3 of the indicating mechanism.

The sleeve r which is loose on the arbor B' so as to move longitudinally thereon for the purpose of engaging and disengaging the clutch d, d^2 , and also to permit the pointer arbor to turn within it, acts upon a disk or collar r^5 connected by a pin and slot as shown at r^6 (Fig. 9) with the pointer arbor so as to partake of the longitudinal movement of the sleeve r without being capable of rotary movement independent of the pointer arbor. Between this disk r^5 and the gear wheel p^3 (which is loose or free to turn on the pointer arbor) is interposed a spring plate r^7 (Figs. 4 and 9, 20 and 21) which when the clutch d, d^2 , is disengaged by the cam projection k^{10} of the slide, as shown in Fig. 9, is compressed between said disk r^5 and gear wheel p^3 bearing frictionally on both so that the rotation of the pinion causes the disk r^5 to rotate with it, and in turn through the pin and slot connection to rotate the pointer-arbor B' and pointer B until the stop projection r^{10} , see Fig. 4, of the disk brings up on the stop projection p^{10} , fixed in the rear side of the front frame plate A^3 of the mechanism, and thus arrests the backward movement of the pointer when the latter arrives at the zero position on the dial. After the pointer is thus arrested the gear p^3 slips frictionally over the spring r^7 while the number-wheel barrel is completing its movement and after the said movement is completed and the slide k withdrawn to its normal position the sleeve r is forced back by the spring r^4 causing the clutch d, d^2 , to engage and at the same time permitting the disk r^5 to move away from the pinion p^3 as shown in Fig. 4, thus relieving the frictional pressure of the spring r^7 and also throwing the stop projection r^{10} out of engagement with the projection p^{10} so that the pointer may move past the zero point without being arrested by the stop, in case it should make more than one complete rotation under the action of the registering mechanism, before being again set back. The movement of the slide k also operates the trip indicator or sign C by means of a pawl engaging a ratchet t^2 on the arbor of the trip sign disk as will be understood from Figs. 2 and 6.

It is necessary that the records on the recording strips should be identified with the instrument from which they are taken. This may be accomplished in any desired manner but most conveniently by providing the number-wheel barrel with a characterizing number or other type w (Figs. 5 and 8) arranged to make its imprint on the strips adjacent to the imprint of the number wheels themselves, so that the record on the strip shows both the number of the instrument and the total number counted by the counting wheels of the instrument up to the time when the record was taken.

The operation may be briefly summarized as follows:—The inspector or other person authorized to take records from the instrument,

opens the door F and inserts the instrument recording strip H in the guide tube K³, and then locks the door so that this record is inaccessible to the operators of the instrument.

5 A fresh record strip for the instrument is thus inserted at stated intervals as for example, at the beginning of each day. At the beginning of a day's work the conductor inserts his individual record strip H², by opening the door

10 E which he can do by operating the key D as before described; that is, pressing the key D inward toward the instrument and turning it around until stopped in the position shown in full lines Fig. 7, when the lock o of the

15 door will be disengaged and the door can be opened, and the record strip introduced. The door E is shown as arranged to open by gravitation as soon as the lock o is released, and a spring E¹⁰, is also applied in the direc-

20 tion to throw the door open, but of course the spring might be applied to hold the door closed in which case it would be pulled open by the conductor after he had turned the key D and before he had withdrawn the key if

25 the individual strip is to be removed or inserted. After the individual strip has been introduced the conductor will again rotate the barrel e³ and thus revolve the number wheels N by turning the key D and will thus

30 obtain an imprint both on his own strip H² and on the instrument strip H showing the count indicated by the number wheel at the beginning of his day's work. If the door E is arranged to open either by gravitation or

35 by a spring, the conductor will close it after he has withdrawn the key D, the door snapping into engagement with the catch o which operates as a spring lock. A shield is provided as shown at T Fig. 2, to prevent tampering with the mechanism of the instrument

40 when either of the doors E or F is open, said shield also being arranged to assist in guiding the strips toward their guide tubes K³, K⁴. The rotation of the number-wheel barrel in

45 making the record is such as to feed the individual strip outward or toward the corresponding door while the instrument record strip is fed inward, or away from the corresponding door. Thus the conductor will have

50 no difficulty in removing his strip whenever he has occasion to do so. The strips merely move along through the tubes K³, K⁴, in their feed movement, the ends of the strips projecting from the tubes if necessary, and

55 standing inside of the main case without interfering with the working parts. Then the actuating lever a³ will be operated in the usual way as the fares are taken, the pointer B showing to the occupants of the

60 car the number of fares accounted for during the trip and the alarm bell sounding at each operation. At the end of the trip the key D is pressed inward and rotated, and the pointer B thus set back to zero, the trip sign C shifted,

65 and a record is made of the total number indicated by the number wheel so that the dif-

ference between this number indication and the one taken at the beginning of the trip gives the number of fares accounted for on that trip. If the same conductor remains in

70 charge of the same car at the next trip, there is no need to open the door E and change the individual strip and the operation will go on as just described, as long, as the one conductor remains consecutively in charge of one

75 car. If, however, another conductor should take charge of the car, the first one after making the final record would remove his individual strip H², and the new conductor would insert his strip, and if the first conductor

80 should subsequently be assigned to some other car, he can take his individual strip with him, insert it in the new machine and obtain records as before described. The more desirable

85 plan, however, is for the conductor to use another individual strip when assigned to a new car or a new route, so that each strip will show his individual record on any one car,

90 each strip being removed after the term of duty upon any one car is completed, and the several strips being retained until the regular time for handing in the reports, which will commonly be at the end of each day. The individual records thus handed in will show by

95 subtraction the number accounted for on each instrument, and the sum of the numbers thus shown for each instrument, will be the total number accounted for, during the day. Furthermore, the inspector at the end of the day

100 removes the instrument strips H the records on which will correspond to the partial records on the several individual strips that have been used in that instrument, and the two sets of records can be readily compared thus

105 affording a check for errors and also a check against dishonesty of either conductor or inspector, and perfect protection to each.

Fig. 14 illustrates the records produced on the instrument-strip H, and two individual strips H² that have been consecutively used

110 in connection with the same instrument. Thus the individual strip H², on the left was used in the instrument No. 71, in the trip at the beginning of which the total number indicated was 5498, and at the end of which the

115 total number indicated was 5573, after which the conductor was transferred to some other car, while the individual strip H² represented on the right hand of Fig. 14, is the one used by the conductor succeeding the one so trans-

120 ferred, and its first indication in instrument No. 71, therefore corresponds with the last indication in that instrument of the other strip. The repetition of the same number on the instrument strip H affords an indication that a

125 transfer of individual strips was made at that point, and thus facilitates the comparison of the individual records with the instrument records.

It is obvious that the mechanical construction may be widely varied, without materially departing from the essential features of con-

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struction and operation, and the invention is not limited to the details of mechanical construction specifically described.

We claim—

5 1. The combination of the counting mechanism with independent supports for two independent recording surfaces and operating mechanism whereby the indication of said counting mechanism is recorded upon said
10 surfaces consecutively, substantially as described.

2. The combination of the counting mechanism and movable support therefor with a support for a recording strip, and a door affording access for the introduction or removal
15 of said strip, and a lock for said door, with mechanism for operating the said movable support to produce a record on said strip, from the counting mechanism thereon and
20 means for unlocking the said door by the said recording mechanism, substantially as and for the purpose described.

3. The combination of the movable trip register and actuator therefor with the counting
25 mechanism operated by said actuator and the movable support for the said counting mechanism said actuator and support being constructed and arranged as described, whereby each when in abnormal position locks the
30 other from movement, substantially as described.

4. The combination of the counting mechanism and movable support therefor with actuating mechanism for moving said support,
35 normally disengaged therefrom, and a lock for holding said parts in engagement and means for releasing said lock near the end of the movement of said support, substantially as described.

40 5. The combination of the counting mechanism and actuator therefor, with a support for a recording surface to receive a record from said counting mechanism and a lock for said actuator controlled by said recording surface,
45 substantially as and for the purpose described.

6. The combination of the movable actuator and a pointer and counting mechanism advanced at each operation thereof, with means
50 for moving the said counting mechanism to record the indication thereof, connected with the said pointer to set the same back to zero, as described, and a clutch connecting said pointer and its actuator and disengaged by
55 the operating mechanism by which the record

is made substantially as and for the purpose described.

7. The combination of the trip register and counting mechanism and rotating support or barrel for said counting mechanism provided
60 with a recess in its periphery with the movable actuator for said trip register and counting mechanism, which enters said recess and operates said counting mechanism when the
65 said barrel is in normal position, and is at other times prevented from movement by the unrecessed part of said barrel, substantially as described.

8. The combination of the counting mechanism and a support or barrel therefor, with
70 a key for rotating said barrel, normally disengaged therefrom, a slide connected with said key and movable to engage and disengage the same with and from the barrel, a locking pawl
75 for holding said slide when the key and barrel are engaged, and a projection on the barrel for disengaging said pawl at or near the end of its rotation produced by said key, substantially as described.

9. The combination of the counting mechanism and a support or barrel therefor with
80 a key for rotating said barrel normally disengaged therefrom, a slide connected with said key and movable to engage the same with and disengage the same from the barrel,
85 a lock preventing said key from rotating when disengaged from the barrel, and means for releasing the same when the key and barrel are placed in engagement, substantially as described.
90

10. The combination of the counting mechanism and a support or barrel therefor with
95 a key for rotating said barrel, normally disengaged therefrom, a slide connected with said key and movable to engage the same with and disengage the same from the barrel, a locking pawl for said slide, and a projection on the barrel for disengaging the same and a
100 projection k^3 on the slide engaging said barrel and operating to disengage the projection thereof from said locking pawls, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHAS. S. SERGEANT.
LOUIS J. HIRT.

Witnesses:

JOS. P. LIVERMORE,
JAS. J. MALONEY.