

1,436,646.

Patented Nov. 28, 1922.

4 SHEETS—SHEET 2.

Fig. 3.

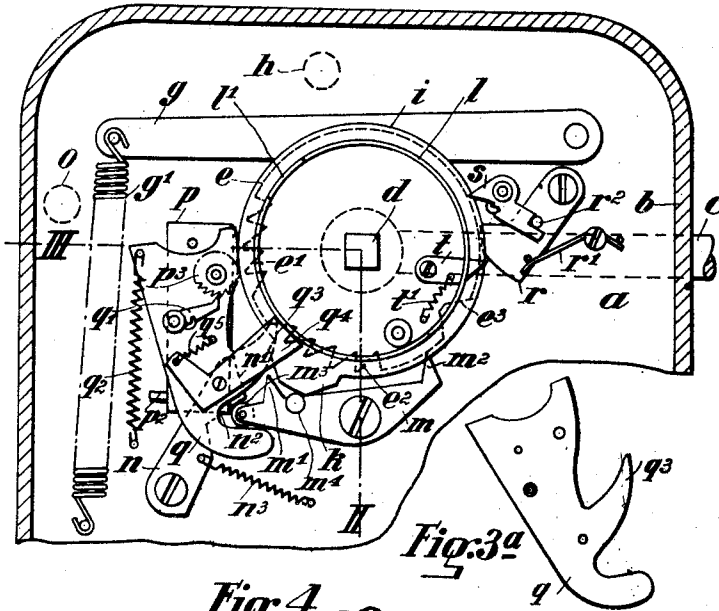
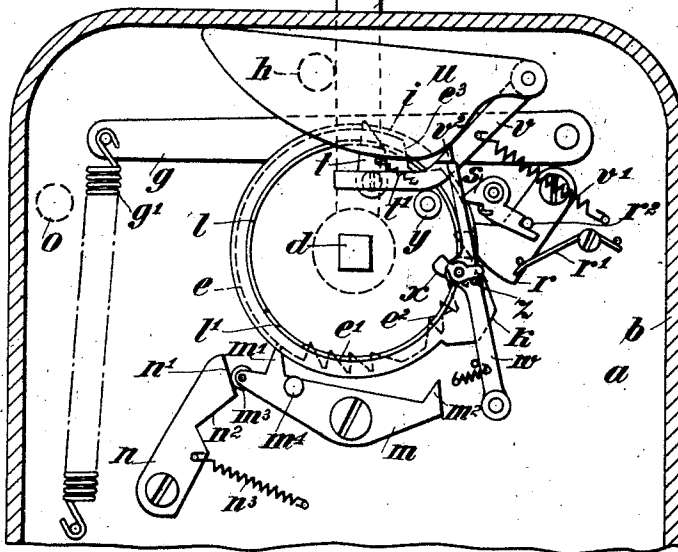


Fig. 4.



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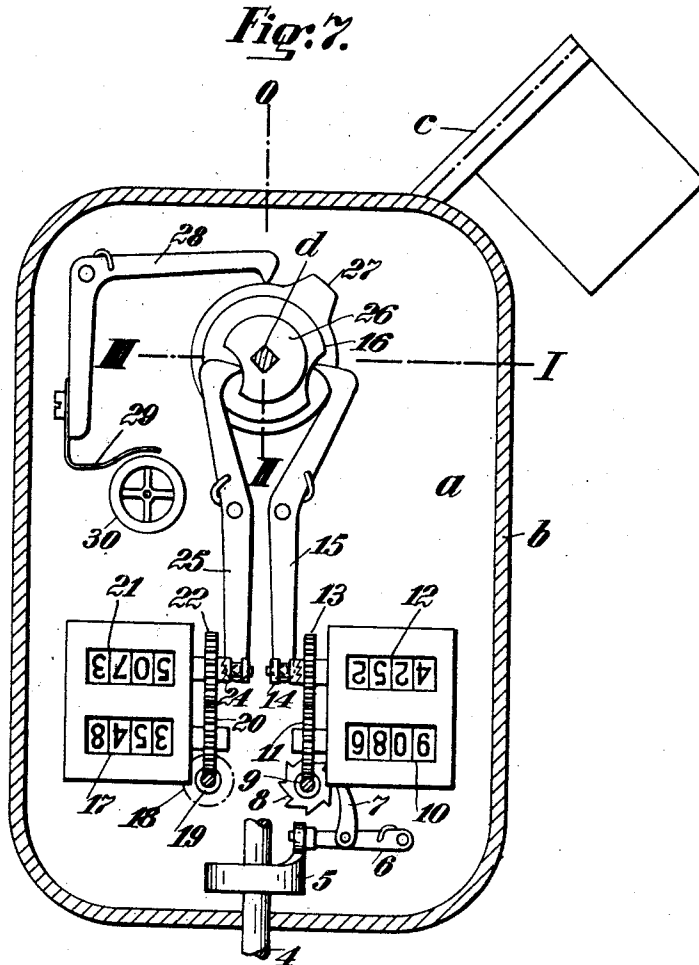
By Hammett & Co.

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F. W. G. BRUHN.
FARE INDICATOR FOR VEHICLES.
APPLICATION FILED FEB. 10, 1922.

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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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FARE INDICATOR FOR VEHICLES.

Application filed February 10, 1922. Serial No. 535,577.

To all whom it may concern:

Be it known that I, FRIEDRICH WILHELM GUSTAV BRUHN, a citizen of Germany, residing at Wilmersdorf, near Berlin, Germany, have invented certain new and useful Improvements in Fare Indicators for Vehicles, of which the following is a specification.

This invention relates to fare indicators which are set for different conditions of service by means of a signal that may consist of a flag adapted to be swung into a number of positions. The object of the invention is to simplify the manipulation required for setting the apparatus for the various conditions of service, to reduce the number of parts required for thus setting the apparatus, and above all to provide perfect security against certain possibilities of fraud.

The possibilities of fraud, with which the invention is intended to cope by simple means in the simplest possible manner, are more particularly the following:

Every fare indicator must, at the beginning of a trip, be set into operative condition and adjusted for the proper tariff. At the end of a trip the fare indicator must first be set to "cash." During the operation of setting the apparatus to "cash" the hirer of the vehicle pays his fare. Therefore the fare to be paid for the trip must remain visible. When the fare has been paid the apparatus must be set out of operative condition, i. e. to "disengaged." The fare recorded for the last trip must disappear. When the apparatus is then again set for service the initial charge according to the particular tariff in question must be recorded. The operation of restoring to their zero or initial positions the members (such as disks, cylinders or the like) that serve to indicate the fare requires a certain length of time. Hence, if only a single member—the signal—is provided for setting the apparatus for the different conditions of service, it will be possible for the driver at the end of a trip, when the apparatus records a certain fare, to set the apparatus so quickly to "disengaged" and then into its operative or "engaged" condition that the said indicating members do not have time enough to return to their zero or initial positions. The driver is thus enabled to prevent the re-

corded fare from disappearing and to commence a new trip with a recorded fare that is higher than the proper initial charge. Various means have been proposed for preventing the apparatus from being set too rapidly to "disengaged" and then to "engaged." One of these means consists in an arrangement by which the signal, when brought into the "disengaged" position, is locked and thus prevented from being set to "engaged" until a slight reversed motion is imparted to it.

It has been found that this arrangement in itself does not afford sufficient security, because the driver, after a little practice, is still able to carry out the necessary motions fast enough to prevent a recorded fare from disappearing. Another attempt to overcome this evil involved a renewed application of the old plan of providing a manually operated member such as a lever in addition to the manually operated signal. The arrangement in accordance with this plan was such that the signal was locked when moved into the disengaged position and had to be unlocked by manipulating the second member before it could again be set to "engaged." This arrangement, in addition to rendering the apparatus inconvenient to handle, involves the drawback of necessitating the provision of a second manually operated member and special locking devices. Besides, even this arrangement does not afford perfect security against the fare being maintained recorded on the apparatus, because the driver, after sufficient practice, is able to carry out the necessary manipulations so quickly that the indicating disks or drums are not given time enough to return to their zero positions.

The too rapid manipulation of the fare recorder may be used as a means for practicing fraud in other ways. Thus, if the apparatus is arranged to be set for all conditions of service by means of the signal, the driver may "inadvertently" switch over from the tariff for which the apparatus happens to be set to "cash" and then to "disengaged" so quickly that the fare disappears before the hirer of the vehicle has had time to read it. The driver will then be able to pretend that the fare was higher than the proper, recorded fare, and if the hirer complains, the

driver will be able to make the excuse that he inadvertently used too much force and switched over to "cash" too quickly, so that the signal immediately went to "disengaged." To provide against this, fare indicators have been equipped with a special member for setting the apparatus to "cash." There could then be no question of switching too rapidly, but this arrangement also involved a second manually operated member, locking devices that had to be provided in order to compel the driver to work the second member, and inconvenient switching manipulations.

The operation of setting the apparatus to "cash" may also be utilized for fraudulent purposes. In existing apparatus the circumstances involved in this operation are generally the following: When the apparatus is set to "cash" the motion of the clockwork is arrested to prevent it from augmenting the fare while the hirer of the vehicle, after having been taken to his destination, is paying for his trip. But the "distance mechanism," which causes the fare indicator to record a fare in accordance with the distance covered, will still be connected to the indicator. Therefore if, while the apparatus is left at "cash", the driver were to drive on, or take in a new passenger, the fare and the fare-checking-devices would be advanced by the distance mechanism. Two possibilities of fraud are given in particular and these are the following:

1. The driver has just reached the end of the trip and set the apparatus to "cash". He receives payment from his fare and notices another person who desires to engage his car. He now omits to set the apparatus to "disengaged" and thus omits to obliterate the fare charged for the last trip while covering the apparatus with his cloak so that the passenger does not notice that it is set at "cash." At the end of the trip the apparatus will appear to be set to "cash" in the proper manner, but in reality the passenger will have to pay for the last passenger's trip in addition to his own.

2. Suppose the driver has to wait for some hours, as on a race course for instance. In such cases he will be able to defraud the owner of the car in the following manner: He gets the passenger to agree to pay a certain sum for the time lost in waiting and when he arrives at the race-course he sets his apparatus to "cash".

During the long waiting time the fare on the fare indicator will now not be increased at all and the fare-checking-devices will not advance either and as the apparatus has not yet been set to "disengaged" the car will not be available for another passenger. At the commencement of the return trip the driver, after having collected the amount recorded

and the sum the passenger agreed to pay for the waiting time, either resets the apparatus (by switching it to "disengaged" and then to "engaged"), or he leaves the apparatus in the "cash" position during the return trip.

In accordance with the present invention the signal used for setting the fare indicator into and out of operative condition, is, when switched into the disengaged position, forcibly kept there for a certain time, that is long enough to enable the various mechanisms to go back into their initial or zero positions. With this method of operation only one manually operated member, viz. the signal, is required. The length of time for which the signal is positively held in the disengaged position is quite independent of the volition and skill of the driver, so that it cannot be influenced by him.

The operation of setting the apparatus to "cash" is also performed without a second manually operated member and with the aid of the said signal in such a way that it is impossible to "inadvertently" set the apparatus to "disengaged" without making a pause at "cash". Another feature of the invention consists in a sign-plate with a suitable inscription being disclosed to view by the operation of the signal when this latter is set to "cash". In an apparatus that is set into and out of operative condition by turning the signal in opposite directions the disclosure of the said sign-plate is only effected when the signal is turned in one of the two directions.

In accordance with the present invention abusive use of the cash position is precluded by means of one or more checking devices arranged to automatically check the operation of setting the apparatus to "cash". By means of a separate recording device the distances are recorded that are covered by the car while the fare indicator is set in its "cash" position. As the driver should never drive with his apparatus at "cash" the distances recorded by the said checking device will completely expose all such fraudulent acts. The time during which the apparatus was set at "cash" can also be checked and the driver can thus be prevented from acting contrary to the car owner's instructions to the effect that the apparatus should not be kept long in the "cash" position. The two said checking devices may both be provided together.

A constructional form of the invention is illustrated in the drawing in which only the back of a fare indicator and the parts to which the invention refers are shown.

Fig. 1 is a front view of the back wall and the parts mounted thereon in section on the line A—B of Fig. 6. The signal is at "disengaged" and it is assumed that a

period during which the signal was locked in the disengaged position has expired, so that the apparatus is ready to be set for service. Figs. 2 to 5 show sections taken on the line C—D of Fig. 6 with the mechanism of the fare indicator in different positions.

Figs. 2 and 3 show the parts by which the signal is locked in the "disengaged" position and by which it is controlled in other positions, but the parts for setting the apparatus to "cash" are omitted. Figs. 4 and 5 show the parts for setting the apparatus to "cash", the gear for locking and controlling the signal being omitted.

In Fig. 2 the parts of the apparatus are in the same position as in Fig. 1 so that the apparatus is at "disengaged" and ready to be set for service.

Fig. 3 shows the apparatus at "engaged".

Fig. 3^a shows a detail of the signal locking mechanism.

Fig. 4 shows the apparatus at "disengaged" and ready to be set for service as in Fig. 2.

Fig. 5 shows the apparatus in its "cash" position.

Fig. 6 is a section of the apparatus taken on the line E—F of Fig. 1.

Fig. 7 is a section on the line E—F of Fig. 6 showing a view of the inner side of the back wall of the apparatus. Fig. 7 corresponds to Fig. 6 but is drawn on a reduced scale.

a is the back wall and *b* the casing of the fare indicator *c*, which bears a flag-like signal at its upper end, as shown in Fig. 7, is journaled in the back *a*.

It will be assumed that the setting of the fare indicator in its "engaged" and "disengaged" positions, and into the positions for recording the various rates or tariffs, is effected by turning the signal *c*, and that, when the signal *c* is turned upward (see Figs. 1, 2, 4 and 6) the apparatus is at "disengaged". It will be assumed further that the apparatus is set for service by turning the signal in the direction of the arrow I, (see Fig. 1) and that it is set into its "disengaged" position by turning the signal in the direction of the arrow II (see Fig. 5). To get the apparatus into its "disengaged" position the signal is turned in the direction of the arrow II (see Fig. 5) until it strikes against the fixed pin or stop *h*.

It is also assumed that the fare indicator is to be capable of being set for three rates or tariffs, and that when the signal is in the position shown in Fig. 3 the fare indicator is set for tariff No. I, while the signal positions shown by the lines II and III in Fig. 3 correspond to tariffs II and III.

Fixed on the shaft *d* of the signal *c* (see Fig. 6) are six disks, viz:

(1) a locking disk *e*. One part of the cir-

cumference of this disk has oblique teeth *e'* inclined in a counter clockwise direction and at other parts there are teeth *e''* inclined in the opposite direction and a notch *e'''*.

(2) a positioning disk *f* which operates to set the signal into the four above-mentioned positions. The positioning disk *f* is made in the form of a four-armed star-wheel and, in conjunction with a lever *g* pressed against it by a spring *g'* it turns the signal *c* into, and holds it in, any one of four definite positions. At its point of engagement with the disk *f* the lever *g* carries a roller *g''* of the same thickness as itself. The lever *g* embraces more than one half of the periphery of the roller *g''* so that the latter is securely journaled in the lever. By this arrangement special pivots or gudgeons for the roll *g''* may be dispensed with and space is thus saved. The lever *g* is almost as thick as the positioning disk *f* and has a little play between the disks *e* and *i*.

(3) the controlling disk *i* which has a projection *k* located in the same plane as itself and a forwardly extending annular projection *l* whose axis coincides with that of the disk itself, but whose diameter is somewhat smaller than that of the disk *i*.

A two-armed pawl or detent *m* has two teeth *m'* and *m''* either of which can be made to engage with the locking disk *e*. When the tooth *m'* engages with the locking disk (see Figs. 1, 2 and 4) a lowering of the signal *c* will result in the tooth *m'* coming into engagement with the teeth *e'* and thus preventing the partly lowered flag or signal from being raised again. Hence, if an operation of setting the apparatus for service has been commenced, it is not possible to restore the apparatus to its inoperative condition again without completing the said operation. At its left end the detent *m* carries a roll *m''* against which either one of two oblique surfaces *n'* or *n''* of a wedge-shaped part of a dog *n* is pulled by a spring *n''*, according to the position of the detent *m*. When the detent *m* is in the position in which its tooth *m'* engages with the disk *e* (see Figs. 1, 2 and 4) the dog *n* will have its oblique surface *n'* pressed against the roll *m''* and it will tend to turn the detent *m* clockwise. When the position of the detent *m* is such that its tooth *m''* engages with the locking disk *e* (see Figs. 3 and 5) the oblique surface *n''* of the dog *n* will be pulled against the roll *m''*, and *t* will tend to turn the detent *m* counterclockwise.

When the signal *c* is turned down into the position it is illustrated in Fig. 3, and in which the apparatus is set for service at tariff No. I, the projection *k* of the controlling disk *i* engages with a pin *m''* of the two-armed detent *m* and turns it out of the position shown in Figs. 1 and 2 into the position illustrated in Fig. 3. During this op-

eration the roll m^2 pushes the dog n aside and swings down into engagement with the oblique surface n^2 of the dog.

The signal c can be turned forward from position I to the positions II and III (Fig. 3), and to and fro between these three positions, without being detained by the detent m , because the tooth m^2 of the detent slides along the periphery of the disk i and the notch e^2 , which the tooth m^2 enters, affords no hold for it. Rotation of the signal beyond the position III is prevented by a fixed stop pin o . It is thus seen that the apparatus can be set without hindrance to any position between the positions of tariffs Nos. I and III. But when the signal c is raised from an engaged position, as the "tariff I" position (see Fig. 3), for the purpose of being restored to the disengaged or inoperative position, the tooth m^2 of the detent m enters into engagement with the teeth e^2 of the locking disk e and prevents the partly raised signal o from being turned down again.

Another feature of the invention consists in the signal o when being raised to "disengaged," i. e. on its way from the "tariff I" (Fig. 3) to the "disengaged" position (Figs. 1, 2 and 4), being arranged to be detained in an intermediate position, the "cash" position. This "cash" position and the means for detaining the signal in it will be described in detail hereinafter, and at this place the operations that occur in restoring the apparatus to "disengaged" will first be described.

When the apparatus is set to "disengaged," i. e. when the signal c is completely raised, its rotation in one direction will be prevented by the stop h , and its rotation in the opposite direction is also prevented because of the engagement of the tooth m^2 of the detent m with a tooth e^2 of the locking disk e . It is thus seen that when the apparatus is set to "disengaged" it is locked so as to be prevented from being immediately reset for service. This locked condition of the apparatus must be maintained for a certain time so as to give the mechanism of the fare indicator sufficient time to return to its normal position, and especially to enable the disks or cylinders that serve to indicate the fare to be paid to regain their zero or initial positions. When this time has expired the apparatus must be capable of being reset for service. This requirement is met by the following means:

Mounted on a support (not shown) attached to the back of the apparatus is a going train p (see Figs. 2 and 3) which comprises a fly p^2 , which, due to the gearing of the wheels of the going train (see Fig. 2), has to execute a large number of revolutions when a wheel p^1 is turned through a small angle. Fixed on the shaft of the wheel p^1

in a ratchet wheel p^3 . A lever q is revolvably mounted on the shaft that carries the wheel p^1 and the ratchet wheel p^3 . The lever q carries a pawl q^1 that engages with the ratchet wheel p^3 . It is thus seen that the lever q can turn clockwise without carrying the ratchet wheel p^3 around with it. But when the lever q is turned counter-clockwise by a spring q^2 the ratchet wheel p^3 is carried round by the pawl q^1 and the going train is driven at a speed that is regulated by the fly p^2 .

The lever q has a curved, pointed projection q^3 , which, when the parts are in the position shown in Figs. 2 and 3, is covered by a plate q^4 pivotally attached to the lever q and adapted to be swung round by a spring. The lever q is acted upon by a spring q^2 so that its curved projection q^3 presses against the annular projection l of the controlling disk i (see Fig. 3). When the signal c is raised, and the disk i with its annular projection l is thus turned, a perforation l^1 in the annular projection is brought opposite to the curved projection q^3 and the cover-plate q^4 . The curved projection q^3 and the cover-plate q^4 cannot enter into the perforation l^1 until the right-hand edge of the perforation l^1 has moved past the right corner of the end of the cover-plate q^4 . But the moment this happens the lever q can be turned by the spring q^2 . The lever q is then swung around into the position shown in Fig. 2 in which the curved projection q^3 and the cover-plate q^4 have completely entered the perforation l^1 in the annular projection l . A definite interval of time is required for swinging round the lever q because the pawl q^1 attached to the latter carries the ratchet wheel p^3 around with it and thus drives the going train and the fly p^2 by which the latter is governed. The time required for overcoming the resistance offered by the going train and fly p^2 is made such as to enable the mechanism of the apparatus to return without fail to its normal or zero position. When the lever q is swung round into the position shown in Fig. 2 the two-armed detent m is shifted from the position shown in Figs. 3 and 5 into the position represented in Figs. 2 and 4. This reversal of the detent m is performed by the right end of the lever q , which carries the pin m^4 and the left arm of the detent m upward when the lever q is swung round as described. It is thus seen that the tooth m^2 of the detent m is moved away from the locking disc e while the tooth m^1 is moved into engagement with the same. It follows that, when the time required for swinging round the lever q has expired, the apparatus can be again set for service, i. e. the signal can be lowered again from the raised position shown in Fig. 2 into the position in which it is represented in Fig. 3. During this lower-

ing of the signal the right-hand edge of the perforation l^1 of the ring-shaped projection l turns the cover-plate q^4 aside and the lever q is then lifted by the right oblique edge of the projection q^3 until this projection q^3 is restored to the position in which its point contacts with the periphery of the annular projection l of the controlling disk i (Fig. 3). The lever q then remains in this position until the next operation of setting the apparatus to "disengaged" occurs.

It is thus seen that the devices heretofore described operate to reverse the two-armed detent m . As explained above, just before the apparatus is completely set for service, i. e. just before the signal is set into its horizontal position, the two-armed detent m is turned into the position shown in Fig. 3 in which the teeth e^2 of the locking disk (which permit of the signal being lifted, but prevent it from being lowered again after it has been partly raised) can become effective, and after the apparatus has been set into its disengaged position in which the raised signal is locked against rotation in the one direction by the stop h , and prevented from rotating in the other direction by the tooth m^2 , the detent m is thrown round into the position that it is shown in Figs. 2 and 4, and in which the teeth e^1 (which permit of the lowering of the signal—i. e. the setting for service of the apparatus—and prevent the signal from being raised once it has been partly lowered) become effective. Due to the action of the going train p the reversal of the detent m just alluded to (and hence the release of the signal c) takes place so slowly that the operation of restoring the recording devices of the mechanism of the fare indicator to normal will be completed before the signal can be lowered again. The reversing gear cannot be affected in any way by the driver. The driver has only a single member, viz. the signal, to attend to, and he need not perform any manipulations except raising the signal to set the apparatus in its disengaged position and lowering the signal to set the apparatus for service. If, after setting the apparatus to "disengaged", the driver should attempt to lower the signal again before the time required for reversing the detent m has expired, the tooth m^2 will engage with a tooth e^2 of the locking disk. The detent m will be held thereby in the position in which it happens to be at that moment, because the spring q^2 is not strong enough to overcome the considerable friction that then arises by the teeth m^2 and e^2 . The reversal of the position of the detent m will therefore not be completed until the signal is let go by the driver. Hence, when the signal is lowered prematurely, the time that it is locked will not be shortened but prolonged.

The means by which the apparatus is set

to "cash" and by which the "cash" position is indicated are as follows:

Arranged at the right of the locking disk e is a pivoted dog r . A spring r^1 tends to press the dog r against the locking disk e . The dog r is, however, normally kept out of contact with e , this being effected by a small pin r^2 on the dog abutting against a ledge of the right end of a pivoted two-armed catch s . A spring tends to rotate the catch s counter-clockwise, but the latter is prevented by the pin r^2 from turning beyond its dog-detaining position shown in Figs. 1, 2, 3 and 4. Pivotaly attached to the controlling disk i is a tappet t which is normally pulled by a spring t^1 into the position shown in Figs. 2 and 5 in which it rests against a stop. The tappet t lies in the same plane as the catch s .

When the signal c is lowered from the position in which it is represented in Fig. 2 into the position of Fig. 3, the tappet t strikes against the left arm of the catch s and is pushed round counter-clockwise against the action of the spring t^1 so that it can move past the catch s . When it has passed the catch s the tappet t is pulled forward again up to its front stop.

But when the signal c is raised from the horizontal position shown in Fig. 3 the tappet t will, when the signal has been turned through about 45° , strike against the left arm of the catch s and turn it counter-clockwise so that the pin r^2 will lose the support afforded by the ledge of the catch s , and the dog r is allowed to yield to the action of the spring r^1 . On the signal c now being raised a little further the dog r enters the notch e^3 in the locking disk s (see Fig. 5) and the lower oblique surface of the notch e^3 will strike against the lower end of the dog r and tend to rotate the dog clockwise. But as the pivots of the disk e and the dog r are fixed, further upward movement of the end of the dog r will be prevented and this will also prevent any further raising of the signal. It is therefore impossible to "inadvertently" move the signal past this position, (which is the "cash" position of the apparatus) by turning it too rapidly or violently. When the "cash" position is reached the tappet t will have passed the left arm of the catch s .

In order to be able to raise the signal c any further the driver must now first let it go again, and when he does this the positioning device, that consists of the star-wheel f and the lever g turns the signal c back again through a certain angle. This backward rotation of the signal c is stopped when the next tooth e^2 ahead of the tooth m^2 of the detent m strikes against the latter tooth m^2 . During this reversed movement the tappet t remains above the left arm of the catch s . The slight lowering of the signal c by the positioning device results in the dog r being lifted out of the notch e^3 again by the ob-

lique contacting surface of the latter and in the dog *r* being again locked in its inoperative position by the right arm of the catch *s* which is turned counter-clockwise by its spring. When the signal *c* is now raised from the position shown in Fig. 5 into its vertical position the locked condition of the dog *r* is not affected in any way.

It is thus seen that when the flag or signal is raised the dog *r* is first released so as to prevent the signal from being rotated upward beyond the "cash" position. When the signal is then let go the dog *r* is restored to, and relocked, in its normal or inoperative position so as to enable the signal to be fully raised. When the signal is lowered the dog *r* is not affected. The operation of raising the signal into the "cash" position has the affect of causing a special "cash" sign-plate *u* (see Figs. 4, 5 and 7) to drop into view (see Figs. 5 and 7); when the signal *c* is fully raised this sign-plate is caused to disappear again (see Fig. 4). When the signal *c* is lowered the sign plate is not affected. The means for controlling the "cash" sign-plate *u* are as follows:

The sign-plate *u*, which is preferably colored so as to be conspicuous and bears an appropriate inscription such as "End of trip. Please pay", is pivotally attached to the back of the apparatus. An arm *v* is rigidly fixed to the sign-plate *u* (see Figs. 4 and 5). A spring *v*¹ attached to the arm *v* tends to turn the sign plate *u* out of the position shown in Fig. 4, in which it is covered by the front *b*¹ of the casing *b*, into the position shown in Fig. 5. The sign-plate *u* is usually locked in its normal position, in which it is represented in Fig. 4, and this is accomplished by a locking member in the shape of a prop *w* whose upper end props up a projection *v*² (see Fig. 4) that juts out from the arm *v*. Pivotally mounted on the prop *w* is a small two-armed tappet *x* whose right arm is normally turned by a spring into the position shown in Fig. 4 in which it abuts against a stop *z*. The left arm of the tappet *x* then lies in the path of a pin *y* fixed on the controlling disk *i*.

When the signal *c* is lowered from the vertical position in which it is shown in Fig. 4 into the position represented in Fig. 3 the pin *y* turns the left arm of the tappet *x* aside and brushes past it without affecting the prop *w*. But when the signal *c* is turned up from its horizontal position the pin *y* strikes against the lower oblique surface of the left arm of the tappet *x* and pushes the prop *w* aside, since the tappet *x* is prevented from rotating by the pin *z*. The top end of the prop *w* being now moved away from the projection *v*² the sign-plate *u* will have lost its support and it will be turned by the spring *v*¹ into the position shown in Figs. 5 and 7. The projection *v*² will move the prop

w clockwise still further than it was moved by the pin *y*, the ultimate position of the prop *w* being shown in Fig. 5. It is thus seen that when the apparatus is set to "cash", the "cash" sign-plate is automatically caused to drop into view. This sign-plate then covers the heading, as for example the word "Tariff", above the tariff indicator (see Fig. 7).

On the signal *c* now being let go by the driver in the manner described above so as to enable it to be fully raised, and on its being thereupon fully raised into the position shown in Fig. 4, the pin *y* that engages with the arm *y* will raise the sign-plate *u* with its arm *v* and restore it to the position shown in Fig. 4 in which it will again be locked by the prop *w* that is turned counter-clockwise by a spring.

The means for precluding abusive use of the "cash" position are in evidence in Fig. 7.

The signal is shown in the position it occupies when the apparatus is set at "cash".

From the driving shaft 4 of the distance mechanism motion is transmitted to the counting train 10 in a known manner, as for example through a cam 5, an arm 6, a pawl 7, a ratchet 8, a worm 9 and a wheel 11 on the shaft of the counting train 10 so that the distances covered by the car are recorded and displayed by the numeral disks.

A novel feature in accordance with the invention consists in providing a second counting train 12 which, when the apparatus is set to "cash," is coupled to the counting train 10.

In the arrangement shown in the drawing a wheel 13, arranged to revolve but not to move longitudinally relatively to the shaft of the second counting train 12, is driven by the wheel 11. The wheel 13 is arranged to be firmly fixed on the shaft of the counting train 12 by a clutch 14 adapted to move longitudinally but not to rotate on the said shaft. When the fare recorder is set to "cash" the clutch 14 is thrown into gear in the manner illustrated by means of a lever 15 acted upon by a cam 16 mounted upon the shaft 2 of the signal or flag.

It follows that the counting train 12 directly records the sum of all the distances covered with fare recorder set at "cash" by the driver. If the apparatus is manipulated in the proper manner no change of the figures displayed by the counting train 12 will take place, even after the car has been used for weeks or months.

The operation of checking the total time that the apparatus was set to "cash" is performed as follows: In the exemplified form of construction it is assumed that a counting train 17 is provided for checking the total time during which the fare indicator was set for service. A clockwork, of which the balance wheel 30 only is shown, acts

through any preferred means (not shown) on a wheel 18 which, by means of a worm 18, drives a wheel 20 on the shaft of the counting train 17. When the fare recorder is set to "cash" a second counting train 21 is coupled with the counting train 17. This coupling operation can be carried out as follows: The wheel 20 meshes with a wheel 22 arranged to rotate, but not to move longitudinally, on the shaft of the counting train 21, and the wheel 22 can be fixed on the said shaft by a clutch 24 arranged to move longitudinally, but not to turn, on the shaft of 21. The clutch 24 is thrown into gear when the apparatus is set to "cash" by means of an arm 25 and a cam 26 mounted on the shaft *d* of the signal *c*. With this arrangement the clockwork must not already be arrested on the apparatus being set to "cash" but only on its being set to "disengaged." The arresting function may be performed by a cam 27 which, when the signal is thrown into the "0" position, causes an arresting member in the form of a spring 29 to engage with the balance wheel 30 of the apparatus. As the clockwork in the novel apparatus is not arrested as in ordinary apparatus when it is set to "cash", but in spite of this the fare must not be increased as the time passes, the act of setting the apparatus to "cash" must be made to sever the connection between the clockwork and the mechanism for advancing the fare recorder and fare checking device. This is effected at any suitable point by any preferred means (not shown).

The counting train 21 serves to record the total time during which the fare indicator was set at "cash."

The numerals of the counting trains 10, 12, 17 and 21 may be arranged to be read through sight holes in the back wall of the apparatus.

I claim:—

1. In a fare indicator, a manually-operated signal adapted to be set into an "engaged" and "disengaged" position, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, and means for automatically unlocking the signal after the said lock has been operative for a certain time.

2. In a fare indicator, a manually-operated signal adapted to be set into an "engaged" and "disengaged" position, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, a movable member for holding the lock in its locking position, and a going train for rendering the said member inoperative after it has held the lock for a certain time.

3. In a fare indicator with an "engaged" and a "disengaged" position, a manually-operated signal which is adapted to be raised

into the "disengaged" position and lowered into the "engaged" position, a primary locking means for preventing the signal, when raised towards its "disengaged" position, from being immediately lowered again, a secondary locking means for preventing the signal, when lowered towards its "engaged" position, from being immediately raised again, and a device for automatically putting the primary locking means out of gear and for putting the secondary locking means into gear only when a certain time after the raising of the signal has elapsed.

4. In a fare indicator with an "engaged" and a "disengaged" position, a manually-operated pivoted signal adapted to be rotated into the "engaged" and "disengaged" positions, a locking wheel mounted on the signal shaft and provided with groups of ratchet teeth that are inclined in different directions, and extend around parts of the circumference of the locking wheel, a two-armed detent which engages with one said group of teeth while the said signal is being rotated into its disengaged position, a reversing member for throwing the said detent into engagement with a second one of the said groups of teeth, and a retarding mechanism for operating the reversing member when a certain time after the signal has been turned into its disengaged position has elapsed.

5. In a fare indicator with an "engaged" and a "disengaged" position, a manually-operated pivoted signal adapted to be rotated in the "engaged" and "disengaged" positions, a locking wheel mounted on the signal shaft and provided with groups of ratchet teeth that are inclined in different directions and extend around parts of the circumference of the locking wheel, a two-armed detent with a normal and off-normal position and adapted to engage with one said group of teeth while it is in its off-normal position and with a second one of the said groups of teeth when it is in its normal position, a positively acting member for throwing the detent into its off-normal position shortly before the operation of setting the signal into its engaged position is completed, a reversing member for throwing the said detent into its normal position, and a retarding mechanism for operating the reversing member when a certain time after the signal has been turned into its disengaged position has elapsed.

6. In a fare indicator with an "engaged" and a "disengaged" position, a manually-operated pivoted signal adapted to be rotated in the "engaged" and "disengaged" positions, a locking wheel mounted on the signal shaft and provided with groups of ratchet teeth that are inclined in different directions and extend around parts of the circumference of the locking wheel, a two-armed de-

tent with a normal and off-normal position and adapted to engage with one said group of teeth while it is in its off-normal position and with a second one of the said groups of teeth when it is in its normal position, a positively acting member for throwing the detent into its off-normal position shortly before the operation of setting the signal into its engaged position is completed, a pivoted arm for throwing the said detent into its normal position, a spring for turning the said arm into a position in which it throws the detent into its normal position, means for tensioning the said spring when the signal is turned out of its "disengaged" position, means for preventing the arm from being moved by the said spring while the signal is in its "disengaged" position, a going train, and means for coupling the said arm to the going train and for releasing the arm to permit its movement by the said spring when the signal is set into its disengaged position.

7. In a fare indicator, a manually-operated signal adapted to be set into an "engaged" and "disengaged" position, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, means for automatically unlocking the signal after the said lock has been operative for a certain time, a casing with a sight-hole therein, a movable sign-plate, means for holding the sign-plate in a normal position, and means connected with the said signal for bringing the sign-plate into an off-normal position behind the sight-hole.

8. In a fare indicator, a manually-operated signal adapted to be set into an "engaged" and "disengaged" position, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, means for automatically unlocking the signal after the said lock has been operative for a certain time, a casing with a sight-hole therein, a movable sign-plate, a locking arm for holding the sign-plate in a normal position, an actuating member connected to the said signal, a member on the said locking arm adapted to cooperate with the actuating member and to give way to it when the signal is moved into its engaged position, and a stop for preventing the said member from giving way to the actuating member when the signal is moved towards its disengaged position into an intermediate position, whereby the said locking arm is moved to release the said sign-plate.

9. In a fare indicator, a manually-operated signal adapted to be set into an "operative," an "intermediate" and a "disengaged" position, a lock for locking the signal when it is shifted from the "operative" to the "disengaged" position, means for automatically unlocking the signal after the said

lock has been operative for a certain time, and means for enforcing a stoppage of the signal in the intermediate position when it is moved from the operative into its disengaged position.

10. In a fare indicator, a manually-operated signal adapted to set into an "operative", an "intermediate" and a "disengaged" position, a lock for locking the signal when it is shifted from the "operative" to the "disengaged" position, means for automatically unlocking the signal after the said lock has been operative for a certain time, a notched disk connected to the said signal, a spring-pressed stopping member adapted to enter the notch in the said disk, a catch for normally holding the stopping member out of engagement with the said notch, a tappet adapted to be carried round by the said signal, and to trip the said catch when the signal, while being moved towards its disengaged position, reaches a certain point, and is thereafter moved a slight distance in the opposite direction, and means for restoring the catch and the stopping member to their normal positions when the signal is again moved forward into the disengaged position.

11. In a fare indicator with an "engaged", "disengaged", and an intermediate position, a manually-operated signal adapted to be set into positions corresponding to the said "engaged", "disengaged" and "intermediate" positions, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, means for automatically unlocking the signal after the said lock has been operative for a certain time, and a checking device for indicating that the signal has been moved into and kept in, the intermediate position.

12. In a vehicle, a fare indicator with an "engaged", "disengaged" and an "intermediate" position, a manually-operated signal adapted to be set into positions corresponding to said "engaged", "disengaged" and "intermediate" positions, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, means for automatically unlocking the signal after the said lock has been operative for a certain time, a shaft whose amount of motion corresponds to the distance covered by the said vehicle, a counting train, means for sometimes transmitting motion from the said shaft to the said counting train, and means for making the motion-transmitting means operative when the signal is moved into the said intermediate position.

13. In a fare indicator with an "engaged", "disengaged", and an "intermediate" position, a manually-operated signal adapted to be set into positions corresponding to the said "engaged", "disengaged" and "inter-

mediate" positions, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, means for automatically unlocking the signal after the said lock has been operative for a certain time, a counting train, a going train, means for transmitting motion from the going train to the counting train, and means for rendering the motion-transmitting means operative when the signal is moved into the said intermediate position.

14. In a vehicle, a fare indicator with an "engaged", "disengaged" and "intermediate" position, a manually-operated signal adapted to be set into positions corresponding to the said "engaged", "disengaged" and "intermediate" positions, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, means for automatically unlocking the signal after the said lock has been operative for a certain time, a shaft whose amount of motion corresponds to the distance covered by the said vehicle, a primary counting train, means for transmitting motion from the said shaft to the said primary counting train, a secondary counting train, and means for coupling the secondary counting train to the primary counting train when the said

signal is moved into the said intermediate position.

15. In a fare indicator with an "engaged", "disengaged", and an "intermediate" position, a manually-operated signal adapted to be set into positions corresponding to the said "engaged", "disengaged" and "intermediate" positions, a lock for locking the signal when it is shifted from the "engaged" to the "disengaged" position, means for automatically unlocking the signal after the said lock has been operative for a certain time, a primary time-indicating counting train, a going train, means for starting the going train when the signal is moved out of the disengaged position, a permanent coupling between the going train and the said primary time indicating counting train, a secondary time-indicating counting train, and means for coupling the secondary counting train to the primary counting train when the said signal is moved into the intermediate position.

In testimony whereof I have signed this specification in the presence of two witnesses.

FRIEDRICH WILHELM GUSTAV BRUHN.

Witnesses:

E. H. GERMAN,
CHARLES D. TURRELL.