M. KUHN & R. NETTER.

CONTROLLING DEVICE.

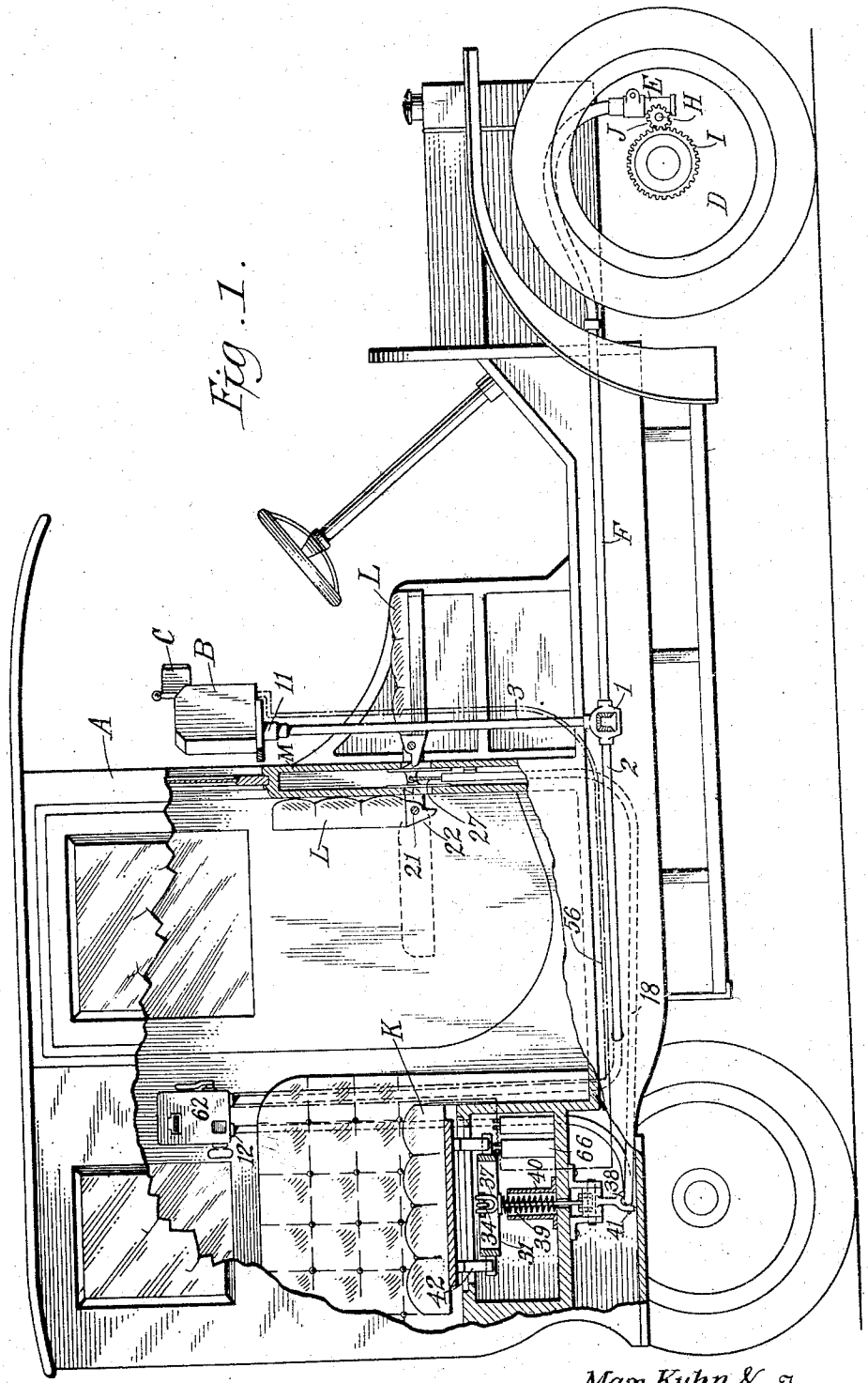
APPLICATION FILED AUG. 26, 1911.

Patented Dec. 10, 1912.

15 SHEETS—SHEET 1.

1,046,808.

Fig. 1.



Witnesses:

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Fig. 3.

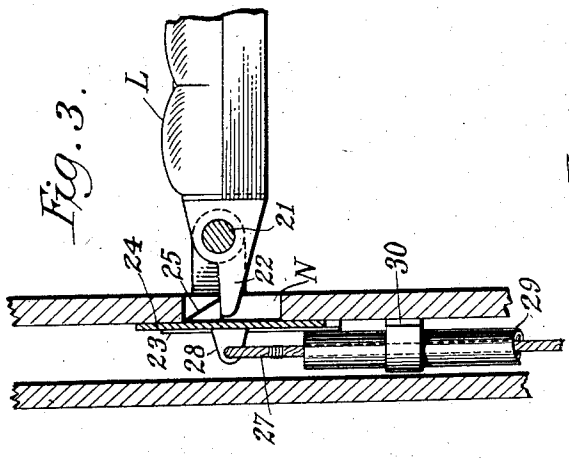


Fig. 4.

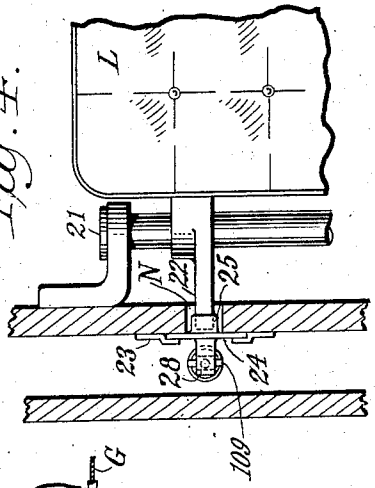
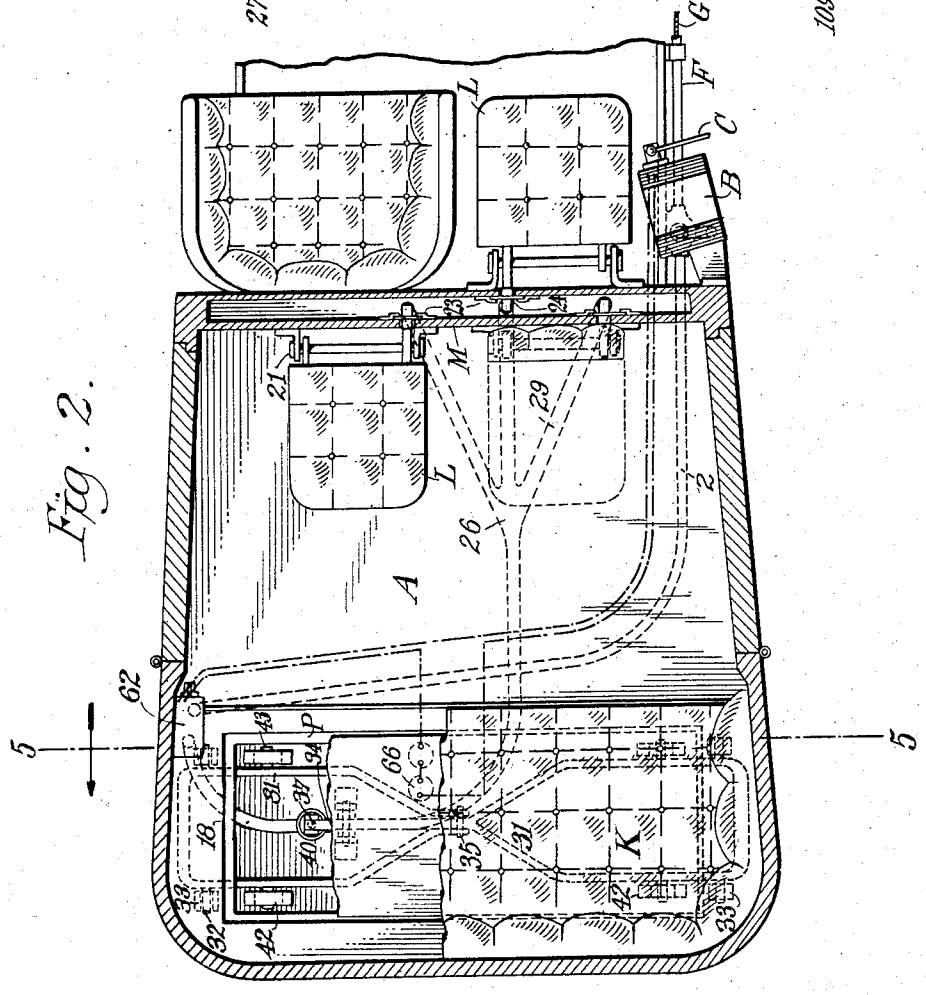


Fig. 2.



Witnesses:

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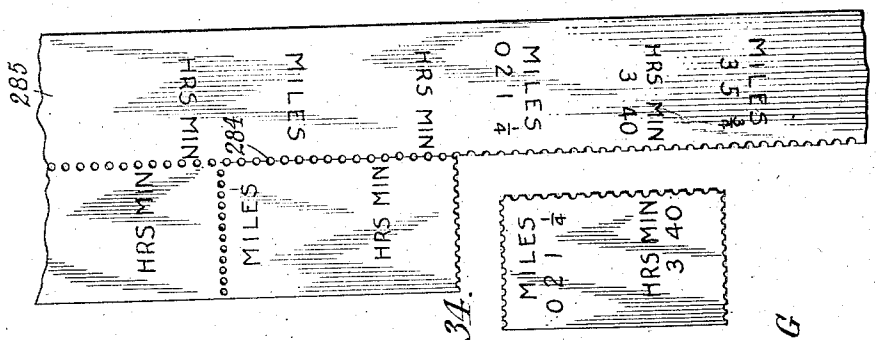

Fig. 34.

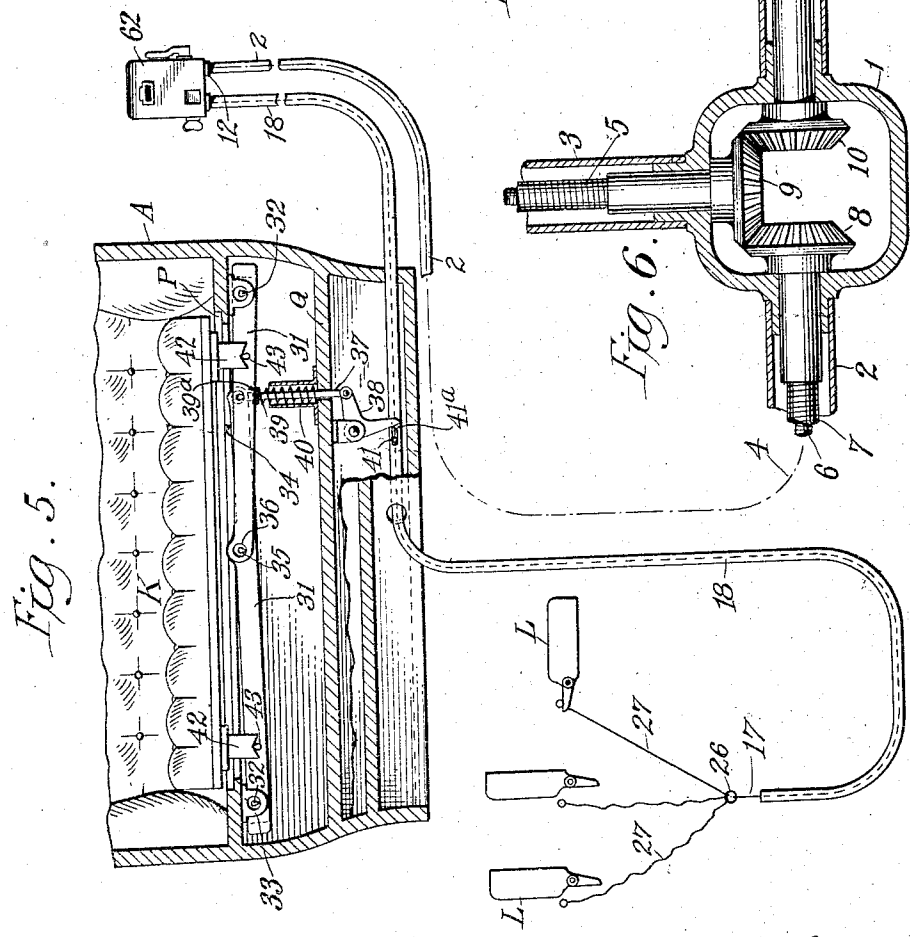

Fig. 5.

Fig. 6.

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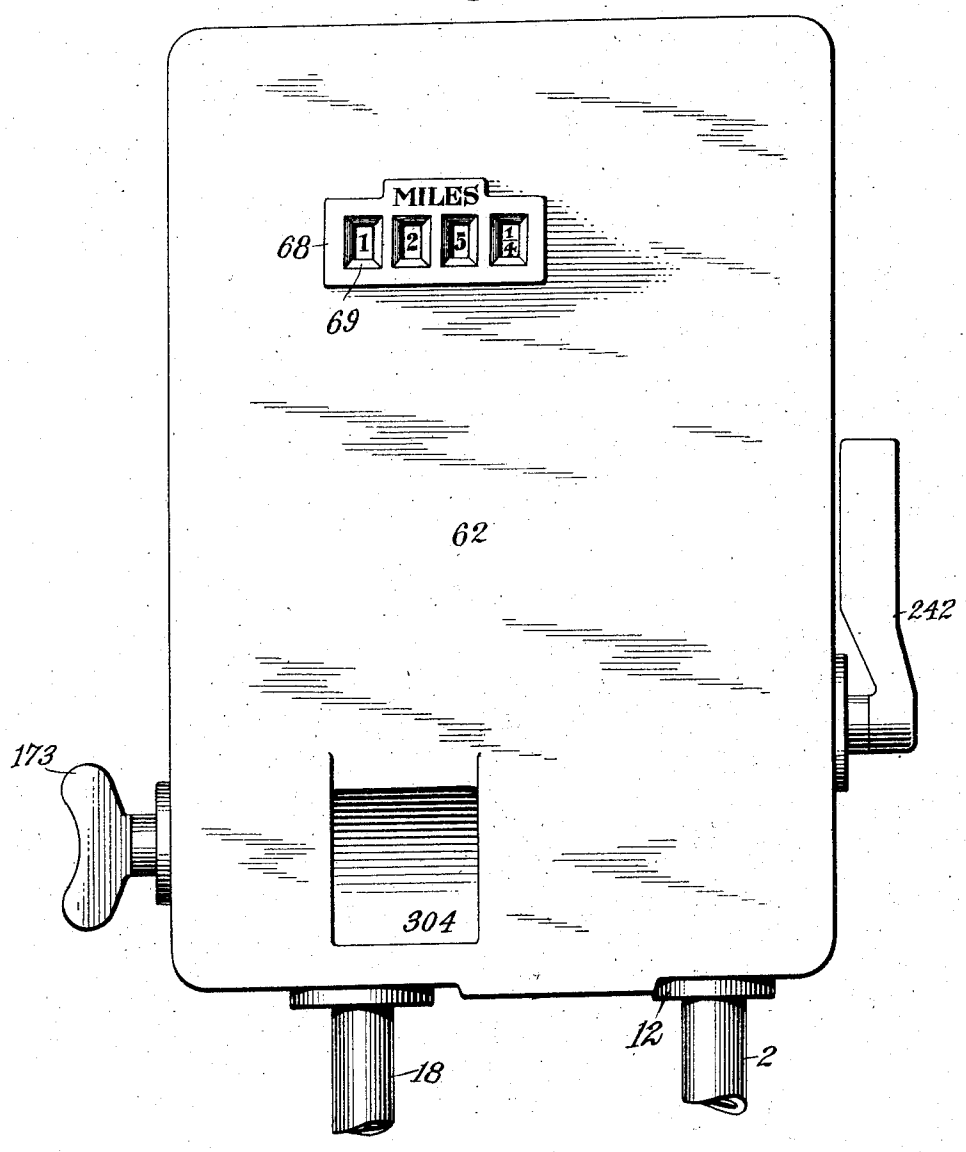
15 SHEETS—SHEET 4.

Fig. 7.



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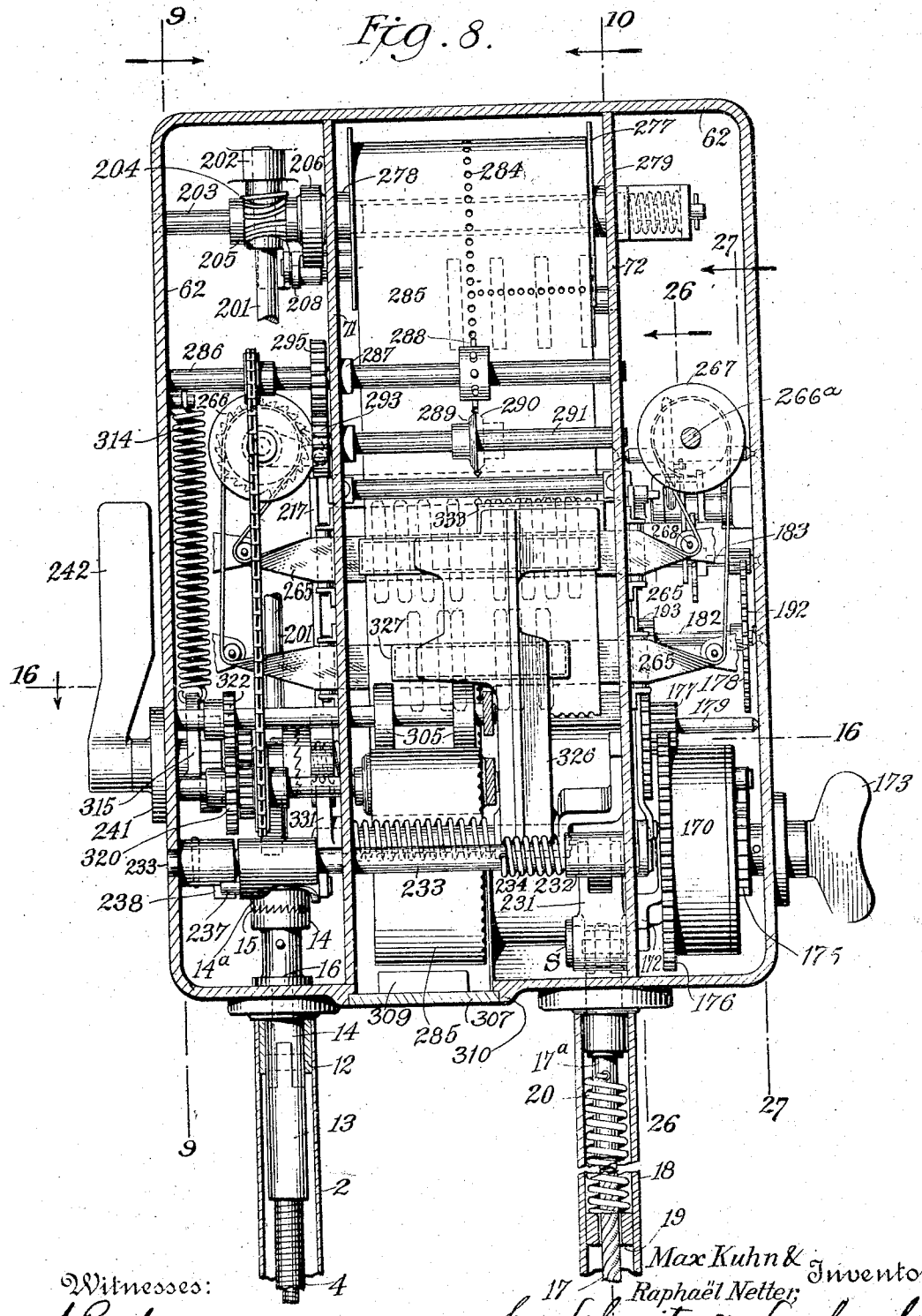
15 SHEETS—SHEET 5.

Fig. 8.



Witnesses:

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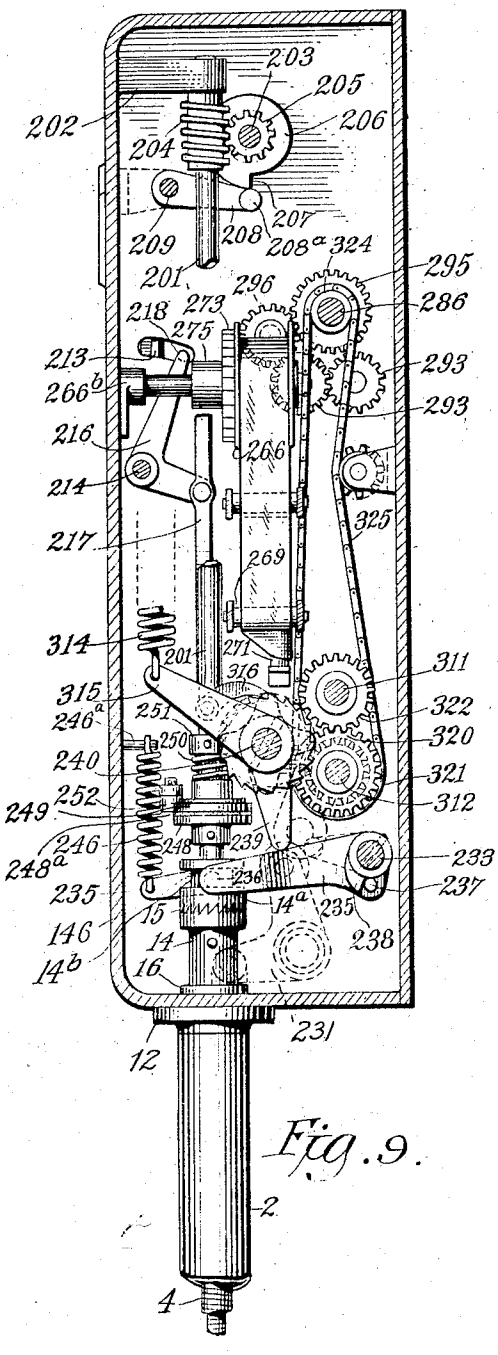

Fig. 9.

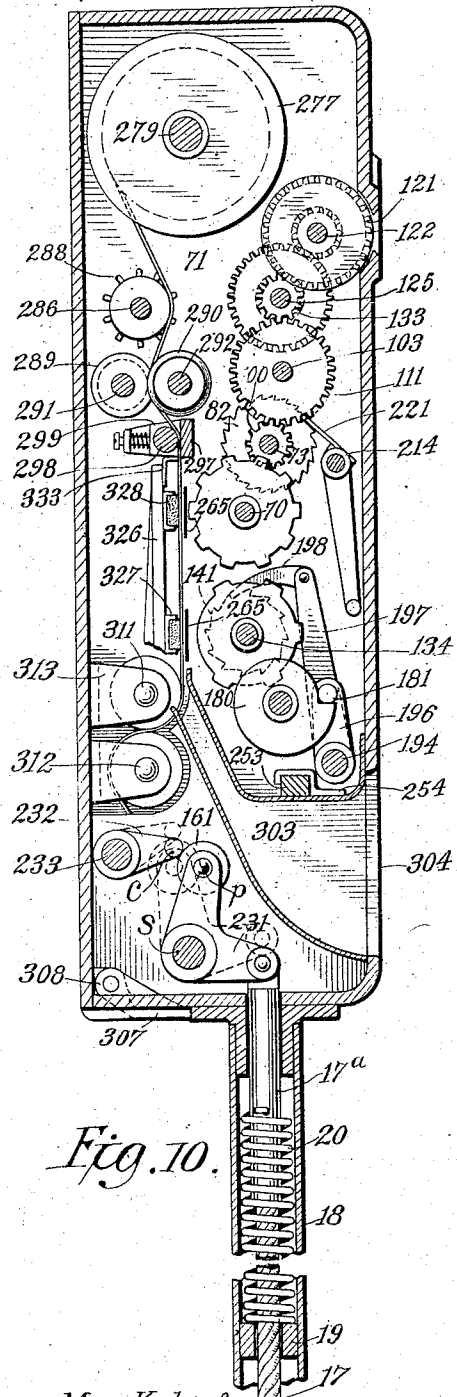

Fig. 10.

Witnesses:

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15 SHEETS—SHEET 7.

Fig. 11.

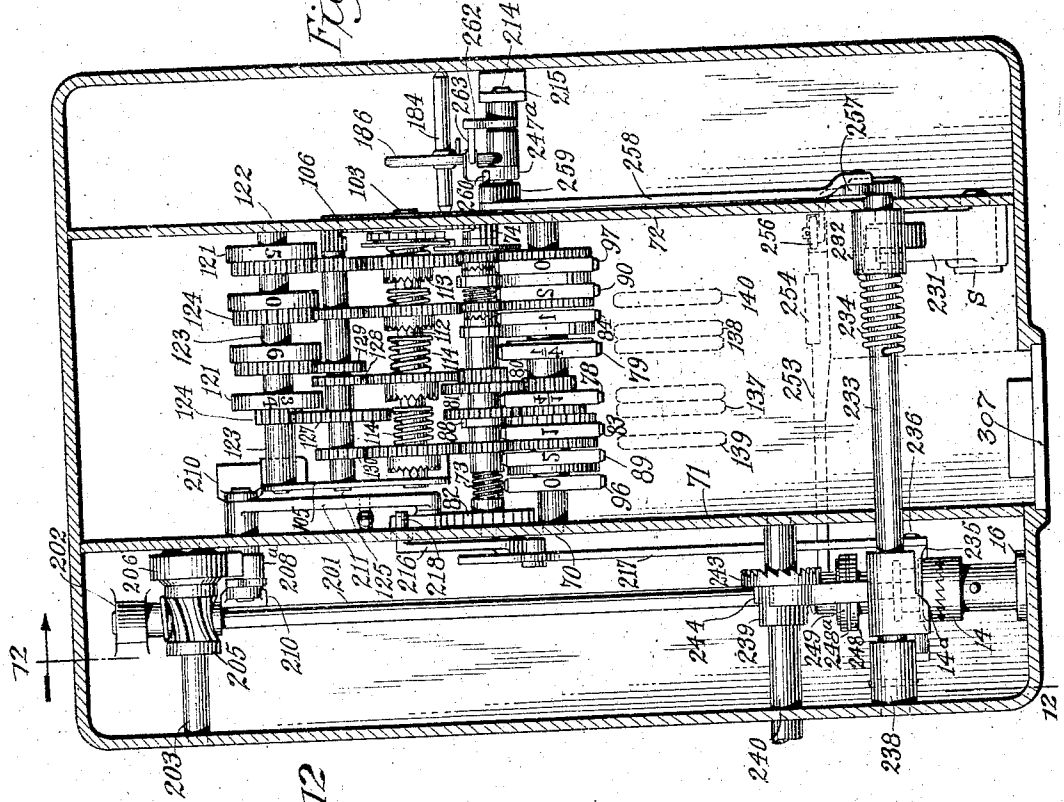
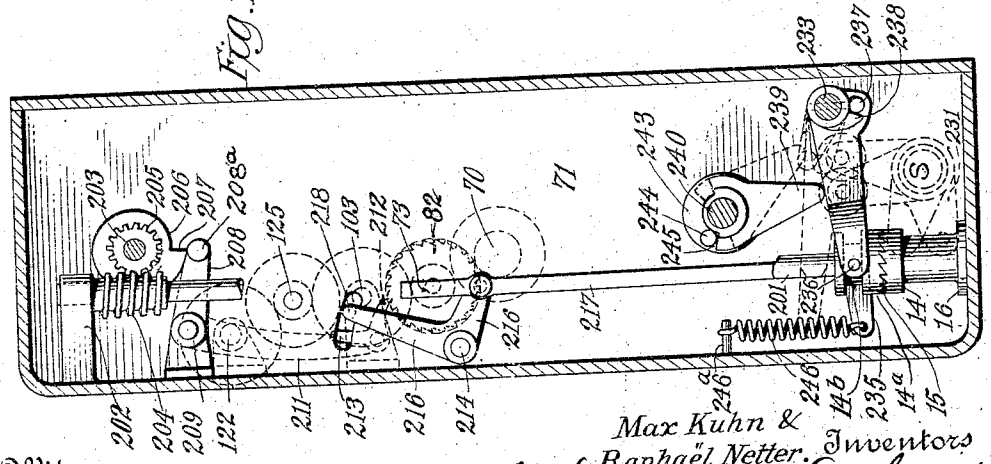


Fig. 12.



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15 SHEETS—SHEET 8.

Fig. 14.

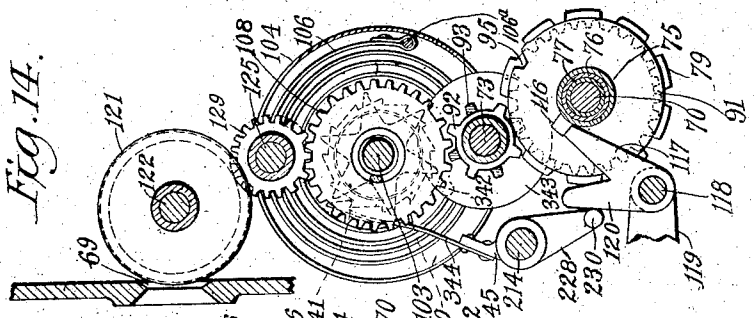


Fig. 13.

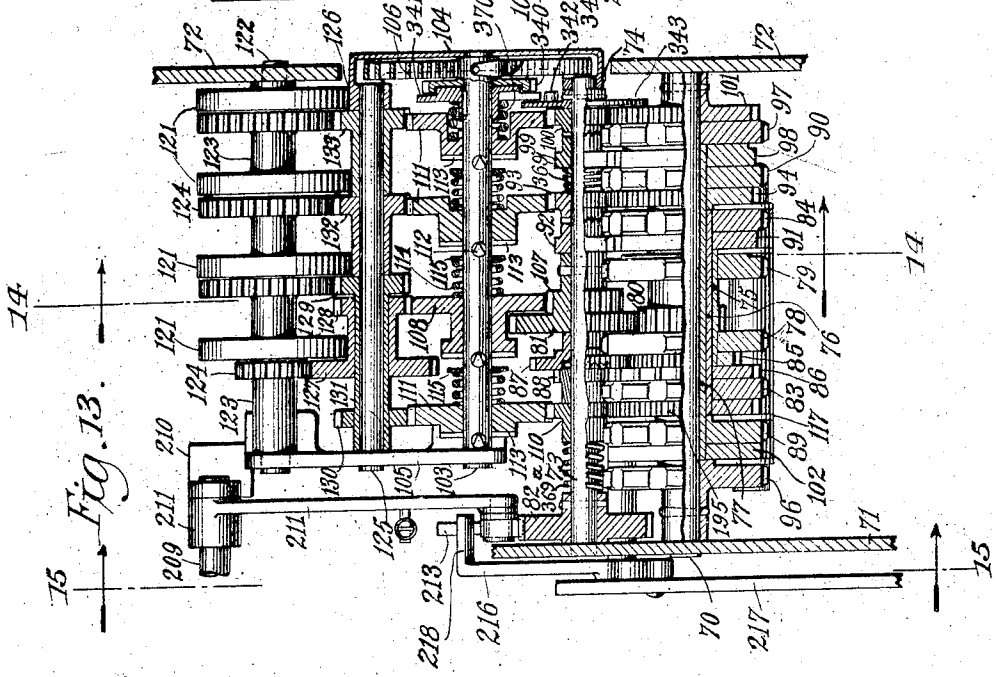
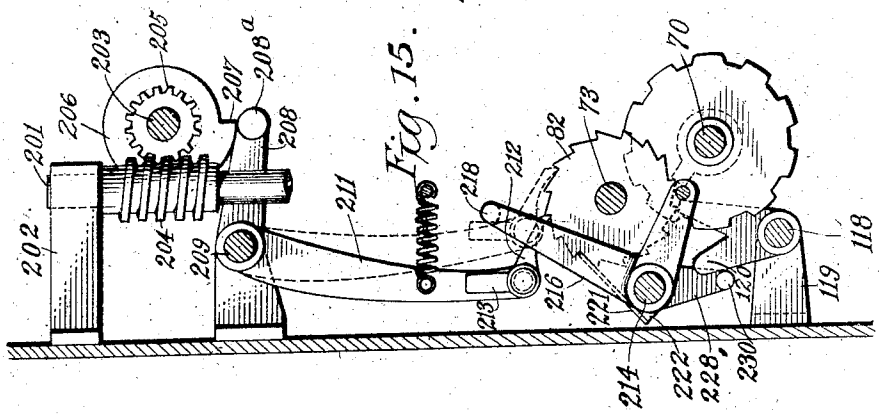


Fig. 15.



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15 SHEETS—SHEET 9.

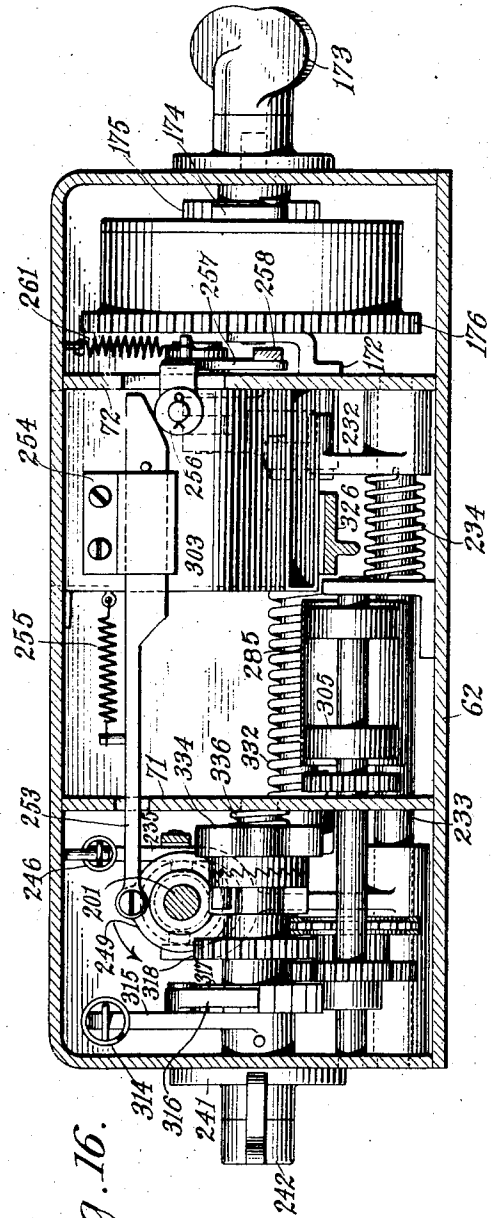
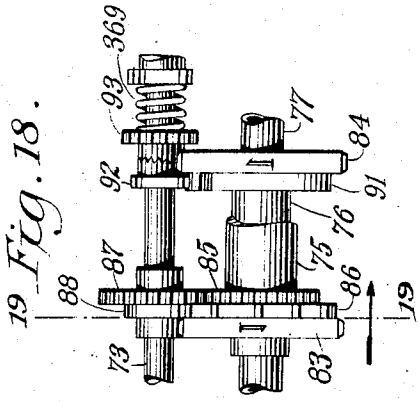
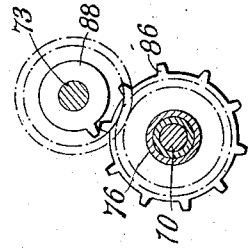


Fig. 16.





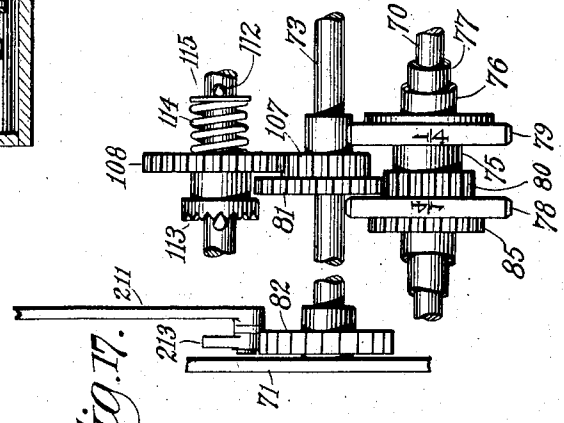


Fig. 17.

Witnesses:

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Patented Dec. 10, 1912.

15 SHEETS—SHEET 10.

Fig. 21.

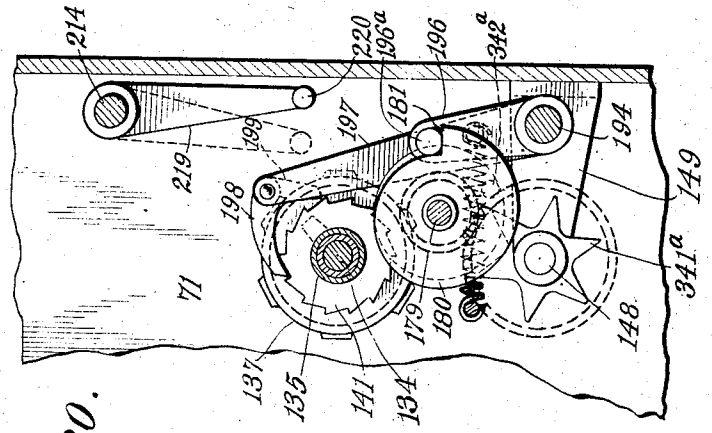
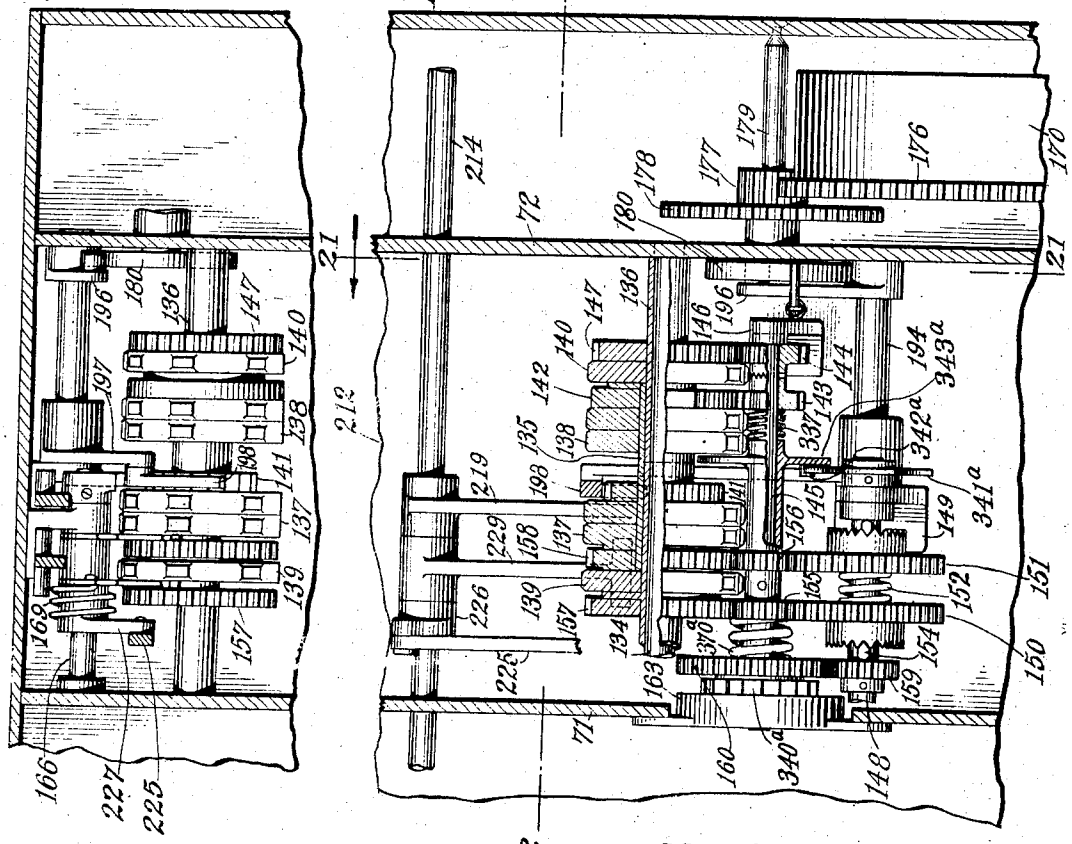


Fig. 22.

Fig. 20.



Witnesses:

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Patented Dec. 10, 1912.

15 SHEETS—SHEET 11.

Fig. 25.

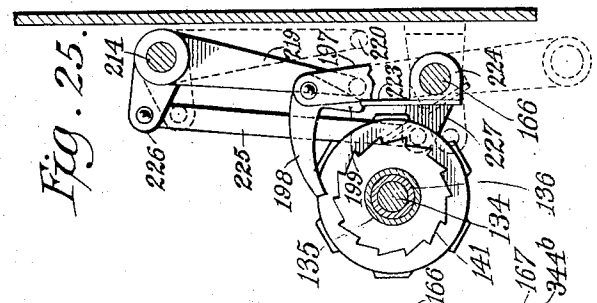
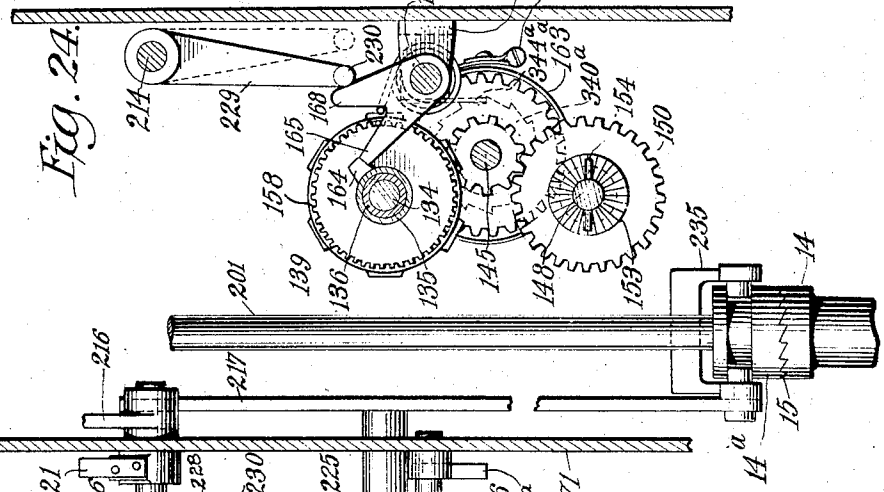


Fig. 24.



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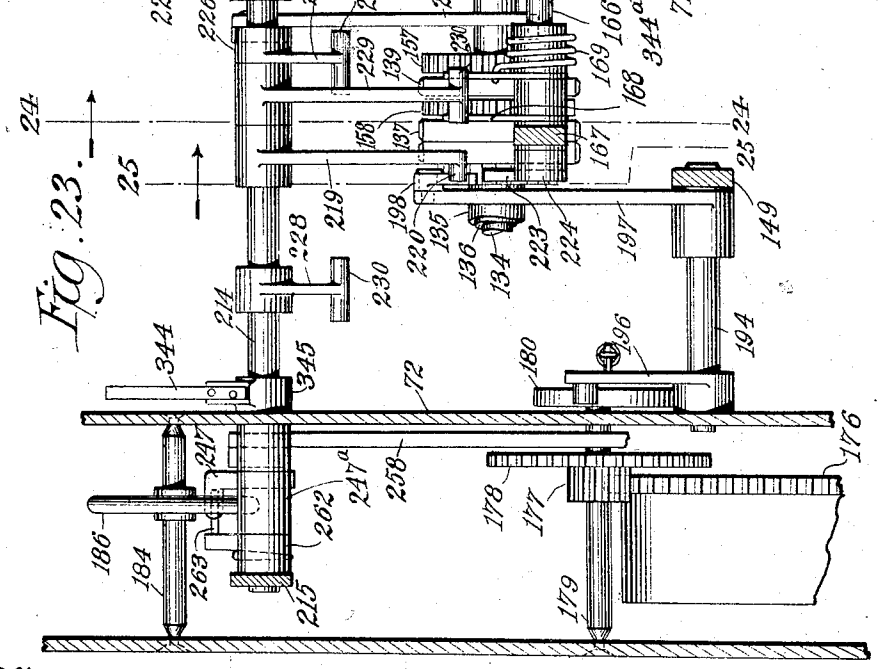

Witnesses:

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15 SHEETS—SHEET 12.

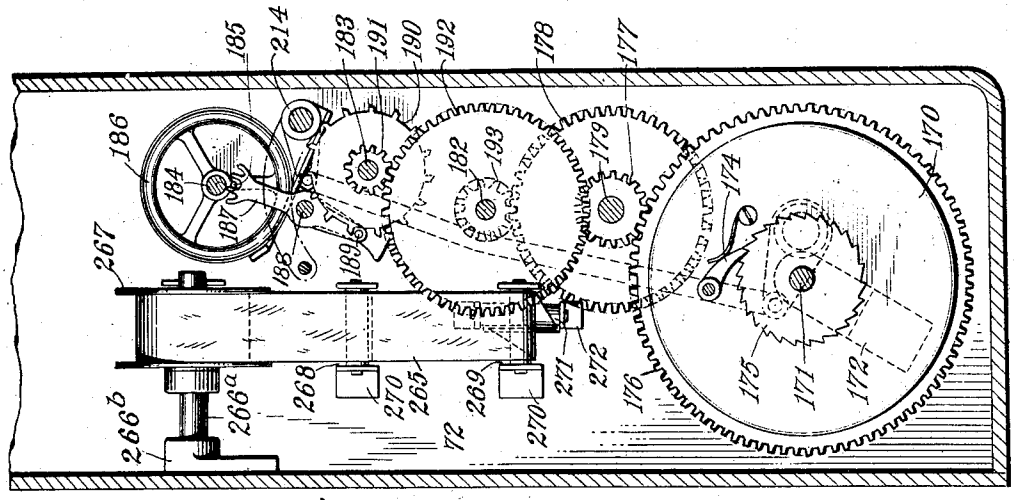

Fig. 27.

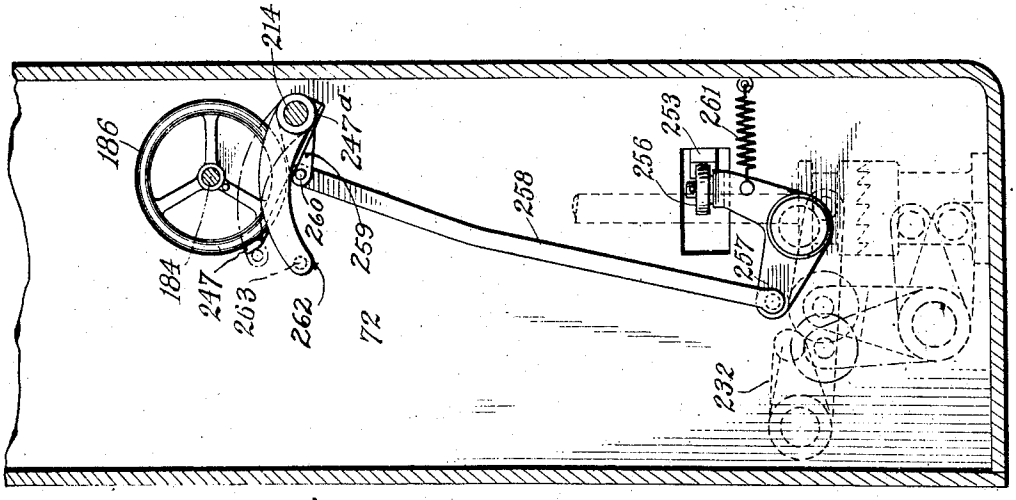

Fig. 26.

Witnesses:
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15 SHEETS—SHEET 13.

Fig. 29.

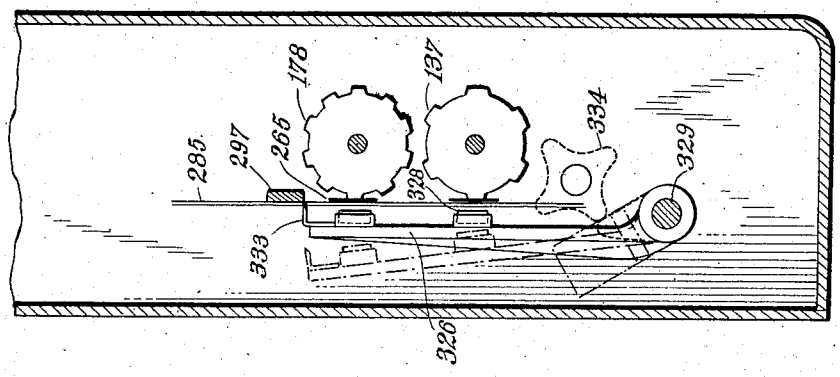


Fig. 28.

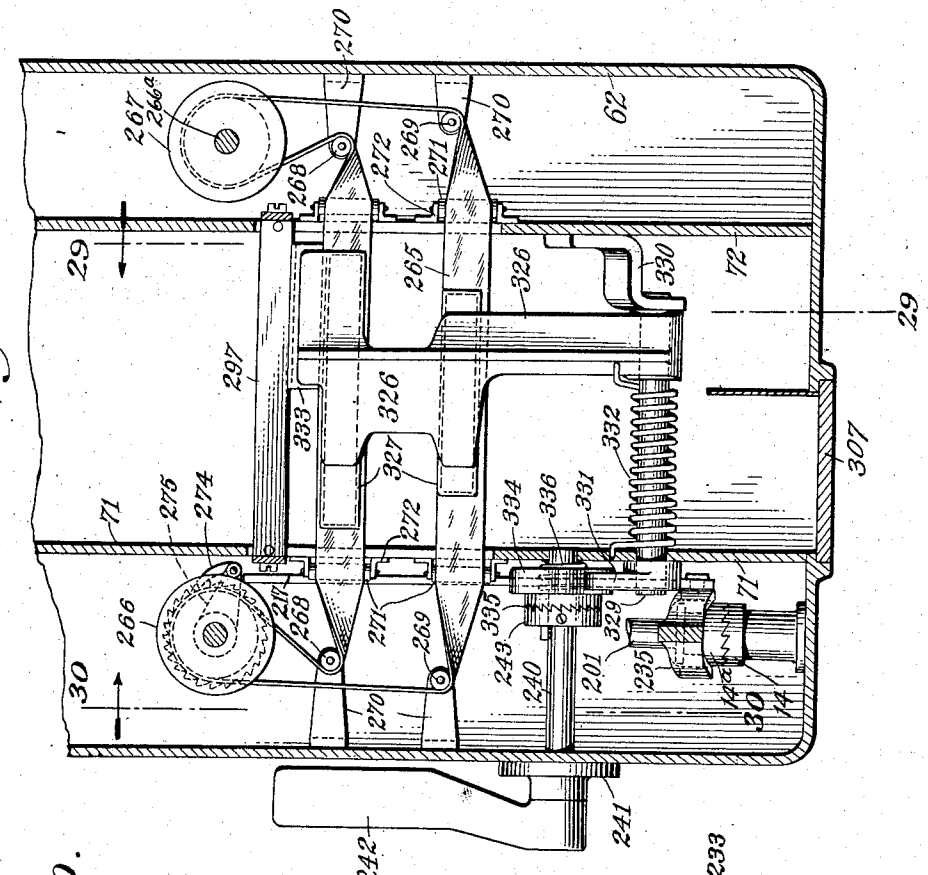
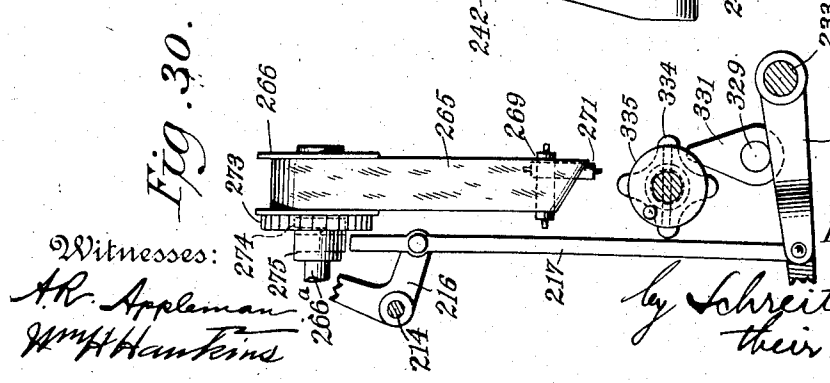


Fig. 30.



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15 SHEETS—SHEET 14.

Fig. 32.

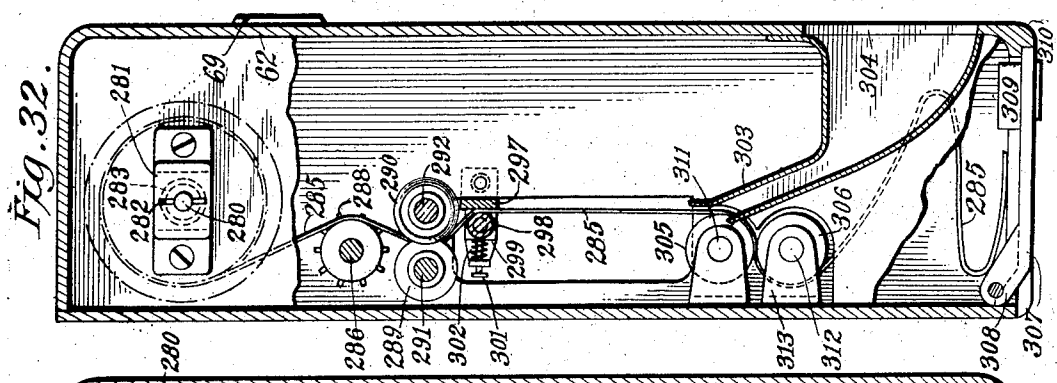


Fig. 31.

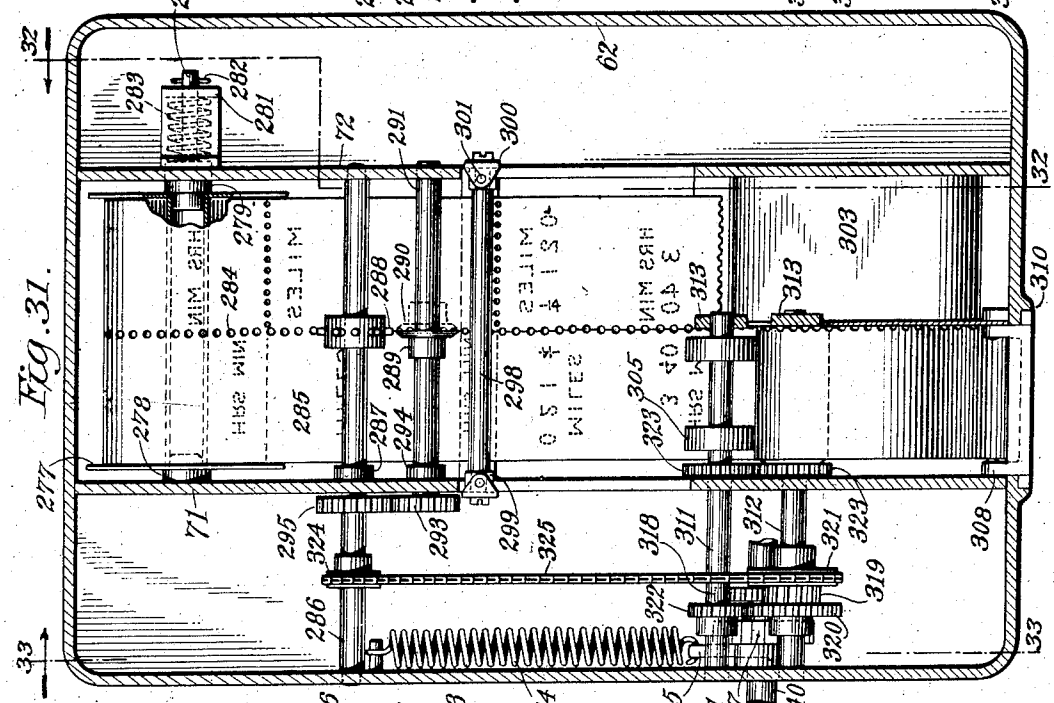
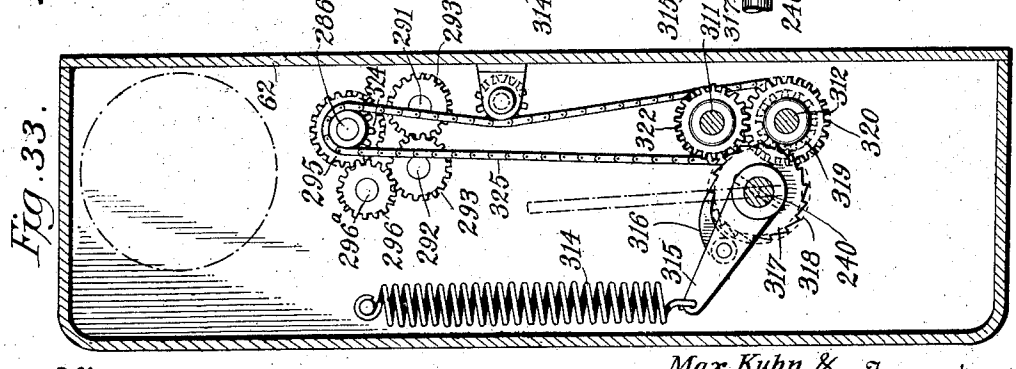


Fig. 33.



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15 SHEETS—SHEET 15.

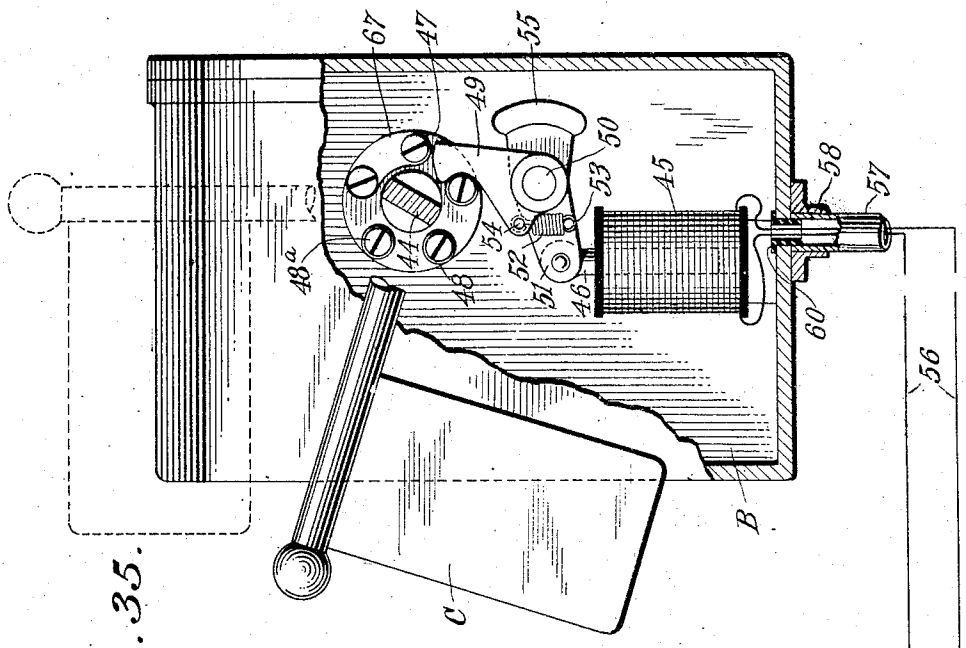

Fig. 35.

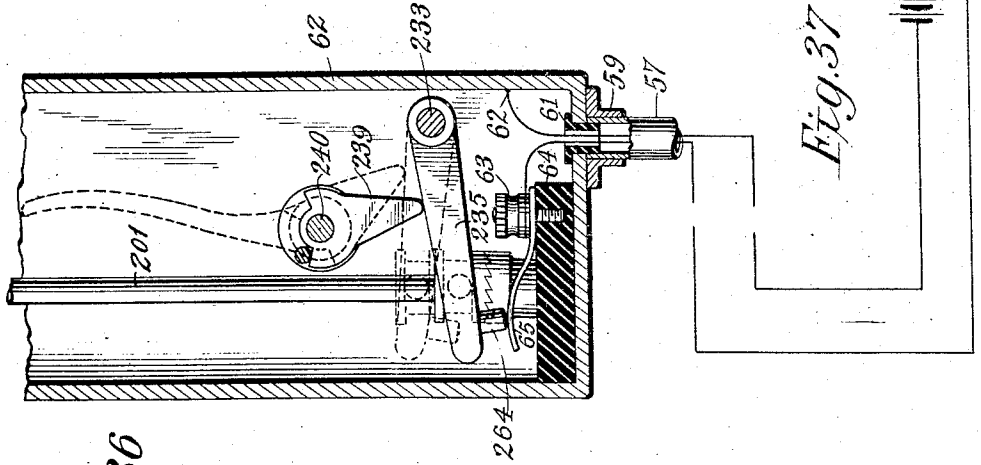

Fig. 37

Fig. 36

Witnesses:

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UNITED STATES PATENT OFFICE.

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CONTROLLING DEVICE.

1,046,808. Specification of Letters Patent. Patented Dec. 10, 1912.

Application filed August 26, 1911. Serial No. 646,181.

To all whom it may concern:

Be it known that we, MAX KUHN, a citizen of the United States, and RAPHAËL NETTER, a citizen of the Republic of France, both residing in the borough of Manhattan, city, county, and State of New York, have invented new and useful Improvements in Controlling Devices, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, illustrating such a controlling device constructed according to our invention and how the same is used for controlling the operations of apparatus for measuring, indicating, and recording the component items of charges for the use of public vehicles, known as taxicabs.

The object of our invention is to provide a controlling device to be driven by the same gear driving the driver's taximeter, but measuring independently the distance traveled, the duration of stops, etc., producing a record of, and visibly indicating the number of miles traveled and time of stops, and, in addition, maintaining the driver's taximeter in what is termed its "recording" position, beyond the control of the driver, as long as the vehicle is used by a passenger; furthermore, a device provided with means for printing the number of miles traveled and the number of hours consumed in waiting, from which the charge for the use of the vehicle may be computed; and means for setting the device in action by the passenger taking any of the seats in the vehicle, and then maintaining it in action, uninterruptedly, as long as the vehicle is used, whether occupied or not, and until stopped.

The controlling device, constructed according to our invention, comprises measuring and recording mechanisms, one for the distance traveled and one for the time or duration of stops, *i. e.* waiting time; mechanism for operating the taximeter locking device; mechanism for setting the controlling device in action by mechanism operated by the passenger taking any one of the seats; mechanism for starting the time measuring and recording mechanism, when the vehicle is stopped, and stopping it again when the vehicle is started; mechanism for printing the recorded distance and time; mechanism stopping the operating mechanism of the controlling device and automatically returning its parts to their starting points, and releasing the taximeter locking device after the operation of printing the record is performed.

The device is shown in the accompanying drawings as installed in a motor driven vehicle, so-called "taxi-cab" of the usual construction and equipped with a taximeter B for recording the distance traveled and the time when the car is waiting in the usual way when the indicator flag is turned down by the driver. The device for locking the taximeter in its recording position is combined with the taximeter and is operatively connected with the mechanism of the controlling device.

In these drawings—Figure 1 is a side elevation, partly sectional view, of the taxi-cab, parts of the side being broken away to disclose parts of our controlling device and its connections as installed therein; Fig. 2 is a horizontal, partly sectional plan view thereof, showing the seats and their connections with the controlling device; Fig. 3 is an enlarged vertical section, showing detail of a seat and of its connections with the controlling device; Fig. 4 is a detail plan view of the parts shown in Fig. 3; Fig. 5 is a transverse vertical section, on line 5—5, indicated in Fig. 2, showing the rear seat and its connections with the controlling device; Fig. 6 is an enlarged detail sectional view showing transmission gears connecting sections of the flexible shaft; Fig. 7 is an enlarged front view of the casing, inclosing the mechanisms of the controlling device, showing the "sight" apertures through which the numerals, indicating the distance traveled, are visible; also "check" delivery; the lever for printing the check, and the key for winding the clock mechanism on the sides; Fig. 8 is a rear elevation of the interior of the casing, showing the arrangement of the several mechanisms; Figs. 9 and 10 are vertical sectional views on lines 9—9 and 10—10 respectively indicated in Fig. 8; Fig. 11 is a rear elevation of the interior of the casing, showing the gears driving the measuring, indicating and registering wheels, the printing or recording wheels and the mechanism for driving the gears by a step by step movement; Fig. 12 is a sectional view on lines 12—12 indicated in Fig. 11; parts of the mechanism, for driving the gears, shown in Fig. 11, being shown in side elevation; Fig. 13 is an enlarged front view, partly sec-

tional, of the registering and printing mechanism shown in Fig. 11; Fig. 14 is a fractional sectional view on line 14—14 and Fig. 15 a similar view on line 15—15, indicated in Fig. 13; Fig. 16 is a sectional plan view on line 16—16 indicated in Fig. 8; Figs. 17 and 18 are details, showing parts of the printing mechanism and its driving connection in elevation; Fig. 19 is a sectional view on line 19—19 indicated in Fig. 18; Fig. 20 is a front elevation, partly sectional view, showing the time recording mechanism; Fig. 21 is a vertical sectional elevation on line 21—21 and Fig. 22, a horizontal section on line 22—22, indicated in Fig. 20; Fig. 23, is a view opposite to that shown in Fig. 20, showing the means for controlling the time recording mechanism; Figs. 24 and 25 are sectional views on lines 24—24 and 25—25 indicated in Fig. 23; Figs. 26 and 27 are sectional views on lines 26—26 and 27—27 indicated in Fig. 8, showing particularly the frictional means employed for controlling the time mechanism. Fig. 28 is a sectional elevation showing the means for inking the types and the printing hammer, coacting with the printing mechanism shown in Fig. 11; Figs. 29 and 30 are sectional elevations on lines 29—29 and 30—30 indicated in Fig. 28; Fig. 31 is an elevation, partly sectional view, showing the mechanism feeding and slitting the strip of paper from which the recording strip retained in the controlling device and the passenger checks are produced. Figs. 32 and 33 are sections on the lines 32—32 and 33—33 indicated in Fig. 31; Fig. 34 (on Sheet 3) is a front view of the strip of paper, divided into the recording strip and a passenger's check detached therefrom; Fig. 35 is an elevation of the taximeter locking device; Fig. 36 a detail sectional view showing the mechanism, for operating the locking device, and Fig. 37 a diagram showing the wiring and electrical connections of the locking and of the controlling devices.

The construction of the car and of the taximeter is considered as well known, and reference will be made to the parts thereof, as shall be deemed necessary in describing and explaining our invention. The several mechanisms of our controlling device are mounted and arranged in the casing 62 (see Fig. 7), subdivided by partitions 71 and 72, into three compartments and provided with apertures for connection with the driving shaft 4, and for the pull-cord 17, actuated by the mechanism combined with the passenger seats of the vehicle. The partitions 71 and 72 serve to reinforce the walls of the casing and afford means for mounting therein the various parts of the mechanisms.

The mechanism for measuring the distance, indicating, recording and printing the number of miles traveled, is shown in Figs. 7 and 8, 10 to 15 and 17 to 19. In this mechanism we employ duplicate sets of type-faced wheels for printing and one set of wheels, bearing corresponding numbers on their peripheries, for showing, through the sight apertures 69 of the casing, the number of miles traveled. The wheels are aranged in sets of four, three of the wheels of each set being faced with numerals from 0 to 9 inclusive, and the fourth with fractions, one fourth, one half, etc. The wheels are driven at relative speeds corresponding to fractions, units, tens and hundreds, the unit wheel of each set being moved, as usual in this kind of apparatus, one division for each complete revolution (four-quarters) of the fraction wheel, the tens wheel one step, when the unit wheel has moved one full revolution and the hundreds wheel moving one step for each complete revolution of the tens wheel. Thus, with four wheels, the mechanism can record 999 and $\frac{3}{4}$ units (miles), which is considered amply sufficient for all practical purposes; but more wheels could be added if it be desired to record more than 1000 miles.

The type-wheels of each set, both in the mile and in the time mechanisms, are alike in every respect, but have their types inverted, owing to their opposite location, to give the figures correct positions for readings. The types of the two (duplicate) sets of printing wheels, one set for printing the totals on the passenger's check, and the other on the tally sheet, or record strip, are not inverted. The object of this is to enable the moving of the printing wheels in both sets in unison, and accordingly, the figures on the passenger checks are printed, as shown in Fig. 34, in reverse positions to those printed on the tally sheet or record strip.

The duplicate sets of the distance printing wheels (see Figs. 11 and 13) are arranged on the shaft 70 journaled in the partitions 71 and 72. Three concentric sleeves 75, 76 and 77, are loosely mounted on this shaft 70, and provide, together with the shaft 70, separate and independent mountings for the four pairs of type wheels and their gears, which are so arranged that one set of the type wheels may be driven by the other through the transmission gears, and so that the transmission from the gear for the faster moving wheel drives that of the next adjacent slower wheel. The driving shaft 73 is located above shaft 70, having one end journaled in the partition 71 and the other in bearing 74, preferably formed on a spring casement, described farther on. The "quarter mile" pair of wheels 78 and 79, bearing the quarter, half, three-quarter and, if desired, also the zero types, are fixed upon the outer sleeve 75 (see Fig. 13), the shortest of the three, whereon also the

driven gear 80 is fixedly mounted, preferably between the type wheels 78 and 79. This driven gear 80 meshes with its driving gear 81, mounted on the driving shaft 73 and pinned thereto, the pin passing through the spacing hub of the gear. This gear 81 is the primary driving gear for the distance mechanism and is, accordingly, the only one fixed to the driving shaft 73. This driving shaft 73 is intermittently rotated by the pawl 212 engaging the ratchet wheel 82, mounted on one end of it, to move the quarter-mile wheel one step at each revolution of the shaft. The unit wheels 83 and 84 are mounted on the intermediate sleeve 76 and suitably spaced from the quarter-mile wheels. They are advanced the distance of one numeral at each complete revolution of the quarter-mile wheels 78 and 79, by the gears 85 and 86, secured on the sleeves 75 and 76 respectively, their mates, the gears 87 and 88 being loosely mounted on the driving shaft 73. On the adjacent sides of the hubs of these gears interlocking radial teeth are formed to move the two gears as a unit when the mechanism is being positively driven, and to permit each of them to move relatively to the other when running reversely.

The gears are maintained in engagement with each other by coil spring 369 mounted on the shaft and backed by the adjacent gears. Gears 86 and 88 are mutilated, the former having ten teeth and the latter but one, and the gears 85 and 87 are of equal size to drive the units wheel the distance of one numeral for each revolution of the quarter-mile wheel. The pair of tens wheels 89, 90, similar in all respects to the unit wheels, are secured in properly spaced positions on the third sleeve 77, and are driven with one-tenth of the velocity of the unit wheels by the gears 91, 92, 93 and 94. Gear 91, meshing with 92, is secured on sleeve 76 and has but a single space 95 (see Fig. 14), whose contacting face is slightly extended beyond the periphery of the gear, to secure its better and more extended engagement with the teeth of its mate 92, having only four teeth formed thereon, these teeth engaging the single space of the gear 91, whereby the latter is turned one-quarter of a revolution for each complete revolution of the unit wheel. Gears 92 and 93 are loosely mounted on the driving-shaft 73, and on the adjoining ends of their hubs, radial interlocking teeth are formed operating similarly to those of the gears 87 and 88. The gears are also yieldingly held together by coil spring 369ª. Gear 94, secured on sleeve 77, meshes with gear 93. The gears 93 and 94 are so arranged and proportioned as to drive the tens wheels with one-tenth the velocity of the units wheels, that is to say, when the unit wheel has made one revolution, the tens wheel, through the rotation of the intermediate gears 92 and 93, is rotated one-tenth of a revolution. The hundreds wheels 96 and 97 are mounted on the shaft 70 and suitably spaced by spacing hubs formed upon them; they are similar to the tens wheels, and to move them at one-tenth speed of the latter, *i. e.*, the tens wheels, the one space gear 98, mounted on sleeve 77, meshes with the four-toothed gear 99, and the latter engages with the interlocking teeth formed on the gear 100 as hereafter described. Both gears 99 and 100 are loosely mounted on shaft 73 and radial interlocking teeth are formed on the adjoining sides of their hubs. The gears are yieldingly pressed together by the spring 369 as are the gears already described. Gear 100 meshes with the gear 101 mounted on shaft 70 and driving the hundreds wheels. A smooth faced spacing wheel 102 is secured on the end of sleeve 77 adjacent the wheel 96 to make the spacing of the type wheels symmetrical.

The mechanism, driving the gears, moving the distance measuring, indicating, recording and printing wheels, is actuated by the mechanism shown in Figs. 8, 11–15 and devised to give the gears an intermittent movement, corresponding to that of the running gear of the vehicle. This mechanism is driven from shaft 201 when the movable clutch jaw 14ª is engaged with the stationary clutch jaw 14, fixed on the end of the flexible shaft 4 (see Fig. 8) driven by the gear, described farther on, preferably from the revolving (front) wheel of the cab. Shaft 203, journaled in the partition 71 and in the side wall of the casing, is driven from the clutch shaft 201 by the worm gears 204 and 205 mounted respectively on shafts 201 and 203. On the latter shaft (203) is also mounted a cam wheel 206, having a drop shoulder 207 formed on its face. This cam contacts with the lug 208ª set in the end of arm 208, fixed to shaft 209, thereby rocking the shaft. Shaft 209, journaled in brackets 210—210, extends through the partition 71, and the rocker arm 211 (see Fig. 15) is mounted, on its end, projecting into the middle portion of the casing; the pawl 212, loosely pivoted on the lower end of arm 211, engages the ratchet wheel 82, fixed to shaft 73. The gears, transmitting the motion from the front wheel of the car to the quarter mile wheels, are so arranged that the quarter mile wheels are advanced a quarter of a turn for each quarter of a mile traveled by the taxicab.

The four number wheels 121 (see Fig. 13), showing the number of miles traveled, through the sight apertures 69 of the casing, have numbers and fractions engraved on their peripheries and are arranged like the type wheels. They have integrally or fixedly formed therewith the gears 124, and

are loosely mounted on a fixed shaft 122, having its ends secured in bracket 105 and partition 72, respectively. Wheels 121 are provided with suitable spacing hubs (or collars) 123 and their gears 124 are driven from the gears mounted on shaft 103 through the gears 127, 128, 129, 132 and 133, mounted on a countershaft 125, whose one end is journaled in the bracket 105 and the other in the bearing 126. The wheels 121 are driven at the same speeds as their corresponding type wheels and are therefore coupled with gear of equal size as the corresponding gear of the type wheels. The driving gears mounted on the countershaft 125 are likewise equal in size to the corresponding gears on the driving shaft 73. The driver for the fraction wheel is accordingly made in double shape and comprises the two gears 127 and 128 formed on the same hub. On account of the described positioning of the wheels, it is necessary to form the drive for the unit wheels double. This comprises the gear 129 mounted on the countershaft 125 and the gear 130 fixedly mounted on the extended hub 131 of the gear 129. The other two gears, 132 and 133, are separate and are provided with suitable spacing hubs or collars. Thus, the number wheels 121 are positively driven synchronously with the printing wheels and similarly driven in the reverse order, and are stopped at their zero reading by the stopping mechanism acting on their corresponding printing wheels.

The driving power transmission for the distance measuring, indicating and recording of our controlling device is shown in Figs. 1 to 10 both inclusive. Figs. 1 to 6 show the transmission as installed in parts of the car and Figs. 7 to 10 show its connection with the parts of the controlling device. The front wheel D of the car is the primary source of the driving power. A gear casing E is preferably mounted in front of the axle in such a way that it is free to move with the steerage movement of the front wheel, and in this casing is secured the end of tube F for inclosing the flexible shaft G. Upon the end of shaft G is set, within the casing E, a worm meshing with the gear (not shown) set on countershaft H. This shaft is driven by the wheel through the gears I and J, mounted respectively on the wheel D and the countershaft H. The gear I is mounted in the usual way by attachment to the spokes or hub of the wheel D. Such a drive is usually employed for the driver's taximeter, the flexible shaft leading directly thereto. For the purposes of our invention, this shaft tube F connects with the three-way gear casing 1 (see Figs. 1 and 6) from which two other tubes 2 and 3 diverge. In these tubes the flexible shafts 4 and 5, made of the inner and outer wires 6 and 7, are housed. Beveled gears 8, 9 and 10 are mounted upon the adjacent ends of the three shafts 4, 5 and G, and are journaled in the gear casing 1. The gear 10, secured to the wheel driven flexible shaft G, is the driving gear and meshes with gear 9 to drive shaft 5, while the gear 9 meshes with gear 8 to drive the shaft 4 with the same velocity. Tube 3 leads to the driver's taximeter and is connected to the base thereof by the box 11. The flexible shaft 5 is connected to the mechanism in the driver's taximeter (not shown) and drives it, when the shaft 44 (see Fig. 35) is set, "recording" by lowering the flag C in the position shown in full lines. Tube 2 is suitably bent to connect with the box 12, projecting from the base of the casing 62 of our controlling device. The flexible shaft 4, housed therein, terminates in a solid end piece 13 jointed to the stem of the stationary clutch (see Fig. 8). Collar 16 set on the bottom of the casing 62, holds the jaw 14 and the flexible shaft 4 in position. This jaw 14 and its movable mate 14^a are provided with interlocking teeth 15 and constitute a clutch connecting the flexible shaft 4 with the mechanisms of the controlling device.

The mechanism shifting the clutch jaw 14^a in engagement with its mate 14 is actuated by the mechanism operatively connected with the seats of the taxicab and acting upon the pull-cord 17, housed in tube 18, and connecting it with the clutch operating mechanism within the casing (see Figs. 8, 9 and 10). The end of tube 18 is suitably fixed to the casing and the connection of the pull-cord 17 with the mechanism of the controlling device is made by the plunger shaft 17^a. Spring 20, whose upper end is connected to the plunger shaft 17^a, rests against the bushing 19 fixed in tube 18 so that when the pull-cord 17 is drawn, the spring 20 is compressed. When the pull-cord 17 and the locking mechanism, described farther on, are released the spring 20 re-acts and the clutch operating mechanism, acted upon by the pull-cord is re-set. The pull-cord is drawn by the act of the passenger taking a seat in the vehicle, and is released again when the passenger leaves his seat. In the taxicab shown in the drawings, there is a double seat K, arranged in position to be sat upon, and three folding seats I secured to its front wall M by hinges 21; two of the seats being hinged to the inner wall to drop into the inclosed part of the car and the third being hinged to the outside wall and dropping outside of the inclosed part next to the driver's seat. Each of the seats is equipped with mechanism for drawing the pull-cord 17, the latter being divided into branches 27, one for each seat. Tube 18 is correspondingly divided into the three branches 29, supported and held in

place by collar brackets 30 secured to the walls of the cab, each branch housing one of the branches 27 of the pull-cord (see Fig. 3). The mechanism devised for the seat K, is shown in Figs. 1, 2 and 5. The folding seats L are turned up when not occupied, to be out of the way and the mechanism for drawing the pull cord 17 is arranged to act when any of them is dropped and occupied. Upon one side of each pair of hinges on seats L a rearwardly projecting arm 22 is formed (see Fig. 1, and for details Figs. 3 and 4), swinging with the seat and entering the correspondingly located slot N of the wall of the car. In the space between the two walls, sliding plates 24, covering the slots N, are set to slide between guides 23, branches 29 of the tube 18 limiting their downward motion, cross-pins 109 acting as stops. Abutments 25, made integral with plates 24, project into the slots N and are engaged by the arms 22, to raise the sliding plates 24, when the seats L are dropped to be occupied by the passenger. Lugs 28, projecting from the opposite faces of plates 24, connect each with one of the branches 27 of the pull-cord 17, and thus, as the plates 24 are moved up, by the dropping of the seat, the cord 17 is drawn to act upon the mechanism, setting the controlling device in action. It is advisable to counterbalance the drop seats L by springs or weights (not shown) or to provide means for holding them when raised (out of the way) to prevent their dropping and drawing the pull-cord, when the car runs unoccupied by a passenger. It is, however, feasible to make the spring 20 of sufficient strength to resist the weight of the drop seats L when none of them is occupied.

The rear seat K is of sufficient length to accommodate two or more passengers and for this reason is designed and provided with mechanism to draw the pull-cord, whichever part of it is occupied by a passenger. Seat K is mounted upon a pair of frame-shaped levers 31, having knife-edged pivotal pins 32 (see Fig. 5) projecting from the sides thereof and resting within comparatively large apertures of brackets 33, secured to the rigid frame P. The side members of the levers 31 converge, those of one lever forming a tongue 34, entering between the sides of the other lever. A knife-edged pivotal pin 35, set in the tongue 34, engages in bearings 36 in the ends of the sides of the other lever. The frame-shaped levers 31 are supported by spring 39, housed in the tubular socket 40, set upon the floor brace Q; the end of tongue 34 being pivotally connected to rod 37 and a cross-pin 39^a, set therein, bearing against the said spring. Four wedge-shaped pins 43 are set in the sides of the frame-shaped levers 31, in positions to engage four stunted legs 42, two of the legs being on each end of the seat K, which is thus yieldingly supported upon this freely balancing lever frame, and so that the pressure of a weight, placed upon it anywhere, will act upon the tongue 34 of the balancing lever frame and thus through rod 37 and upon the spring 39. The other end of rod 37 is pivoted to the end of the horizontal arm of bell crank lever 38, fulcrumed to the lower side of the floor brace Q. The other, vertically depending arm of bell crank 37 is suitably bifurcated and straddles the pull-cord tube. This arm engages the cross-pin 41, secured to the pull cord 17 and projecting through slots 41^a made in the tube, wherein the pull cord is housed. When the seat K is occupied—depressed—cross-pin 41 is engaged by the forked end of the lower arm of bell crank 38, and as the lever swings on its pivot the pull-cord 17 is drawn and acts on the clutch jaw shifting mechanism of the controlling device. When the passenger leaves the seat, it is raised to its normal position again by the recoil of the spring 39, the action of the lever 38 upon the pull-cord ceases and the clutch jaw shifting mechanism of the controlling device is returned by the recoil of spring 20 to its inactive position.

The mechanism for operating the clutch.— From the foregoing description it will be understood that the distance measuring, recording, etc., mechanism is actuated from shaft 201, whose upper end is journaled in bracket 202 and whose lower end is loosely set in a socket of the jaw 14. This shaft 201 is driven by the flexible shaft 4 from the front wheel of the taxicab, when the clutch jaw 14, secured to the flexible shaft 4, and its mate, the jaw 14^a, are closed. Jaw 14^a, keyed to slide on the shaft 201, is raised from the jaw 14 by the spring 246 (see Fig. 9) hung on pin 246^a, and having its other end connected to the extended end of arm 235, and the bell crank 231 (see Fig. 10) whose one arm is pivotally connected to the pull-cord 17, is held by the spring 20 in the position indicated in dotted lines in Fig. 10. In this position the bell crank 231 raises the arm 232, mounted on shaft 233, as also indicated in dotted lines in Fig. 10. The full lines show the component parts of the mechanism for operating the clutch and of mechanisms for starting and stopping the drives of the distance and time measuring and recording devices in such relative positions as they are when the clutch jaw 14^a is closed and the controlling device is in operation.

The mechanism, shifting the clutch jaw 14^a in and out of engagement with the jaw 14 (see Figs. 9–12) is operated by the pull-cord 17, pivotally connected to the lower arm of the bell-crank 231. The spring 20, set in the pull-cord tube 18, resting on plug 19 and having its upper end secured in the

plunger 17ª, acts on bell-crank 231, to hold it in the position indicated in dotted lines in Fig. 10, and is compressed when the pull-cord 17 is drawn by the mechanism, actuated by the depressing of any of the seats of the taxicab. When all the seats of the taxicab are released, spring 20 re-acts and returns the bell-crank 231 to its normal position. The other parts of the clutch operating mechanism are, however, not acted upon thereby and the clutch remains in closed position and the controlling mechanisms continue in action, the distance wheels being driven when the taxicab runs, and the time wheels when it stands still, until the drives are stopped by the printing operation, producing the passenger's check and the corresponding imprint on the tally sheet.

Bell-crank 231 is fulcrumed on stud S set in partition 72 (see Fig. 10) and acts on arm 232, yieldingly mounted on shaft 233, being held thereto by spring 234 (Fig. 8) whose one end is fastened in the shaft 233 and the other in the hub of the arm 232. To avoid and reduce friction, the arm of bell-crank 231, acting on the arm 232, is bifurcated and a roller 161 is rotatably mounted therein on pin *p*. This roller 161 contacts with the crank-pin *c* set in the end of arm 232. One end of shaft 233 is journaled in partition 72 and its other end in the side-wall of the casing (see Fig. 8). The branches of the forked arm 235, also loosely mounted on the shaft 233, embrace the clutch-jaw 14ª, and the pins 236, set in their ends (see Fig. 9), engage in the annular groove 14ᵇ. The lug 238, rigidly secured to shaft 233, abuts against pin 237, set in the arm 235, and the spring 234 (Fig. 11) is set to act on the shaft 233 to turn it to the front, whereby the arm 235 would be swung downwardly, by the action of the lug 238 upon the pin 237, and so move the clutch jaw 14ª into engagement with its mate 14. When the bell-crank 231 is swung by the drawing of the pull-cord 17, the arm of the bell-crank 231, holding the arm 232, is withdrawn, shaft 233 is turned, by the tension of spring 234, and the arm 235, engaged by the lug 238 bearing against the pin 237, shifts the jaw 14ª down upon jaw 14, revolving with the flexible shaft 4. The clutch, when thus closed, by the depressing of any of the seats of the taxicab, is not released or opened, when the seat or seats of the taxicab are again vacated. The arm 239, loosely hung on shaft 240, and normally held in the position, indicated in dotted lines in Fig. 12, drops, propelled by gravity, into the position shown in full lines in Fig. 12, and holds the jaw 14ª in its engagement with the jaw 14 and controlling mechanisms in operative action until it is raised again by the depressing of lever 242 to print the passenger's check. One end of the shaft 240 is journaled in the partition 71 and its other end, projecting through the casing, in the boss 241, (see Fig. 8). The lever 242 is rigidly secured to the end of shaft 240 and the collar 243 is also rigidly secured to this shaft 240 adjoining the arm 239. Pin 244 is set in this collar 243, in position to engage the shoulder 245 of the arm 239, when the lever 242 is depressed. Thereby the arm 239 is raised from the arm 235, the latter is released and then the spring 246, which is extended when the arm 235 is depressed, reacts, and raising arm 235, withdraws the jaw 14ª from its engagement with the jaw 14, thus opening the clutch, whereby the driving shaft 201, and the driving mechanisms connected therewith, are stopped. The shaft 214 is turned, simultaneously with the shaft 240 (see Figs. 11–12) by the upward motion of rod 217, acting on the arm of the bell-crank 216, and the pin 263, set in arm 262, fixed to shaft 214, is thereby moved to press brake 247 against the balance wheel 186 to stop the time controlling mechanism.

The mechanism, reversibly driving the gears, driving the distance wheels, (see Figs. 10–15) is actuated by the spring 106, wound up during the forward moving of the gears, driving the recording and type wheels of the distance mechanism, and then, when released, driving the shaft 103 and the gears mounted thereon. One end of shaft 103 is journaled in the circular casement 104, and the other in the bracket 105 affixed to the casing. The spiral spring 106 is housed in the casement 104, its inner end is fixed to the hub of ratchet wheel 340, mounted on shaft 103, (see Fig. 14) and its other end to a pin 106ª set in the wall of the casement. The star wheel 341 is held in frictional contact with ratchet wheel 340, mounted on the shaft 103, by the spring 370, set in the recess of the hub of gear 111, and set to press the star wheel 341 against the ratchet wheel 340. The star wheel 341 is positively driven, in one (forward) direction, by pin 342, set in disk 343, fixed to shaft 73, so that every revolution of shaft 73 gives the star wheel 341 one-sixth of a turn. By this mechanism the spring 106 is wound up during the forward driving of the gears, and is held in check by spring-pawl 344, mounted on arm 345, fixed on shaft 214. Gear 107 (Fig. 13) is fixed to shaft 73, preferably by forming it integral with the gear 81, and meshes with gear 108, yieldingly connected with the shaft 103. Three other gears, 11, equal in size with gear 108, are also mounted on, and yieldingly connected to, the shaft 103. Two of these gears 111 mesh with gears 93 and 100, respectively, mounted on shaft 73, and drive the tens and hundreds type wheels when the spring 106 is released. The third gear meshes with the gear 110, loosely mounted on shaft 73, and the latter meshes with gear

195 fixed on the sleeve 76 with the units wheel. The gears 108 and 111 are yieldingly connected to the shaft 103 by pins 112 (see Figs. 11 and 13) set in, and projecting from, the shaft 103, one at the side of each gear. The hubs of gears 108 and 111 are serrated; the pins 112 are V-shaped in their cross-section, and set in shaft 103 with their edges facing the serrated hubs 113 of the gears 108 and 111. Each one of these gears 108 and 111 is held in engagement with one of the pins 112 by one of the helical springs 114. These springs are slid on the shaft 103, one between each of the gears and one of the disks 115. These disks are slid on the shaft 103 and set one against each one of the pins 112. This arrangement of mounting the gears 108 and 111 on the shaft 103 permits the gears to be sidewise forced out of engagement with their respective pins 112, when their rotation is stopped, and the shaft 103 to continue to revolve, after some, or all, of these gears have stopped. It also permits each of these gears to revolve at its own predetermined speed, independently of the speed of the other gears mounted on the shaft.

The reversing mechanism operates when the mechanism driving the shaft 73 is released. The pawl 344 is then raised, to release spring 106, by the same movement of the shaft 214 and at the same time when the other check and feed pawls are released. When thus released, spring 106 unwinds and drives shaft 103 in reverse direction, whereby the type and registering wheels are returned to their zero readings.

To effect the stopping of each of the type wheels at its starting position, each pair of the type wheels is provided with a stop lug 116, so positioned that the reverse rotation of each pair of type wheels is stopped when its lug strikes against its corresponding stop arm 117. These stop arms are mounted on shaft 118, journaled in brackets 119 formed on the controller casing; they are formed with a second arm 120, acted upon by the releasing mechanism to be described, to positively move each one of the arms 117 into engagement with the corresponding stop lug 116 of one pair of the type wheels. When the reverse rotation of the first type wheel of the train is thus stopped, the gear (111) driving it, can travel no farther, but the tension of the spring 106 forces it away from its pin (112) and the shaft 103 continues to rotate, revolving the other gears, mounted upon it, until the last of the type wheels (unit) is brought back to its zero position.

The time measuring and recording mechanism is devised generally on similar principles as the distance measuring, recording, etc., mechanism. The arrangement and details of construction of this mechanism are shown in Figs. 20 to 27. Upon the shaft 134 (see Fig. 20) fixed in partitions 71—72, two concentric sleeves 135 and 136 are loosely mounted one upon the other. The duplicate minute wheels 137 and 138 are fixed on the outer and shorter sleeve 135 in symmetrical position. They have types "10", "20", "30", etc., (not shown) engraved upon their faces to print the numbers of minutes, indicating the sixths of an hour, the first (or last) space being left blank. A ratchet wheel 141, mounted on the same sleeve 135, is actuated by pawl 198 operated by mechanism described farther on, to drive the minute wheel intermittently one-sixth of its revolution at each motion, bringing the types consecutively in printing position. The duplicate hour wheels 139 and 140 are fixed on the sleeve 136 in suitably spaced positions, and are provided on their faces with the type numerals 0–5, inclusive (not shown), for printing hours; such wheels, capable of registering six hours, being deemed sufficient for the purposes intended. The hour wheels are driven from the minute wheels, at a relative velocity of 1 to 6, by transmission gears, mounted on the sleeves 135 and 136 and on the shaft 145, journaled in the bracket 146 and the spring casing 163, similarly to those described in connection with the distance recording mechanism. The one space gear 142, secured on sleeve 135, meshes with the four tooth gear 143, mounted alongside of the gear 144 on shaft 145, and the gear 144 with gear 147, secured on sleeve 136. The gears 143 and 144 are made of proper relative sizes to drive the hour wheels at the required velocities. On the adjoining ends of their hubs radially interlocking teeth are formed, whereby the gears are clutched together, the spring 337 pressing the gear 143 against 144. Their interlocking teeth are so shaped that when driven forward the gears 143 and 144 move together, and when rotating reversely the gear 143 may continue rotating after the gear 144 comes to a stop. Below the shaft 145 the short shaft 148 is journaled in bracket 149, and in the partition 71 (see Figs. 20 and 21). On this shaft the gears 150 and 151 are mounted and held in a yielding connection therewith by the wedge-shaped pins 154, set in the shaft 148 and engaging the serrated ends of the hubs of gears 150 and 151. This construction is the same as described in connection with the distance recording mechanism, except that here only one spring 152, slid on the shaft 148 between the two gears 150 and 151, is required to press their serrated or V-grooved hubs in engagement with the pins. The gears 150 and 151 mesh with gears 155 which are pinned to shaft 145 and 156 loosely mounted on said shaft by means of a sleeve or extended hub which carries at

its other end the disk 343ª. Gears 155 and 156 mesh also with the gears 157 and 158, fixed on sleeves 136 and 135 described above. The gear 159 and its mates thus effect a yielding drive for the shaft 148, whereon the gear 159 is secured. This gear meshes with gear 160, loosely mounted on shaft 145, connected with the recoil spring 163ª (see Figs. 20 and 24) by frictional contact with ratchet 340ª, as has been described above, so that the spring is wound during the positive driving of the time wheels by means of the star wheel 341ª, and unwinds later, reversely driving the gears of the time mechanism, in a manner similar to the spring 106, reversing the gear of the distance mechanism, when the forward driving mechanism is released, as described further on. The time wheels are similarly stopped at their zero readings, the yielding connections of the gears on shafts 145 and 148 permitting the wheels to be stopped independently while the remainder of the mechanism is still revolving. The time-type wheels are provided with stop lugs 164 co-acting with stop arms 165 loosely mounted on a short shaft 166 journaled in partition 71 and bracket 167 (see Figs. 23 and 24). Stop arms 165 (Fig. 24) are held inactive away from the path of their corresponding stop lugs, by the coil springs 169 (Fig. 23) until they are required to act, when the mechanism devised to move them into position to be struck by the stops 164, whereby the type-wheels are stopped at their respective zero positions, acts upon their branches 168 to swing them in active position.

The mechanism driving the time wheels is shown in Figs. 8 and 27. This mechanism is in its main features similar to a clock driving mechanism and is constructed as follows: The main spring (not shown) is housed in the drum 170 and is secured thereto and to shaft 171 in the usual way. The shaft is journaled in bracket 172 and the side-wall of the casing, through which it is extended, and the turn key 173, for winding up the spring, is secured to its projecting end. The spring is held in wound position by pawl 174 hung on the drum 170 and engaging ratchet wheel 175 secured to shaft 171. Driving gear 176, secured to the drum 170, revolves as the main spring unwinds and drives the pinion 177, mounted together with gear 178 upon shaft 179, the driving shaft for the time indicating and recording mechanism. One end of this shaft 179 is journaled in the side wall of the casing and its other end extends through the partition 72. Above the driving shaft 179 three other shafts 182, 183 and 184 are journaled in successive order. Shaft 182 is driven by gear 178 set on shaft 179 and meshing with pinion 193 secured to shaft 182. Shaft 183 is driven by the cog wheel 192 meshing with pinion 191 mounted on shaft 183. A balance wheel 186 with the usual hair spring (not shown) is mounted on the shaft 184 and the escapement rocker arm 187 (see Fig. 27), oscillating on pin 188, set in the casing, engages with the pin 185 set in its hub. In the other end of the rocker arm 187 an escapement pin 189, intermittently engaging the teeth on wheel 190 mounted on shaft 183, is set.

The time wheels are intermittently driven from the clock mechanism through a rocker shaft 194 (see Figs. 20 and 21) journaled in bracket 149 and partition 72. The shaft is rocked by the arm 196 mounted thereon and provided with a lug 196ª at its free end engaging with the cam-wheel 180, having a drop shoulder 181 formed on its face (see Fig. 21) and fixed on the end of shaft 179, projecting through the partition 72. The clock gears are so proportioned that the cam-wheel 180 makes one revolution every ten minutes, thereby advancing the minute wheel one division. Arm 197, mounted on the other end of rock-shaft 194, carries on its free end the pawl 198, loosely pinned thereto and engaging ratchet wheel, 141 mounted on sleeve 135, slid loosely on shaft 134 and whereon the previously described gears, meshing with the gears on shaft 145, and driving the minute wheels of the time mechanism, are mounted. Arm 199 is formed integrally with the pawl 198 and cooperates with the mechanism described farther on, whereby the pawl 198 is raised from its engagement with the ratchet wheel 141, when the spring 163ª is released to return the time wheels to their zero readings.

The mechanism, reversely driving the time recording and type wheels, is constructed similarly to that for reversely driving the distance recording and type wheels, described above. In this mechanism the disk 343ª (see Fig. 20) connected with the gear 156 by a sleeve, or made integral therewith, is mounted on shaft 145, the disk 343ª and the gear 156 moving as a unit. The pin 342ª, set in the disk 343ª, engages with the star wheel 341ª, mounted fixedly on the shaft 148, and at every revolution of the disk, impinges against one of the six points of star wheel 341ª, thereby intermittently driving it and rotating the shaft 148, one-sixth turn. Gear 159, also mounted fixedly on shaft 148, drives gear 160, mounted on shaft 145. The hub on gear 160 has frictional contact with the ratchet wheel 340ª, to which one end of spring 163ª is attached, the other end of the spring 163ª being secured to a pin 344ᵇ in the casing of the spring (see Fig. 24). This frictional contact between gear 160 and ratchet 340ª is obtained by the bearing of the spring 370ª against the faces of the gears 160 and 155, the latter being fixed to shaft 145. The

ratchet 340ª is held in check by the pawl 344ª mounted fixedly on shaft 166 (see Figs. 23 and 24). By this mechanism the spring 163ª is wound up during the forward driving of the gears, the operation of winding up the spring being similar to that described in connection with the mechanism reversely driving the gears driving the distance wheels. The releasing of spring 163ª to return the time recording type wheels to their zero positions, is actuated by the rock-shaft 214. Its construction and operation are explained farther on.

The mechanism for starting and stopping the gears driving the time wheels, is illustrated in Figs. 9, 11, 16, 23 to 27. The time wheels are driven by the clockwork, as hereinbefore explained and the brake 247 (see Figs. 23–26), set in hub 247ª, loosely mounted on shaft 214, is provided to contact with the periphery of the balance wheel 186 and to stop the clockwork thereby. Brake 247 is operated by mechanism actuated by the shaft 201 (see Fig. 11) to move and hold the brake against the balance wheel 186, and stop its oscillating motion, when the shaft 201 rotates, driving the distance wheels, as explained, and to again release the balance wheel 186 when the shaft 201 ceases to rotate. The mechanism acts only when the shaft 201 is clutched to the flexible driving shaft 4; it starts the clockwork, driving the time wheels, immediately, when the shaft 201 is clutched to the flexible driving shaft 4; stops it when the taxicab is started going and starts the clockwork again when the taxicab is re-started after stopping. The mechanism is constructed as follows: The flanged collar 248 (see Fig. 9) is secured on shaft 201, a disk 248ª of leather, or felt, or the like, is applied on its upper side. A second collar 249, constructed as a counterpart of collar 248, is loosely mounted on the same shaft and held in engagement with collar 248 by the spring 250, slid on shaft 201 and set against collar 251 pinned on the same shaft. Arm 252, (see Fig. 9), extending from collar 249, is loosely pinned to the bar 253 slidably secured in guide plate 254 (see Fig. 16) conveniently fixed on the wall of the check chute 304. Bar 253 projects through the partition 72 and its wedge-shaped end engages the roller 256, mounted on the horizontally turned-over end of one arm of the bell crank 257, pivoted to the partition 72. The other arm of bell crank 257 is pivoted to connecting rod 258, whose other end is pivoted to an arm 259 loosely mounted on shaft 214. Pin 260 is set in the arm 259 in position to act on brake 247 when the arm 259 is raised. Spring 261, having one end attached to the bell crank 257 and the other to the casing, acts on the bell-crank 257 to move the rod 258 upwardly to raise the arm 259 and press the brake 247 against the balance wheel 186. The time mechanism operates when the shaft 201 is stopped (when the taxicab is at a standstill.) The pull on the bar 253 being then released, the spring 255 re-acts and pulls the bar 253 to the right. Its wedge-shaped end then acts on the roller 256 to swing the bell crank 257 so as to pull down the rod 258 and release the brake on the balance wheel 186. The clock mechanism then starts agoing and drives the time wheels. When the shaft 201 is rotated, the friction of the collar 248 produces a drag on collar 249, the bar 253 is drawn to the left (see Fig. 16) against the tension of a spring 255, the roller 256 and bell-crank 257 swing yieldingly to the reaction of spring 261, rod 258 is moved up, and pin 260 set in arm 259, acts upon brake 247, moving it to and holding it against the balance wheel 186 to stop its oscillating motion. Another arm 262 is fixedly mounted on shaft 214 and is similarly provided with a pin 263 which acts against the brake 247 to stop the clock. This device acts only when the shaft 214 is turned by depressing the hand lever 242 to print the passenger's check at the end of the trip for which the taxicab was engaged.

The mechanisms for releasing the driving gears of the distance and time mechanisms are constructed and operate as follows: The rocker shaft 214, whereon the releasing mechanisms are mounted (see Fig. 23), is journaled in the partition 71 and bracket 215. The shaft extends through both partitions, and the bell crank 216 (Figs. 12 and 15) is secured on its end, projecting beyond partition 71. The lower end of bell crank 216 is pivotally connected to the rod 217, whose lower end is operatively connected with the arm 235, moving the clutch jaw 14ª, and the rock shaft 214 is turned when the clutch jaw 14ª is raised or lowered to stop or start the controlling device. In the other end of the bell crank 216 a pin 218 (see Fig. 15) is set, extending through a slot in the partition 71 (see Figs. 9, 11 and 12) engaging the arm 213, made integral with the pawl 212 and to raise the pawl from the ratchet wheel 82, when the jaw 14ª is moved up on shaft 201. The spring pawl 221, secured to the hub 222, also mounted on shaft 214 (see Fig. 15), and held in engagement with the teeth on ratchet wheel 82, during its positive drive, to hold it against the tension of spring 106 when the driving pawl 212 swings rearward, is lifted from the ratchet wheel 82 simultaneously with the raising of the pawl 212, when the shaft 214 is turned by the raising of rod 217, and thereby the distance indicating and recording wheels and their gears are set free to be driven reversely to their zero positions by the recoil of the spring 106, as already described.

The mechanism, mounted on the rock shaft 214, also releases the time wheels and their gears at the same time and in a similar manner as the mile wheels are released. Pin 220, engaging arm 199 (see Fig. 21) is set in the free end of drop arm 219 (see Figs. 23 and 25), rigidly secured on the rock shaft 214. When the shaft 214 is turned, when rod 217 is moved up by the arm 235 raising the clutch jaw 14^a as above explained, the pin 220 engages the downwardly depending arm 199 (see Figs. 21 and 25) of the pawl 198, thereby raising the pawl from the ratchet wheel 141. The spring pawl 223 (see Figs. 23 and 25), secured on hub 224, fixedly mounted on shaft 166, engages with the ratchet wheel 141, mounted on sleeve 135, and driving the time wheels. Its function is the same as that of the pawl 221 above described. Pawl 223 is raised from its engagement with the ratchet wheel 141 simultaneously with the withdrawing of pawl 198, by the same turn of shaft 214, through the link 225 pivotally connecting arms 226 and 227 mounted respectively upon shafts 214 and 166, and thereby also the time wheels are released to be reversely driven by the unwinding spring 163^a, to permit the reverse movement of the time wheels and of the recording mechanisms connected therewith.

Two arms 228 (see Figs. 14 and 15 and 23), having studs 230 projecting to either side, set on their free ends, are secured to and moved by the turning of the shaft 214. These arms 228 engage arms 120 on stop arms 117 and move the latter into position to be engaged by the stop lugs 116 of the distance wheels, to stop the latter in their reverse motion at their zero reading. Each of the arms 228 operates two of the stop arms 117 of the four distance wheels. Another arm 229, having also a stud 230 set in its free end and projecting to both sides thereof, is secured to the shaft 214 (see Figs. 23 and 24) in position to engage the two branch arms 168 of stop arms 165, whereby, when shaft 214 is turned, stop arms 165 are moved against the tension of springs 169, in the path of stop lugs 164 of the time wheels and stop the reverse motion of the latter at their zero readings. Thus the turning of the shaft 214, effected by the raising of the rod 217 when the clutch jaw 14^a is raised, releases the distance and the time wheels and sets the reversing mechanism and the stopping devices in action to return all wheels to, and stop each at, its zero readings. When the shaft 214 is again swung in the opposite direction by the shifting of the clutch jaw 14^a in engagement with the jaw 14, the mechanisms are reset again so that the wheels can be positively driven forward.

The printing mechanism is shown in Figs. 8–10, and 26–33. The type-wheels have already been described in connection with the distance and the time mechanisms. The ink ribbon 265 is stretched over spools 266 and 267 loosely mounted on studs 266^a set in the bosses 266^b on the casing 62, and over guide rollers 268 and 269, revolving on pins set in brackets 270 secured to the casing 62 in suitable positions to bring the upper run of the ribbon 265 in front of the type wheels 78, etc., of the distance mechanism, and the lower run opposite the time printing wheels 137, etc., (see Fig. 10). To permit the ink ribbon 265 to pass, the partitions 71—72 are slotted (see Fig. 28) and guide-rollers 271 are mounted in brackets 272, secured to the sides of the partitions adjoining the slots. These guide-rollers 271 give the ink ribbon 265 a quarter turn to stretch it flatwise in where it passes the type wheels. A ratchet wheel 273 (see Figs. 9 and 30) is secured to one end of the ribbon spool 266 and is engaged by the pawl 274 (see Figs. 28 and 30), pivoted to the end of an arm 275, loosely mounted on the stud 266^a in position to be engaged by the rod 217 when the lever 242 returns to its normal position after the printing operation. The pawl 274 is thereby actuated to push the ratchet wheel 273 one step, shifting or drawing the ink ribbon 265 a corresponding distance along. The arm 275 and pawl 274 drop with the rod 217, propelled by gravity when the next passenger takes a seat in the cab.

The paper tape 285, whereon the passenger check and the record are printed, is wound on a spool 277 having a tubular axle for mounting it upon the stationary stud 278 (see Fig. 31), secured to the partition 71 and the movable stud 279 is mounted and arranged to be withdrawn through a hole in the partition 72. The stem 280 of this stud 279 is slidably mounted in the bracket 281 and a cross-pin 282 is set in its end, projecting beyond the bracket. The spring 283, slid on the stem 280 between the bracket and the head of the stud 279, is set to press the stud into the tubular axle of the spool 277 and to hold the spool sufficiently tight to prevent loose unwinding of the paper tape. This arrangement for mounting the spool 277 permits ready removal and inserting of new spools. The paper tape 285 is perforated longitudinally, the perforations 284 dividing it in two parts and affording means of positively feeding it. One half of the paper tape is perforated transversely at equidistant intervals, the perforations dividing the strip into passenger checks. The words "Miles", "Hrs." and "Min." are printed on the paper tape as shown in Figs. 31 and 34, in positions to come directly above the printed record of the distance (miles) traveled and of the time (hours and minutes) consumed in waiting while the taxicab was engaged in the service of each passenger. This necessitates

the printing of the records in relatively inverted positions, as described.

The paper tape 285 is drawn from the spool toward the bottom of the casing by the feed-roll 288 (Figs. 8–10, 31–33) mounted on shaft 286, extending from the partition 72 through the partition 71 to the opposite wall of the casing. This shaft may be made of two pieces coupled together by collar 287 to facilitate its setting in its bearing when assembling the mechanism. Shaft 286 is driven by the chain 325 stretched over the sprocket wheel 324 mounted thereon, and the teeth of the pins set in the feed-roll 288, secured thereon, engage with the perforations 284 in the paper tape. Beneath the feed-roll 288 and in line therewith, two overlapping shearing disks 289 and 290 are mounted on shafts 291 and 292, journaled in the partitions 71 and 72. The collars 294 (see Fig. 31 where one is shown) are set on these shafts adjacent the partition 71, to prevent lateral shifting of the shafts. On their ends, projecting beyond the partition 71, the gears 293 (see Fig. 33), are mounted. These gears mesh, and being of the same size, drive the cutters at a uniform speed, but in opposite directions. The gears 293 are driven by the gear 295, mounted on shaft 286, through the gear 296 loosely revolving on the stud 296ª, set in the partition 71 and meshing with the gear 295 and the gear 293, mounted on shaft 292. By this arrangement the cutters 289 and 290 are driven at the same speed as the feed roll 288, and as they are of the same effective diameter, the paper tape 285 is neither pulled nor retarded by the cutters, and is smoothly cut longitudinally before the printing is done thereon. The two strips of the paper tape pass between the bar 297 (see Fig. 32) secured to the partitions 71 and 72 and roller 298, mounted in blocks 299 set between brackets 300 also secured to the partitions 71 and 72 to the front of it. The bar 297 serves also as a support for the paper tape and a straight edge for smoothly cutting off of the passenger's check. Screws 301 are set in the blocks 299 and tension springs 302 slid thereon, and set against the flanged ends of brackets 300, press the paper tape 285 between the roller 298 and the bar 297 to hold it flat for the action of the transverse cutter.

A chute of suitably shaped plates 303 is provided (see Fig. 32) to carry the passenger's check to the slot 304 in the front wall of the casing This slot is made sufficiently wide to admit two fingers to be inserted for withdrawing the check, if necessary. The plates 303 forming the chute are, however, so shaped that no access is had therethrough to the interior of the controlling device and any tampering with the mechanism or withdrawing of the record strip, deposited inside the casing, is prevented. This record or tally sheet, after being printed upon, passes between rollers 305 and 306, fixed to the shafts 311, 312, extending through partition 71 and journaled in the casing at one end and in brackets 313 at the other, and folds in the space of the casing accessible through the aperture closed by the door 307 turning on the concealed hinges 308, fitted flush with its flanged seat 310 and provided with lock 309, securely fastening it to the casing. The rollers 305 and 306 are positively driven with the same velocity as the cutters 389 and 290 and the feed roll 288, so the paper tape is stretched flat for the printing wheels. They are also driven from shaft 240 by the passenger depressing the lever 242 at the end of the trip. After being depressed, the hand lever 242 is returned to its normal position by the spring 314 (see Figs. 31 and 33) secured to the casing at one end, and at the other end to an arm 315, rigidly secured to shaft 240. The pawl 316, pivoted to the side of arm 315, engages with the ratchet wheel 317, secured on the same hub with a gear 318, loosely mounted on the shaft 240. The gear 318 meshes with the gear 319, secured on the same hub with gear 320, and the sprocket wheel 321 and loosely mounted on shaft 312. Gear 320 meshes with gear 322, secured on shaft 311, thus positively driving this shaft when the hand lever 242 returns to its normal position. The shaft 312 is positively driven from shaft 311 by the gears 323, 323, one of which is mounted on each of the two shafts (311 and 312). The chain 325 is stretched over the sprocket wheel 324 secured on shaft 286 and the sprocket wheel 321 on shaft 312. All these transmission gears are so proportioned that the feed-roll 288, the cutters 289, 290 and the rollers 305 and 306 are driven with a uniform speed.

The swinging platen 326 (see Figs. 8, 28, 29) is shaped to conform to the lines of type to be printed and provided with the frames 327 wherein pads 328 are set in line with the distance and time type wheels. A knife 333, coextensive with the width of the passenger check, is secured to the upper end of the platen 326 so as to strike the paper tape at the lower edge of the bar 297, so as to produce a shearing action therewith. This cutting of the passenger check takes place simultaneously with the printing by the strike of the platen, whereby also the paper tape is pressed upon the type wheels. The platen 326 has a hub formed on its lower end fixedly mounted upon the shaft 329, journaled in bracket 330, attached to partition 72 and in the partition 71 through which it projects. Finger 331 is fixed to the end of shaft 329 projecting beyond partition 71. The platen 326 is pressed against the type wheels (or nearly so) by the spring

332 slid on the shaft 329 and having its ends respectively secured to the partition 71 and to the platen. The cam wheel 334, is loosely mounted on shaft 240 and on the reduced side of a part of its hub 335, radial ratchet shaped teeth are formed; engaging the correspondingly formed teeth formed on the clutch jaw 243 to positively drive the cam wheel 334 when the hand lever 242 is depressed. The ratchet teeth are shaped to permit the hand lever 242 to return to its normal position without reversely turning the cam wheel 334, whose teeth are shifted out of engagement with the jaw 243 during the return movement of the hand lever. The cam-wheel 334 is pressed in engagement with the clutch jaw 243 by the spring 336 (see Figs. 16 and 28) mounted on shaft 240 between the partition 71 and the cam-wheel 334. The raised and depressed parts of the acting surface of the cam wheel 334 (four being shown) for engaging with the finger 331, set on shaft 329 and the platen 326, being pressed away from the type wheels by each of the raised parts when acting upon the finger 331 and released to strike, when by the turn of the cam-wheel 334, this raised part has passed the finger, being then free, the spring 332 held under tension, re-acting to forcibly swing the platen against the paper tape 285, pressing it upon the type wheels, and driving the shear blade 333 to cut the passenger's check, which drops into the chute below.

The mechanism for locking the driving shaft of the taximeter in "recording" position is also actuated by the mechanism operating the clutch jaw 14^a. The locking mechanism is shown in Figs. 35 to 37. The staff of the flag C is fixed to the taximeter-shaft 44 serving as a crank to turn it. By turning the shaft 44 the mechanism of the taximeter is controlled and the flag C serves also as an indicator of the status "non-recording", "recording", etc. The position of the flag C, shown in dotted lines in Fig. 35, indicates that the mechanism of the taximeter is in the "non-recording" status; the position of the flag shown in full lines indicates that the shaft 44 was turned to set the mechanism of the taximeter into "recording" action. The disk 47 is also fixed to the shaft 44 and five stop rollers 48 are rotatably mounted on studs 48^a screwed in the face of the disk 47. To lock the shaft 44 when turned to set the recording mechanism of the taximeter in action, we provide the hook-shaped bolt 49 and arm 51 pivoted on stud 50, and connected by spring 52 whose one end is connected by pin 53 to the arm 51 and the other by pin 54 to the bolt 49. The pin 54 is extended to ride upon the lever arm 51 when the latter is released and swung upwardly by the weight 55 set on the other free end of arm 51, whereby bolt 49 is swung away from the shaft 44, the latter being thereby set free to be turned into "non-recording" position. The yielding connection of the bolt 49 with the lever arm 51 by the spring 52 is necessary to permit the bolt 49 to be "set" in locking position before the shaft 44 is turned, for instance, when the electrical circuit, operating the shaft locking device is closed by the passenger taking a seat in the taxicab before the driver has turned the shaft 44. To prevent the arm 49 locking the shaft in this position, the segmental plate 67 is affixed to that part of disk 47 then opposite the bolt 49, which prevents the bolt 49 from snapping in and locking the shaft in that position. When the shaft 44 is then turned, the bolt 49 rides on the plate 67 in spring-pressed engagement, and then slips into the opening between the rollers 48 when the shaft 44 has been turned as far as necessary to set the mechanism of the taximeter into its "recording" position. The lever arm 51 is actuated by the solenoid 45 and the weight 55; it is drawn down when the solenoid is energized by the connecting of the electrical circuit to and from the battery 66, and is released, and drawn up, by weight 55 when the electrical circuit is broken.

The mechanism closing and breaking the electrical circuit is shown in Fig. 36. The wires 56, housed in the conduit 57, connect the terminals of the solenoid with the battery 66, conveniently housed underneath the seat of the car. The wire conduit 57 is connected to the casings of the taximeter, and to the casing 62 of our controlling device, by the flanged hollow studs 58 and 59, and the wires 56 enter the casings through the insulating collars 60 and 61. One of the wires is connected to the controller casing 62 (see Fig. 36) and the other to the binding post 63 screwed in the insulating block 64. The circuit closer consists of the spring 65, connected to the binding post 63, and the lever arm 235, shifting the jaw 14^a, is utilized as the movable contact of the circuit closer. When the clutch jaw 14^a is not in engagement with its mate 14, the circuit interrupted, the arm 235 being then held in the position indicated in dotted lines in Fig. 36—but immediately upon a passenger taking a seat in the taxicab, the battery circuit is closed by the arm 235 being thereby moved into the position shown in full lines in Figs. 9 and 36 to shift the clutch jaw 14^a in engagement with its mate 14. By this motion of the arm 235, the metallic stud 264, set therein, is brought in contact with the spring 65, the solenoid is energized, its plunger 46, connected to the lever arm 51, is drawn in, and the locking bolt 49 is set to lock the shaft 44 as explained. The drop arm 239, locking the arm 235 when the clutch is closed, also holds the stud 264 in contact

with the spring 65 so that the electrical circuit remains safely closed until the mechanism is released by the printing operation.

Our controlling device is used and operates as follows: The mechanisms of the device do not move or act, except when the clutch, connecting it with the driving gear on the front wheel of the car, is closed. This is done, automatically, when a passenger takes a seat and the mechanism of the controlling device set in motion. The clutch is locked in its closed position, and cannot be released except by turning the lever of the printing mechanism. Simultaneously with the closing of the clutch, the electric circuit is closed, the solenoid energized and draws down the lever setting the locking mechanism of the taximeter. The shaft of the taximeter is thereby locked, if it is then turned in recording position, or immediately when the driver pulls down the flag. When the car runs, the distance mechanism operates, being driven by the transmission from the front wheel of the car. When the car stops, the clockwork, driving the time mechanism, is released and records the duration of the stop. When the car is started again, the clockwork driving the time measuring mechanism is stopped. This starting and stopping of the mechanisms is repeated at every stop and start of the car as long as the controlling device is in action and until its mechanism is released as explained. When at the end of the trip, the passenger pulls the hand lever to obtain his ticket (check); the mechanism actuated by the printing operation stops the clockwork driving the time mechanism, sets the releasing and reversing mechanisms in action, unlocks the clutch of the driving shaft, whereupon the movable jaw of the clutch is removed from its engagement with its fixed mate, the electrical circuit is interrupted, and the locking mechanism in the driver's taximeter is released. The recording wheels are then returned to their zero positions, as explained, and the controlling device is then ready to be again set in action.

We claim as our invention:

1. The combination with a device for measuring the distance traveled by a vehicle, and with means for driving the mechanisms from a running gear of the vehicle, of a clutch, connecting the driving means with the mechanisms of the device, mechanism operating the clutch; and means for locking the clutch when closed; a movable seat in the vehicle, means actuating the clutch operating and the locking mechanisms by moving the seat, connected therewith; and of manually operatable mechanism releasing the clutch locking mechanism and disengaging the clutch.

2. The combination with a device for measuring the distance traveled by a vehicle and with means for driving the mechanisms of the device from a running gear of the vehicle, of movably mounted printing types and mechanism moving the types correspondingly to the distance traveled by the vehicle, operatively connected with the distance measuring device; a clutch, connecting the driving means with the mechanisms of the device; mechanism operating the clutch; a movable seat in the vehicle; means, connected therewith, actuating the clutch operating mechanisms by moving the seat; manually operatable mechanism for producing an imprint from the types as set, and of mechanism, operatively connected therewith, and actuating the mechanism operating the clutch to disconnect the driving means from the mechanism of the distance measuring device.

3. The combination with a device for measuring, indicating and recording the distance traveled by a vehicle, having its driving gears operatively connected with a running gear of the vehicle; a shaft, turnably mounted therein, and means on the shaft, controlling the operations of the measuring, indicating and recording mechanisms by turning the shaft; of a controlling device, comprising mechanism for measuring the distance traveled by the vehicle; means for driving the operating mechanisms of the controlling device from the running gear of the vehicle; a clutch, comprising a stationary and a movable part, connecting the driving means with the mechanism of the controlling device; mechanisms for shifting the movable part of the clutch in and out of engagement with the stationary part; a locking device for the shaft of the measuring, indicating and recording device; and mechanism, actuating the locking device, operatively connected with the movable part of the clutch.

4. The combination with a device for measuring, indicating and recording the distance traveled by a vehicle, having a shaft, turnably mounted therein, means on the shaft controlling the operations of the measuring, indicating and recording mechanisms by turning the shaft, and a locking device for the shaft, of a controlling device; a clutch, comprising a stationary and a movable part, connecting the driving means of the vehicle with the mechanism of the controlling device; mechanism for shifting the movable part of the clutch in and out of engagement with the stationary part; mechanism, actuating the shaft locking device, operatively connected with the movable part of the clutch; a movable seat in the vehicle, and means, connected therewith, actuating the mechanism, shifting the movable part of the clutch by moving the seat.

5. The combination with a device for measuring, indicating and recording the dis-

tance traveled by a vehicle, having a shaft, turnably mounted therein, and means on the shaft, controlling the operations of the measuring, indicating and recording mechanisms by turning the shaft; of a locking device for the shaft, and a controlling device, comprising mechanism for measuring the distance traveled by the vehicle; means for driving the operating mechanisms of the controlling device from the running gear of the vehicle; a clutch, connecting the driving means with the mechanism of the controlling device, and comprising a stationary and a movable part; mechanism moving the movable part of the clutch in and out of engagement with the stationary part, and mechanism actuating the shaft locking device, operatively connected therewith; a movable seat in the vehicle; means connected therewith, actuating the clutch operating mechanism by moving the seat; automatically acting means for locking the movable part of the clutch in engagement with the stationary part, and manually operatable mechanism for releasing the means locking the clutch.

6. In a device for measuring and indicating the distance traveled by a vehicle, the combination of means for driving the mechanisms of the device correspondingly to the speed of and distance traveled by the vehicle; movably mounted types; mechanism for moving the types correspondingly to the distance traveled, operatively connected with the distance measuring and indicating device; a time measuring device; a second set of movably mounted types; mechanism for moving said second set correspondingly to the time measuring device, means operatively connected with the time measuring device, and with means driving the mechanism of the device measuring and indicating the distance traveled by the vehicle, for arresting the operation of the time measuring device and holding it so arrested during the period of driving the distance measuring device and means for producing an impression of both sets of the types as set, and of means operatively connected therewith for automatically stopping the operation of the time measuring device.

7. The combination with a taximeter for vehicles of electrically operatable means for locking its mechanism in "recording" position, of a controlling device, comprising mechanism for measuring the distance traveled by the vehicle and means for driving its operating mechanism from the running gear of the vehicle, synchronously with, but independently from, the means driving the taximeter; an electric circuit breaker, operatively connected with the controlling device, and means for automatically operating the circuit breaker by the starting and stopping of the controlling device.

8. The combination with a device for measuring, indicating and recording the distance traveled by a vehicle, and having its driving gear connected with the running gear of a vehicle, of a controlling device, comprising mechanism for measuring the distance traveled by the vehicle; means for driving the operating mechanism of the controlling device from the running gear of the vehicle, synchronously with, but independently from, the means driving the mechanism of the device for measuring, indicating and recording the distance traveled; means connecting the mechanism of the controlling device with the means for driving it; and means, operatively connected with the controlling device and with a device for measuring, indicating and recording the distance traveled by the vehicle, for holding the measuring, indicating and recording device in its "recording" position as long as the mechanism of the controlling device is kept connected with its driving means.

9. The combination with a device for measuring, indicating and recording the distance traveled by a vehicle, and having its driving gear connected with the running gear of a vehicle, of a controlling device, comprising mechanism for measuring the distance traveled by the vehicle; means for driving the operating mechanism of the controlling device from the running gear of the vehicle, synchronously with, but independently from, the means driving the mechanism of the device for measuring indicating and recording the distance traveled; means connecting the driving means with the mechanisms of the controlling device, a movable seat in the vehicle, and means, connected therewith, for actuating the connecting means by moving the seat; and means, operatively connected with the controlling device and with a device for measuring, indicating and recording the distance traveled by the vehicle, for holding the measuring, indicating and recording device in its "recording" position as long as the mechanism of the controlling device is kept connected with its driving means.

10. The combination with a device for measuring, indicating and recording the distance traveled by a vehicle, and having its driving gear connected with the running gear of a vehicle, of a controlling device comprising mechanism for measuring the distance traveled by the vehicle; means for driving the operating mechanism of the controlling device from the running gear of the vehicle, synchronously with, but independently from, the means driving the mechanism of the device for measuring, indicating and recording the distance traveled; a clutch, connecting the driving means with the mechanisms of the controlling device, mechanism operating the clutch; and means for locking

the clutch when closed; a movable seat in the vehicle, means actuating the clutch operating and the clutch locking mechanisms by moving the seat, connected therewith; and of manually operatable mechanism, releasing the clutch locking mechanism and disengaging the clutch.

11. The combination with a device for measuring, indicating and recording the distance traveled by a vehicle, and having its driving gear connected with the running gear of a vehicle, of a controlling device comprising mechanism for measuring the distance traveled by the vehicle; means for driving the operating mechanism of the controlling device from the running gear of the vehicle, synchronously with, but independently from, the means driving the mechanism of the device for measuring, indicating and recording the distance traveled; a clutch, connecting the driving means with the mechanisms of the controlling device, mechanism operating the clutch; and means, operatively connected with the controlling device and with a device for measuring, indicating and recording the distance traveled by the vehicle, for holding the measuring, indicating and recording device in its "recording" position as long as the mechanism of the controlling device is kept connected with the driving means.

12. The combination with a device for measuring, indicating and recording the distance traveled by a vehicle, and having its driving gear connected with the running gear of a vehicle, of a controlling device comprising mechanism for measuring the distance traveled by the vehicle; means for driving the operating mechanism of the controlling device from the running gear of the vehicle, synchronously with, but independently from, the means driving the mechanism of the device for measuring, indicating and recording the distance traveled; a clutch, connecting the driving means with the mechanisms of the controlling device; a movable seat in the vehicle, means for closing the clutch by moving the seat operatively connected therewith; means, operatively connected with the clutch for holding the measuring, indicating and recording device in its "recording" position when the clutch is closed, and manually operatable mechanism for opening the clutch.

13. The combination with a device for measuring, indicating and recording the distance traveled by a vehicle, having its driving gears operatively connected with a running gear of the vehicle, of a controlling device comprising movably mounted types and mechanism moving the types; means for driving the operating mechanism of the controlling device, synchronously with, but independently from, the means driving the mechanism of the device for measuring, indicating and recording the distance traveled; means for connecting the mechanism of the controlling device with the driving means, and means operatively connected therewith and with the mechanism of the device for measuring, indicating and recording the distance traveled, for holding the latter in its "recording" position while the mechanism of the controlling device is held connected with its driving means; manually operatable mechanism for producing an imprint from the types as set, and of mechanism, operatively connected therewith, and disconnecting the mechanism of the controlling device from the driving means and releasing the measuring, indicating and recording device from its recording position, upon producing an imprint of the types.

MAX KUHN.
RAPHAËL NETTER.

Witnesses:
R. A. PIPER,
AGNES F. MADDEN.

Corrections in Letters Patent No. 1,046,808.

It is hereby certified that in Letters Patent No. 1,046,808, granted December 10, 1912, upon the application of Max Kuhn and Raphaël Netter, of New York, N. Y., for an improvement in "Controlling Devices," errors appear in the printed specification requiring correction as follows: Page 6, line 122, for the reference-num ral "11" read *111;* page 11, line 79, for the reference-numeral "389" read *289;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of January, A. D., 1913.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.