L. B. SPENCER.

SELECTIVE MECHANISM.

APPLICATION FILED OCT. 29, 1908.

929,043.

Patented July 27, 1909.

2 SHEETS—SHEET 1.

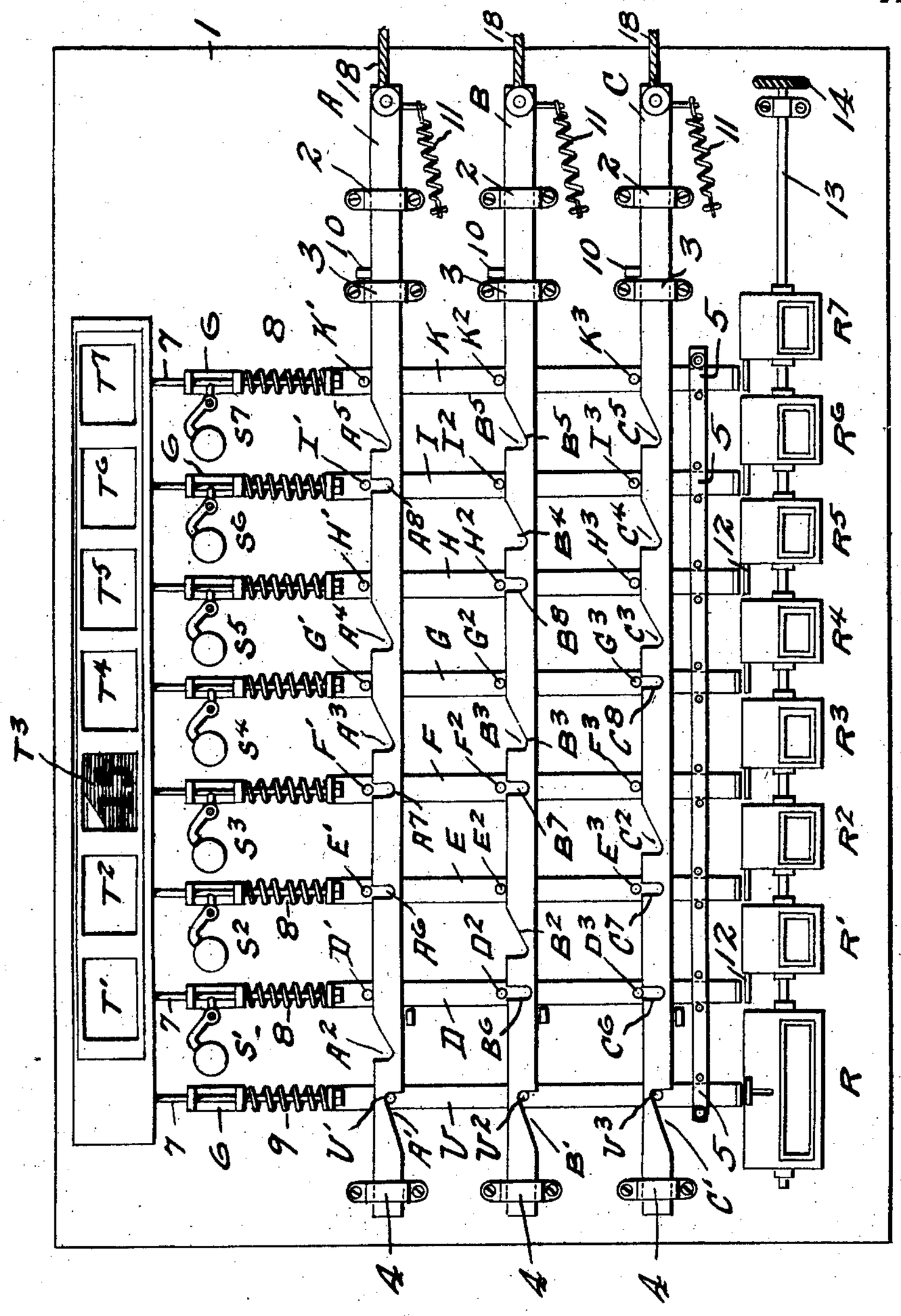

FIG. 1.

WITNESSES

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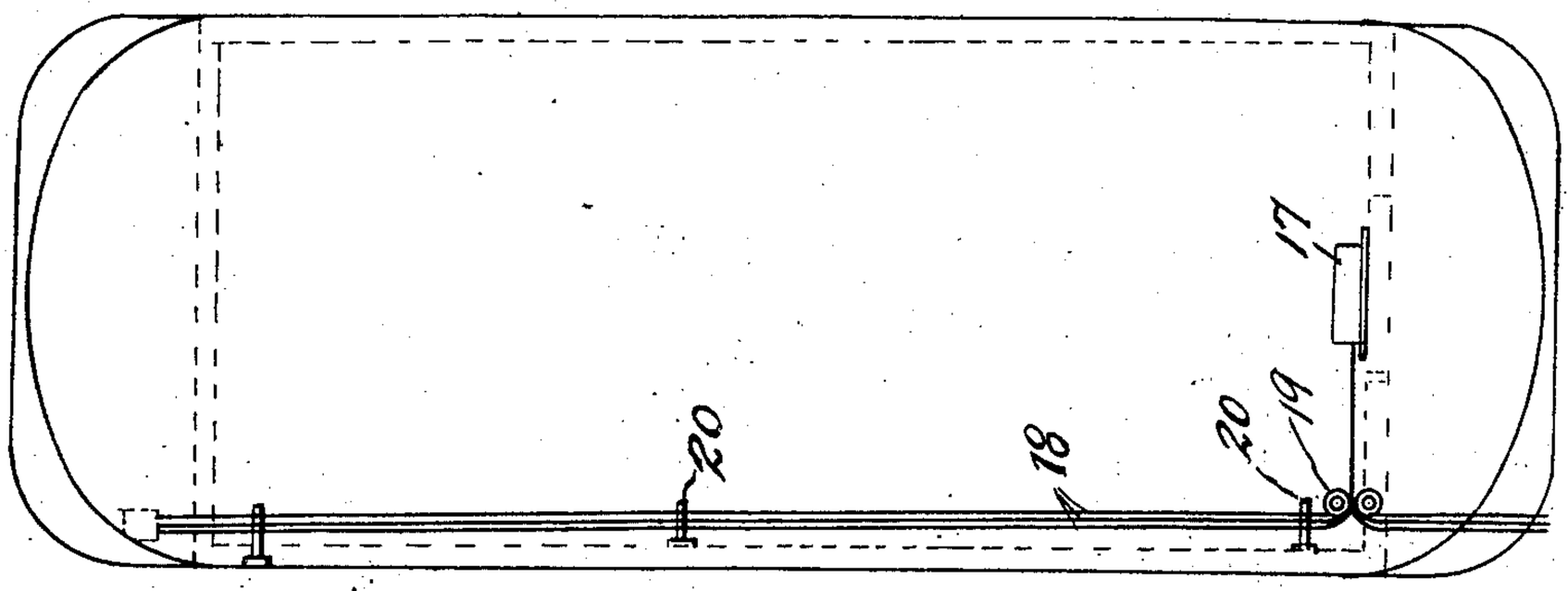

FIG. 4.

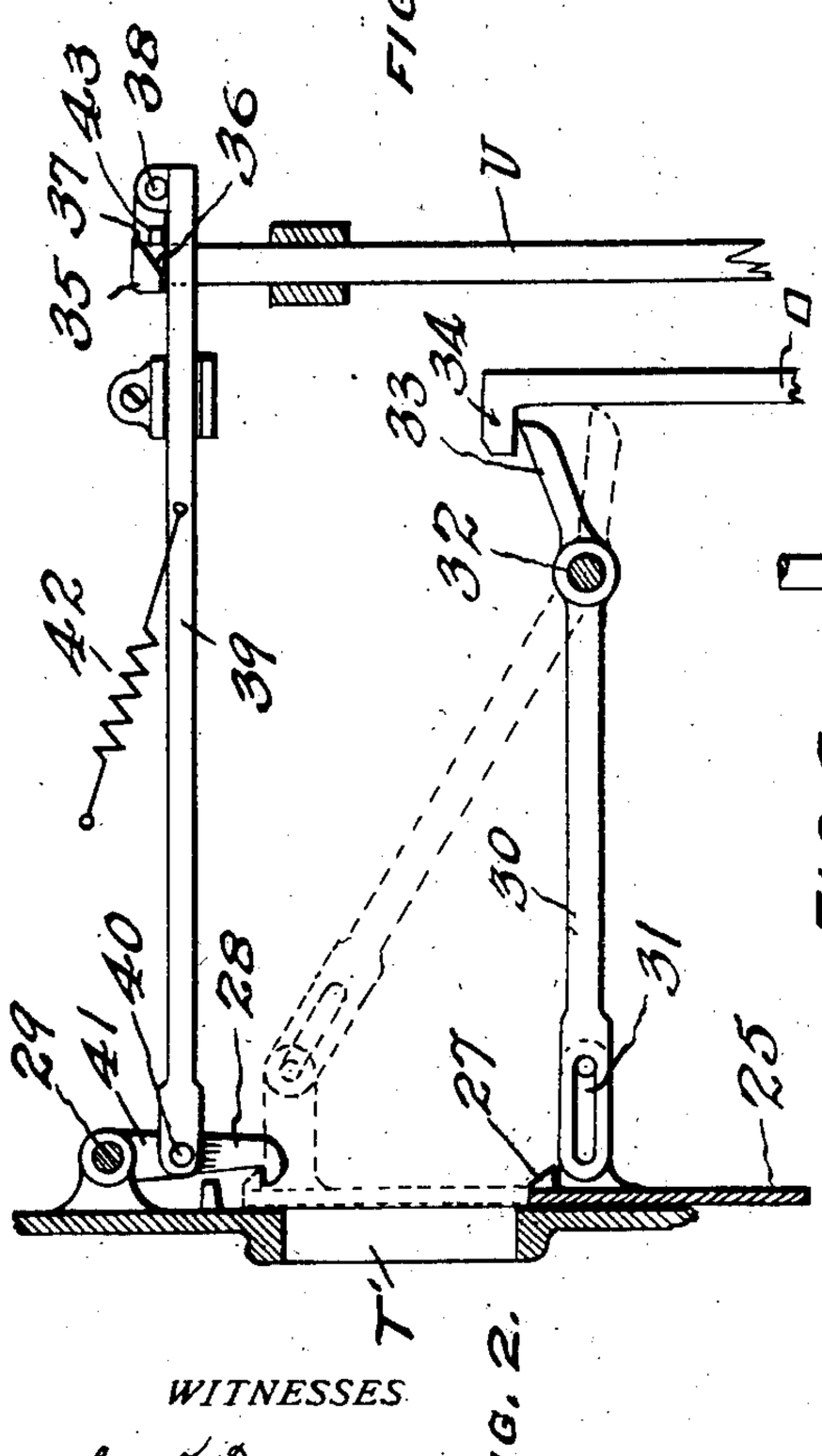

FIG. 2.

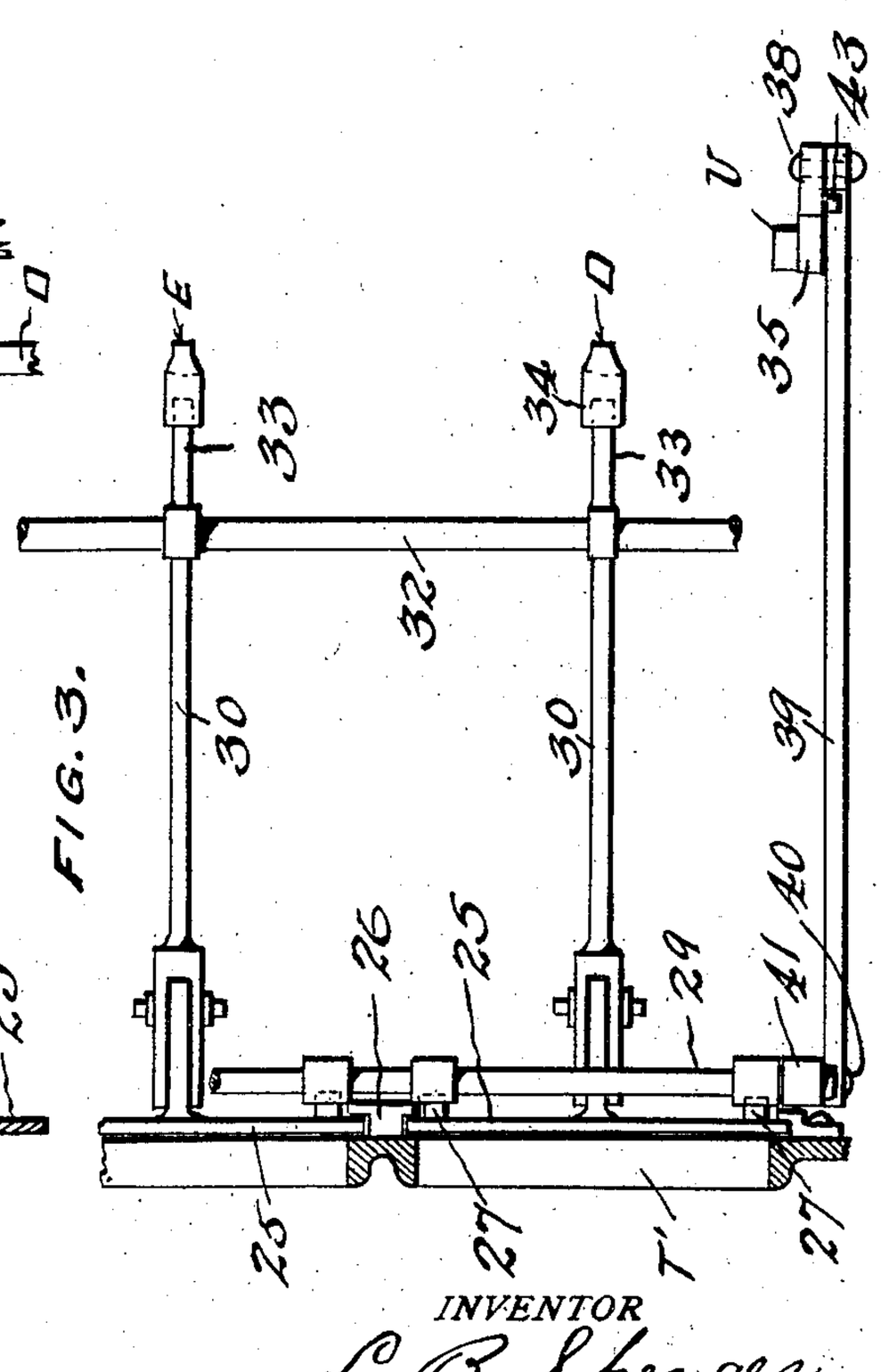

FIG. 3.

WITNESSES

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SELECTIVE MECHANISM.

No. 929,043. Specification of Letters Patent. Patented July 27, 1909.

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To all whom it may concern:

Be it known that I, LOUIS B. SPENCER, a citizen of the United States, and resident of Ogden, in the county of Weber and State of Utah, have invented certain new and useful Improvements in Indicating Mechanism, of which the following is a specification.

My invention relates primarily to indicating mechanism by means of which a certain number of operating devices may selectively control a greater number of indicators, sometimes called operated devices. For instance, with three operating devices seven operated devices may be selectively controlled and the mechanism may be constructed and arranged so that when one of the operated devices has been actuated by movement of the corresponding one or more of the operating devices, none of the other operated devices may be moved until the one in active position has been returned to inactive position.

In addition to the selective mechanism which in itself is capable of widely varying uses my invention includes indicating mechanism proper and operating mechanism by which the selective mechanism is controlled from a distance.

While the invention as a whole is capable of other uses, it is here exemplified as applied to fare registers for interurban railroad cars in which a number of different classes of fares are to be recorded. Previously constructed registers for this service have generally included a setting device which is first adjusted in accordance with the class of fare to be registered and an operating device which is then acted upon to make the actual registration. In distinction from such construction my invention provides no setting device but a plurality of operating members, one or more of which are acted on simultaneously and serve by means of the selective mechanism not only to select the class of fare which is to be registered, but to effect in practically the same operation the registration itself.

More specifically, the operating mechanism consists in a convenient form of the invention, of three cords running close together in the position in which the single cord is generally placed, and capable of being extended to other cars or to the platforms in the ordinary manner. These cords are generally arranged parallel in a horizontal plane so that after the conductor once becomes familiar with their positions and with the different combinations of cords corresponding to the different classes of fares, the register can be worked with great accuracy and rapidity. Evidently, the loss of time occasioned in other classes of registers in having to first manipulate a setting device is by my invention entirely obviated.

The drawing is a diagram illustrating one way in which the invention may be carried out but it is to be understood that the invention is capable of embodiment in different forms.

Figure 1 is a general diagram of the selective mechanism. Fig. 2 is a sectional diagram of one form of visual indicating mechanism. Fig. 3 is a plan of the mechanism of Fig. 2, and Fig. 4 is a detail view showing the invention in use in connection with a fare register.

Selective mechanism.—Referring to Fig. 1, reference character 1 designates a bed plate on which are reciprocably mounted in suitable guides 2, 3 and 4, bars A, B and C, which constitute in the present exemplification the operating devices. Three devices are used for illustration but any convenient plurality of operating devices may be employed. Bars D, E, F, G, H, I and K constitute in this exemplification the selectively operated devices. They are arranged to reciprocate at right angles to bars A, B and C in suitable guides 5, 6. In addition, there is a universal operated device, common to all the operating bars, exemplified by bar U arranged similarly to the other operated devices in similar guides. The operated bars terminate in rods 7 which pass through guides 6. Bars D, E, F, G, H, I and K are provided with springs 8 compressed between guides 6 and the bars and serving to urge the bars downward. Universal bar U is provided with a tension spring 9 connected to the bar and its guide 6 serving to urge the bar upward. The operating bars A, B and C are provided with lugs 10 moving between guides 2 and 3, serving to limit the motion of the bars and springs 11 connected to the bars and the bed plate urge the bars to the left so that normally the lugs engage guides 3 and the parts are in the position shown in Fig. 1.

The construction and operation of the "common" or universal bar will be disregarded for the present and the construction and operation of the selectively operated de-

vices will be further explained. The selectively operated bars D, E, etc., are provided each with three pins D′, D², D³, E′, E², E³, etc. Operating bars A, B and C are provided respectively each with four cam notches A², A³, A⁴, A⁵, B², B³, B⁴, B⁵, etc., also with three slots A⁶, A⁷, A⁸, B⁶, B⁷, B⁸, etc., respectively.

When one of the operating bars, A, for instance, is pulled its cam notches come opposite the pins on the operated bars and such of the bars as are not restrained by other means are free to descend under influence of their springs 8, pins D′, G′, H′, etc., descending into the cam-notches until they reach the bottom thereof. Since it is generally desirable to arrange the mechanism so that only one of the operated devices may be moved at a time, in the present exemplification all of the operated bars except one are held up against the action of their springs when one or any group of the operating bars is pulled. When the pull on the operating bar is released it moves again to the left under influence of its spring 11 and the cam-notch forces upward the pin which has dropped into it, restoring the corresponding bar to normal position against the influence of its spring. The down and up stroke of the operated bar constitutes, in this exemplification, the cycle of its movements and the movement of the operated device is used for any useful purpose as will appear later.

It will be noted that there are seven operated bars employed in connection with three operating bars and these correspond with the possible number of groupings of the operating bars as follows: A alone; B alone; C alone; A and B; A and C, B and C; A, B and C. In this exemplification, the mechanism is arranged so that one operated bar corresponds to each of the foregoing groups of operating bars and so that upon pulling one group of operating bars only the corresponding operated bar will move. Supposing that one operating bar, for example A, remains stationary, and the other two are pulled, it is evident that three combinations may be made. Three operated bars, therefore, must be controlled by operating bars B and C, and four other operated bars are inoperative so far as bars B and C are concerned. In this case, the operated bars controlled by operating bars B and C are E, F and I. Slot A⁶ in bar A is therefore arranged directly beneath pin E′ on bar E; slot A⁷ is below pin F′ and slot A⁸ is below pin I′. Bars E, F and I are, therefore, free to fall and rise without interference by bar A. All the other operated bars D, G, H and K are, however, prevented from movement by the corresponding pins D′, G′, H′, and K′ resting upon an unbroken portion of bar A. Considering any other group of two operating bars, it will be found that they selectively control three operated bars and, therefore, that each operating bar is arranged, so far as its slots are concerned, to permit movement of three of the operated bars and to restrain four of the operated bars from movement.

It will be observed that two of the pins of each of three of the operated bars are in normal position opposite slots in the two corresponding operating bars and that the other one of the pins on these operated bars is opposite solid parts of the operating bars. This is the case with bars D, E and F. The pin D′ on bar D is opposite a solid part of bar A and the other two pins are opposite slots; pin E² on bar E is opposite a solid part on bar B and the other two parts are opposite slots; while pin F³ on bar F is opposite a solid part of the bar C and the other two pins are opposite slots. These bars D, E and F are, therefore, the ones controlled by the movement of a single one of the operating bars. For example, if bar A is pulled, cam-notch A² comes opposite pin D′ and the pin which was previously opposite a solid part of the bar drops into the notch, permitting operated bar D to descend under influence of its spring, pins D² and D³ meantime entering slots B⁶ and C⁶, respectively. Similar, if bar B or bar C is pulled, operated bar E or F, respectively, will drop. Upon permitting the operating bar to return to its normal position, the corresponding operated bar is returned to normal position, as has been described. Only one of the operating bars adjacent to bar D, bar E or bar F, is provided with a cam-notch since for the movement of bar E, D or F, it is only necessary to bring a cam-notch in line with the single pin on that bar which is normally opposite a solid part of the corresponding operating bar. It will be found that a single one of the pins on each of three other of the operated bars is opposite a slot, while two of the pins on each of these operated bars is opposite a solid part of the corresponding operating bar. Thus bar G has pins G′ and G² opposite solid parts of bars A and B while pin G³ is opposite slot C⁸ in bar C; pins H′ and H² of bar H are opposite solid parts of bars A and C while pin H² is opposite slot B⁸ in bar B and pins I² and I³ of bar I are opposite solid parts of bars B and C, while pin I′ is opposite slot A⁷ of bar A. These operated bars G, H and I are to act only upon the simultaneous movement of two of the operating bars. Therefore, two of the three operated bars at points adjacent to bars G, H and I are provided with cam notches and these notches are upon the operating bars which present a solid face to the adjacent pins of the operated bars. Thus, bars A and B have cam-notches A³, B³ adjacent to pins G′, G² of bar G while there is no cam-notch on bar C adjacent to the pin G³. A similar arrangement is found with respect to bars

H and I. Supposing it is desired to actuate bar G it is evidently impossible to do this by pulling operating bar A alone, since although cam-notch A^3 will come opposite pin G′, pin G^2 will remain opposite a solid part of bar B and bar G cannot drop. To move bar G operating bars A and B are pulled together bringing cam-notches A^3, B^3 simultaneously opposite pins G′, G^2, respectively, and bar G thereupon drops under influence of its springs, since its other pin G^3 is opposite slot C^8. Therefore, operated bar G corresponds to operating bars A and B, and it will be evident, similarly, that bar H corresponds to bars A and C and bar I corresponds to bars B and C. On pulling bars A, B or C in groups of two, therefore, the corresponding operated bar G, H or I will drop and rise again when the operating bars are released as before explained. The remaining one, K, of the operated bars is to be actuated by simultaneous movement of all three of the operating bars. Therefore, the pins K′, K^2 and K^3 of bar K are all opposite solid parts of bars A, B and C, and each of bars A, B and C, is provided adjacent to the corresponding pin with a cam-notch A^5, B^5, C^5, respectively. Evidently, the pulling of any one or two of the operating bars is ineffective to move bar K, but when all three bars A, B and C are pulled together all the cam-notches come opposite the corresponding pins of bar K and the bar drops under its spring-pressure and is returned again to normal position by the release of the operating bars.

It is desirable to arrange the mechanism so that when one group of operating devices is pulled, even a short distance, it shall be impossible to pull any other group before the action required of the first group is completed. This becomes of great importance, when, for instance, the selective mechanism is employed to convey signals to an engine operator. When this provision is made it will be impossible for two signals to be placed before the operator simultaneously. Turning to the drawing, it will be found as soon as any bar or group of bars, for instance, considering a single bar A, is pulled, the corresponding operated bar drops into cam A^2 and at the same time pins A^2 and D^3 drop into corresponding slots B^6, C^6 in the other operating bars B and C. So long as bar D remains even slightly depressed, therefore, it is impossible to pull operating bars B and C and bar A and its corresponding operated bar D must return to normal position before another group of operating bars can be actuated. These conditions will be found to exist with respect to any other combination of the operating bars.

Universal bar U is provided with pins U′, U^2, U^3, normally resting in cam notches A′, B′, C′ in operating bars A, B and C, respectively, and these cam notches are arranged to act oppositely to the cam-notches A^2, B^2, etc., employed in connection with the selectively operated bars. Spring 9, as has been noted, is a contractile spring and therefore holds the universal bar normally in the position indicated. Upon pulling any one or more of the operating bars, the corresponding cam notch or notches A′, B′ or C′ force down its pin U′, U^2 or U^3, thus pulling down the universal bar. Release of the operating bars permits return of the universal bar to its normal position in an obvious manner.

Some of the uses of my selective mechanism will now be described.

Operating mechanism.—Fig. 4 is a diagram of a car in which the register 17 containing the selective mechanism and other indicating mechanism which will be described is mounted at one end in the usual position. The operating bars A, B, C, are each connected to one of the three cords 18 as also shown in Fig. 1. The cords pass over guide-pulleys 19 and after passing the pulleys may be spliced as shown, to form branches leading to the platform or to the other cars. Within the car the ropes pass back through guides 20 arranged in the usual position at convenient height, each guide having three separated eyes to space the cords apart. Evidently, after learning the combinations of cords corresponding to the different classes of fares, the conductor may rapidly select the proper cords by the sense of touch and effect the registrations with great rapidity and accuracy. The horizontal arrangement of the cords permits them to be easily grasped by different fingers.

So far as I am aware it has never been proposed previous to my invention to operate fare registers by means of a plurality of operating cords or other devices extending to a point distant from the register and which are to be acted on in different groups and by one action serve to both select the class of fare to be registered and to effect the desired registration.

Any suitable devices which can be used at any part of the car can be substituted for cords. For instance, three rock shafts provided with handles and each similar to the single shafts now generally used for fare registers may be employed. So far as I am aware, however, the cords are the most convenient operating devices which can be used.

Indicating mechanism.—As shown in the drawing, the bed plate 1 is provided at the top with a box containing apertures T′ to T^7, inclusive, for the display of movable targets such as are used in fare registers. A target is shown in aperture T^3. The targets are to be set up by the fall and rise of the corresponding operated bars by any suitable mechanism. A representative target actuating mechanism will now be described.

(See especially Figs. 2 and 3). The targets 25 are arranged to reciprocate in guides 26. Each target is provided with one or more hooks 27 and these hooks are adapted to be engaged by latches 28 pivotally mounted on rod 29 near the top of the casing. Latches 28 are rigidly connected to the rod so that they move in unison. Each target is provided with a setting lever 30 connected to the target by a pin and slot connection 31 and fulcrumed on a rod 32. The rear end 33 of each lever 30 is engaged by a projection 34 on the upper end of the corresponding one of the operated bars D, E, F, etc. The common or universal operated bar U also extends up into the target casing and is provided at its upper end with a cam 35 engaging a cam face 36 carried by a flap 37 which is pivoted at 38 to a link 39. The link is reciprocably mounted in suitable guides and is connected at 40 to arm 41 rigidly mounted on rod 29. A spring 42 urges link 39 to the left and serves also to urge latches 28 into engagement with hooks 27 on the targets. Flap 37 is provided with a projection 43 resting normally upon link 39. When any one of the operating bars is pulled the corresponding operated bar D, E, F, etc., is depressed and its projection 34 acting on arm 33 of the corresponding lever 30 causes the other arm of the lever to rise and carry up the appropriate target until hook 27 engages the corresponding latch 28. When the operating bar returns to normal position the operated bar rises again, leaving the target and its lever in elevated position under the retention of latch 28. At each registering operation, the universal bar U also descends. As it does so its cam 35 forces cam face 36 of flap 37 to the right as viewed in Fig. 2, thus moving link 39 and retracting all the latches 28 from their normal position. The cams 35, 36 are so arranged that this retracting movement of the latches occurs during the first part of the downward stroke of the operated bars. As soon as the upper edge of cam 35 passes the lower edge of cam 36, link 39 goes back to normal position under influence of spring 42, returning latches 28 to normal position, ready to engage the hooks 27 of any one of the targets which is elevated by one of the selectively operated bars. When universal bar U returns upward to normal position the upper face of cam 35 elevates the flap 37 until cam 35 passes it, whereupon the flap drops back to normal position ready for reëngagement by cam 35. From the foregoing, it is apparent that at every registering action of the selective mechanism the universal bar U and connected parts serve to clear the register by permitting whatever target was in position to drop out of sight.

The targets 25 are representative of any indicating device which may be connected with the selectively operated bar. Each of the selectively operated bars may also be provided with audible signals such as $8'$ to 8^7. Suitable striking mechanism, the details of which are not of consequence, is provided so that the movement of each operated bar causes the striking of the corresponding bell. The bells may be of different tones or multi-stroke mechanism may be provided so that the movement of each of the operated bars causes a distinctive number of strokes to be made on its bell. The selective mechanism may also be arranged to operate counting devices R', R^2, R^3, R^4, R^5, R^6, R^7, which are shown secured to the bed plate 1. Each of the counting devices is provided with a lever 12 or other suitable device to be acted on by one of the operated bars. Counting devices R' to R^7, inclusive, correspond respectively to selectively operating bars D to K inclusive. It is evident that upon depression of any operated bar the lever of the corresponding counting machine will be depressed and a unit thereby added to the indication of the counter. The counting machine R provided for the universal bar is of greater capacity than the individual counting devices and it registers on every stroke of the operating bars. Reset mechanism consisting of a rod 13 and knob 14, or any other suitable devices, may be provided to simultaneously reset the numbering machines and these may be provided, if desired, with the customary trip and total counters so that only the trip counter need be reset.

Evidently, the invention above described is capable of being carried out in different ways and I, therefore, contemplate many and wide changes in the particular structures shown and described.

When the word "group" is used in regard to operating devices, it is intended to mean either one or more than one of the operating devices which may be moved at the same time. In the exemplifying structure herein described there are seven groups of operating devices. When it is stated that an operated device corresponds to one of the groups of operating devices it is meant that this operated device moves only in response to the movement of that one group of operating devices.

I claim:

1. In selective mechanism, a plurality of operating devices, a greater plurality of selectively operated devices, each corresponding to a different one of the groups in which the operating devices may be actuated and means by which movement of any group of the operating devices causes movement of the corresponding operated device.

2. In selective mechanism, a plurality of operating devices, a greater plurality of selectively operated devices, each correspond-

ing to a different one of the groups in which the operating devices may be actuated and means by which movement of any group of the operating devices causes movement of the corresponding operated device and of the corresponding one only.

3. In selective mechanism, the combination of a plurality of operating devices, a greater plurality of selectively operated devices each corresponding to a different one of the groups in which the operating devices may be actuated, a common operated device and means by which movement of any group of the operating devices causes movement of the corresponding selectively operated device and at the same time causes movement of the common operated device.

4. In selective mechanism, the combination of a plurality of operating devices, a greater plurality of selectively operated devices each corresponding to a different one of the groups in which the operating devices may be actuated, a common operated device and means by which movement of any group of the operating devices causes movement of the corresponding selectively operated device and of the corresponding one only and at the same time causes movement of the common operated device.

5. In selective mechanism, a plurality of operating devices, a greater plurality of selectively operated devices, each corresponding to a different one of the groups in which the operating devices may be actuated, means by which movement of any group of the operating devices causes movement of the corresponding operated device, and an indicator actuated by each of the selectively operated devices.

6. In selective mechanism, a plurality of operating devices, a greater plurality of selectively operated devices, each corresponding to a different one of the groups in which the operating devices may be actuated, means by which movement of any group of the operating devices causes movement of the corresponding operated device and of the corresponding one only, and an indicator actuated by each of the selectively operated devices.

7. In selective mechanism, the combination of a plurality of operating devices, a greater plurality of selectively operated devices each corresponding to a different one of the groups in which the operating devices may be actuated, a common operated device, means by which movement of any group of the operating devices causes movement of the corresponding selectively operated device and at the same time causes movement of the common operated device, and an indicator actuated by each of the selectively operated devices.

8. In selective mechanism, the combination of a plurality of operating devices, a greater plurality of selectively operated devices each corresponding to a different one of the groups in which the operating devices may be actuated, a common operated device, means by which movement of any group of the operating devices causes movement of the corresponding selectively operated device and of the corresponding one only and at the same time causes movement of the common operated device, and an indicator actuated by each of the selectively operated devices.

9. In registering mechanism, the combination of selective mechanism including a plurality of operating devices, a plurality of indicating devices greater in number than the operating devices and operating mechanism including a member connected to each operating device, extending to a point distant from the selective mechanism by means of which the operating device may be controlled.

10. In registering mechanism, the combination of a plurality of operating members which may be acted upon at a plurality of comparatively distant points, a plurality of indicators greater in number than the operating members, and mechanism intermediate the operating members and the indicators by which any one of the indicators may be actuated by the movement of an appropriate group of the operating members.

11. The combination of a register, selective mechanism therein, including a plurality of operating bars, and a greater plurality of indicators and a plurality of cords, one connected to each of the operating bars and extending substantially parallel to a considerable distance from the register.

12. The combination of a register, a plurality of operating bars therein, a cord connected to each operating bar, the cords extending through suitable guides to a point considerably distant from the register, a plurality of indicators greater in number than the operating bars and selective mechanism intermediate the bars and the indicators by which the indicators are selectively controlled upon pulling the cords in different combinations.

13. The combination of a registering machine operated by two or more ropes, in which these ropes when pulled separately each register separately within the machine and when pulled in combination with another rope or ropes register differently and separately within the machine from that which they register when pulled alone.

14. The combination of a plurality of operating devices which may be moved in any of their possible groupings, operated devices equal in number to the possible groupings of the operating devices, each of the operated devices corresponding to and moving only in accordance with the movement of one of said groups of operating devices, and means by

which movement of any group of operating devices causes movement of its operated device only.

15. The combination of a plurality of operating devices which may be moved in any of their possible groupings, operated devices equal in number to the possible groupings of the operating devices, each of the operated devices corresponding to and moving only in accordance with the movement of one of said groups of operating devices, means by which movement of any group of operating devices causes movement of its operated device only, and means by which after any group of operating devices has been slightly moved no other group may be moved until after the one-first-mentioned returns to normal position.

16. The combination of a plurality of operating devices which may be moved in any of their possible groupings, operated devices equal in number to the possible groupings of the operating devices, each of the operated devices corresponding to and moving only in accordance with the movement of one of said groups of operating devices, means by which movement of any group of operating devices causes movement of its operated device only, and a common operated device moving on each movement of any group of the operating devices and an indicating device actuated by the common operated device.

17. The combination of a plurality of operating devices provided with cams, a greater plurality of operated devices provided with cam followers, the cams and followers being arranged so that on movement of any group of operating devices only one and always the same one of the operating devices is moved and an indicating device actuated by each of the actuated devices.

18. The combination of a plurality of operating devices provided with cams, a greater plurality of operated devices provided with cam followers, the cams and followers being arranged so that on movement of any group of operating devices only one and always the same one of the operated devices is moved, stops on the operated devices, the operating devices being provided with slots for the stops, said stops and slots serving after any group of operating devices is slightly moved to prevent movement of any other of the operating devices until the group mentioned returns to normal position, and an indicating device actuated by each of the actuated devices.

19. The combination of a plurality of operating devices provided with cams, a greater plurality of operated devices provided with cam followers, the cams and followers being arranged so that on movement of any group of operating devices only one and always the same one of the operated devices is moved an indicating device actuated by each of the actuated devices, a common operated device, means by which said common device is moved when any group of operating devices is moved and an indicating device actuated by the common operated device.

20. The combination of a plurality of operating devices provided with cams, a greater plurality of operated devices provided with cam followers, the cams and followers being arranged so that on movement of any group of operating devices only one and always the same one of the operated devices is moved, stops on the operated devices, the operating devices being provided with slots for the stops, said stops and slots serving after any group of operating devices is slightly moved to prevent movement of any other of the operating devices until the groups mentioned returns to normal position, an indicating device actuated by each of the actuated devices, a common operated device, means by which said common device is moved when any group of operating devices is moved and an indicating device actuated by the common operated device.

21. The combination of selective mechanism comprising a plurality of operating devices to be moved singly or in any of their possible groupings, indicating devices greater in number than the operating devices to be selectively actuated thereby and operating cords corresponding in number to the operating devices running from the operating devices to a distant point and supported in substantially parallel horizontal arrangement.

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Witnesses:
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J. H. MILLER.