J. M. DALY.

COMPUTING MACHINE.

APPLICATION FILED JUNE 7, 1909.

994,823. Patented June 13, 1911.

5 SHEETS—SHEET 1.

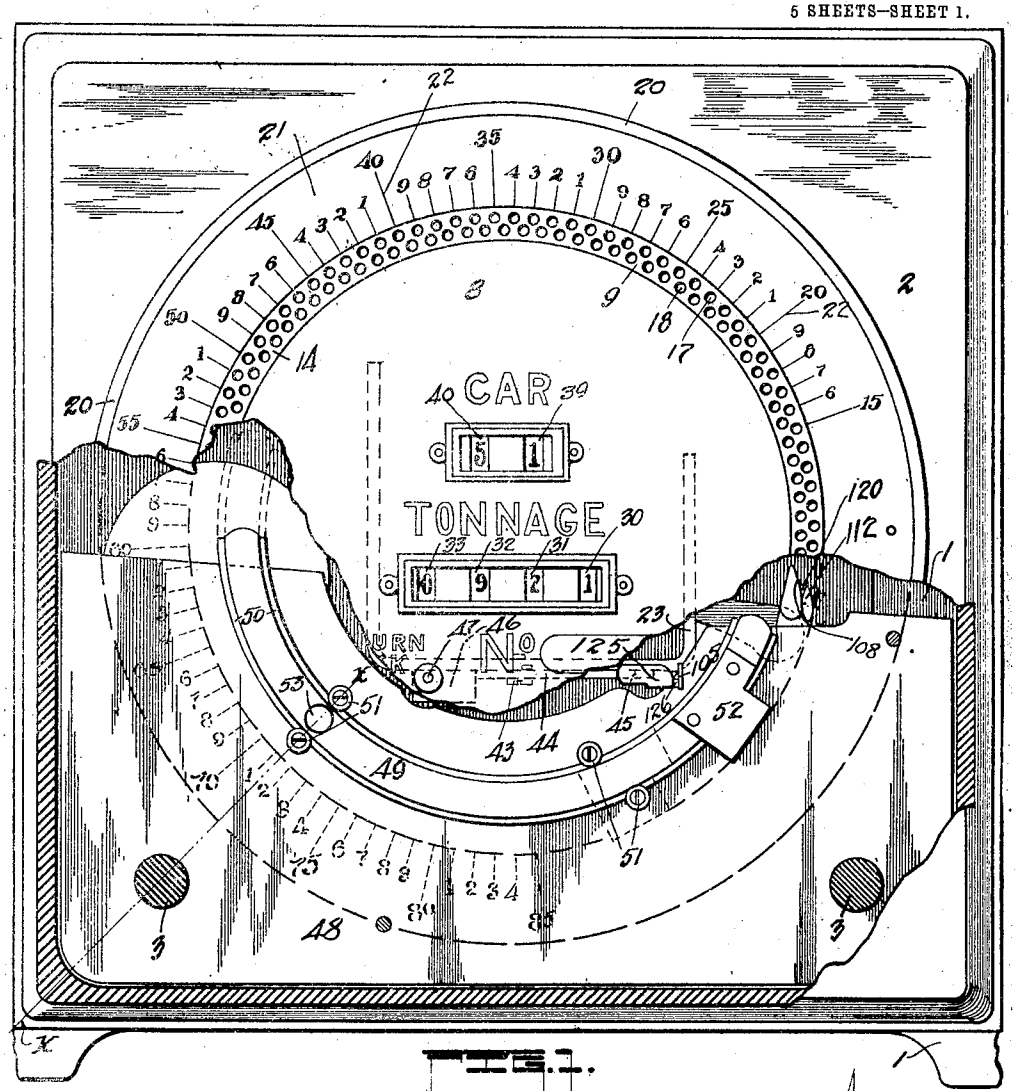


FIG. 1.

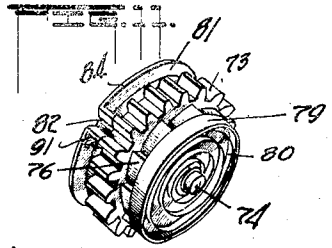


FIG. 3.

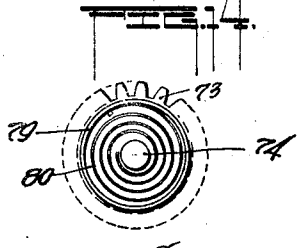


FIG. 4.

Witnesses:—
Miles C. Fuller
D. A. Wilson.

Inventor
John M. Daly
By Chas. F. Wood Pate
Atty.

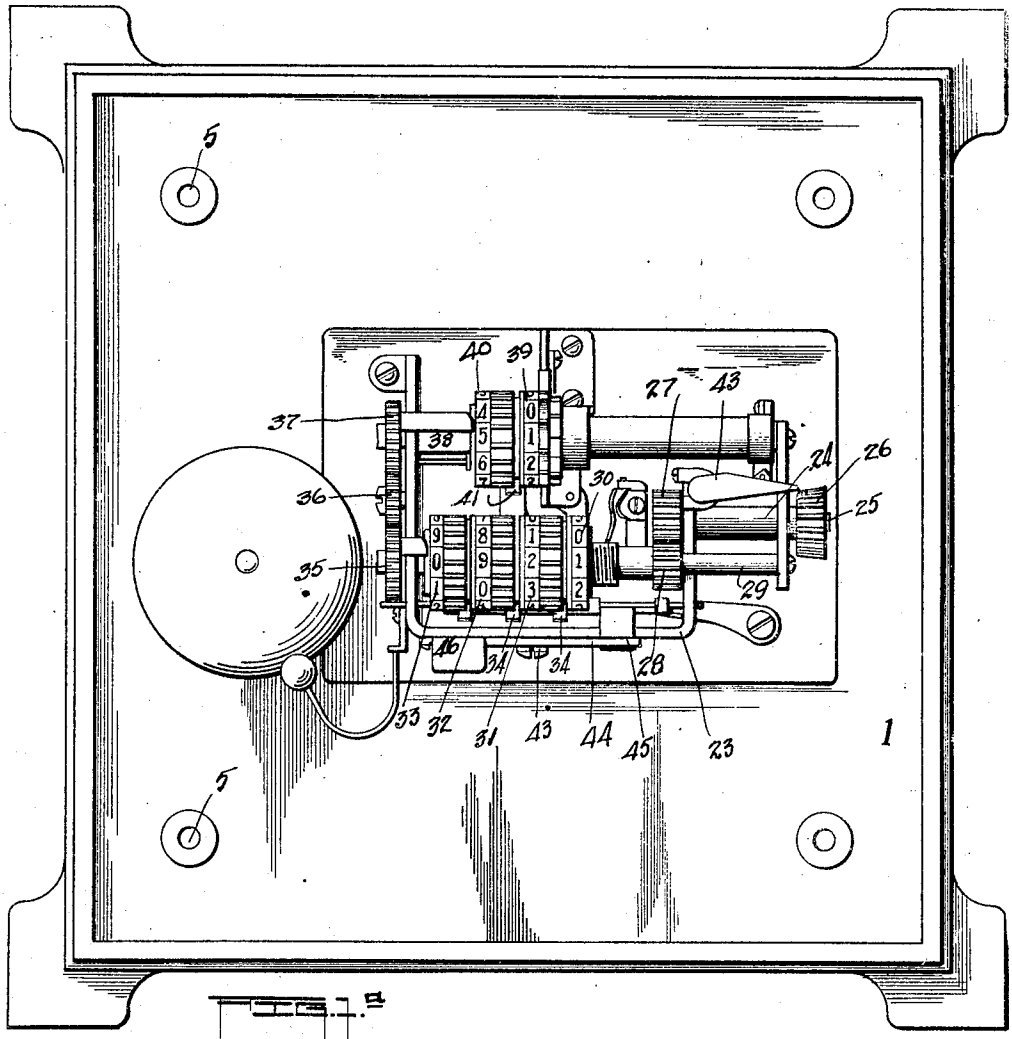
J. M. DALY.

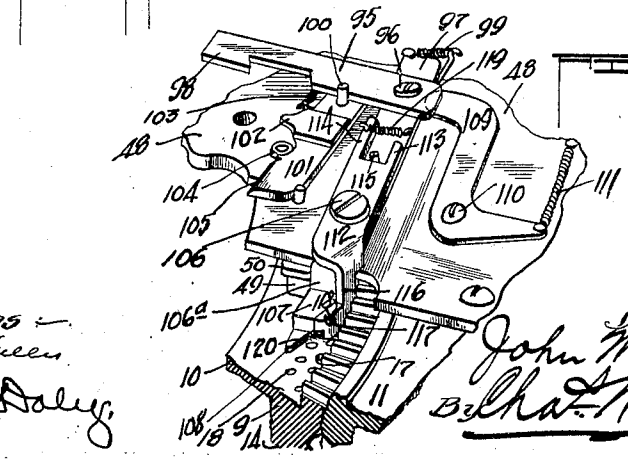
COMPUTING MACHINE.

APPLICATION FILED JUNE 7, 1909.

994,823. Patented June 13, 1911.

5 SHEETS—SHEET 2.





Witnesses:—
Thos. G. Green
Louis S. Daly.

Inventor
John M. Daly
By Chas. A. LaPorte
Atty

J. M. DALY.

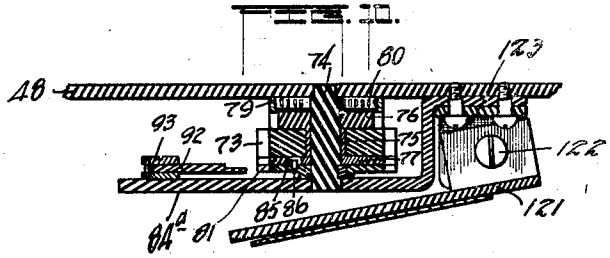
COMPUTING MACHINE.

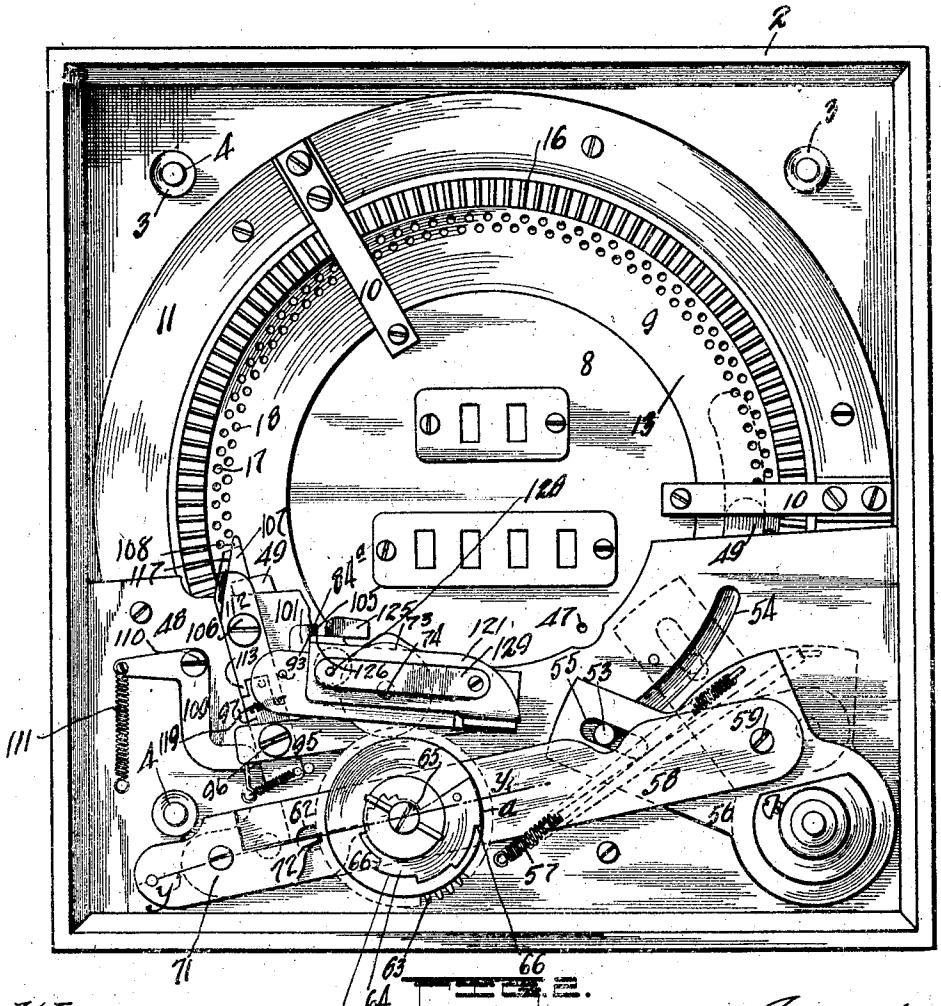
APPLICATION FILED JUNE 7, 1909.

994,823.

Patented June 13, 1911.

5 SHEETS—SHEET 3.





Witnesses:
Mina C. Green
D. A. Wilson

Inventor
John M. Daly
By Chas. N. LaPorte
Atty.

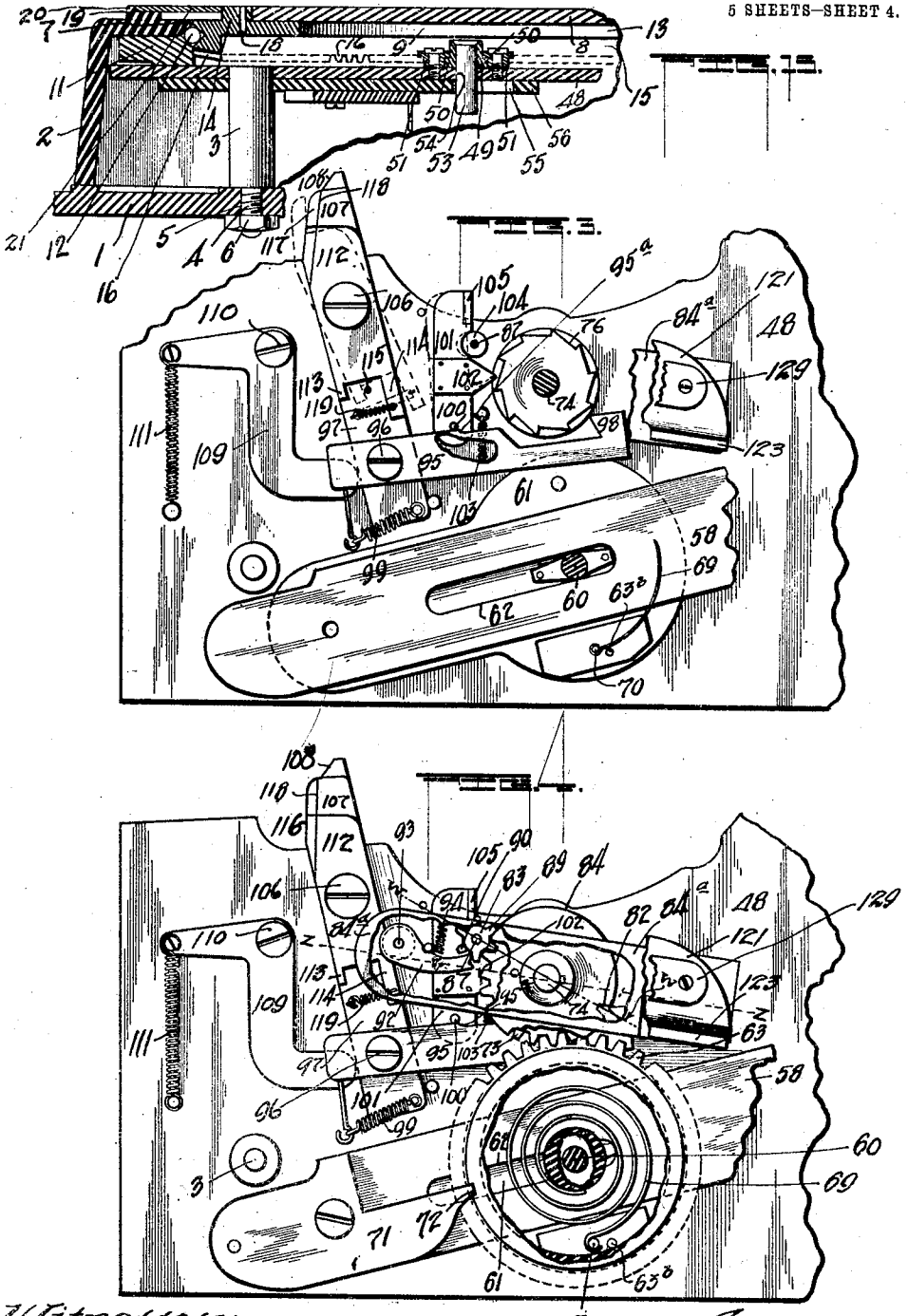
J. M. DALY.

COMPUTING MACHINE.

APPLICATION FILED JUNE 7, 1909.

994,823. Patented June 13, 1911.

5 SHEETS—SHEET 4.



Witnesses:
Miles C. Fuller
D. A. Wilson

Inventor
John M. Daly,
By Chas. H. Corbett
Atty.

J. M. DALY.

COMPUTING MACHINE.

APPLICATION FILED JUNE 7, 1909.

994,823. Patented June 13, 1911.

5 SHEETS—SHEET 5.

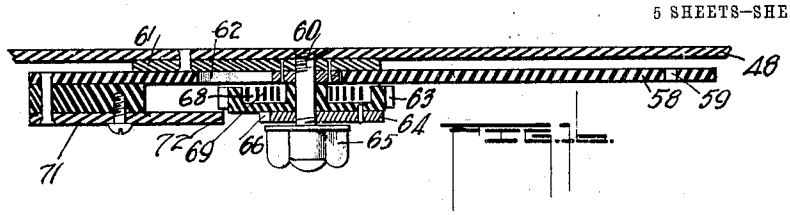


FIG. 1.

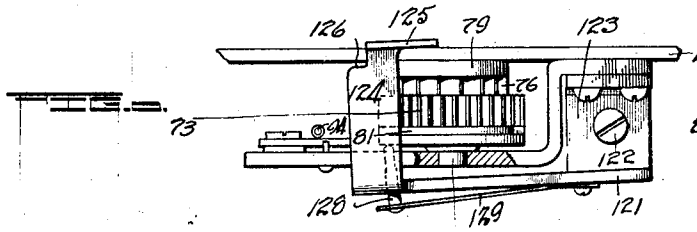


FIG. 12.

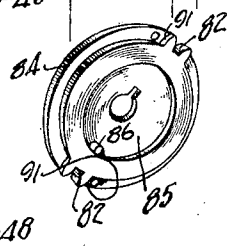


FIG. 7.

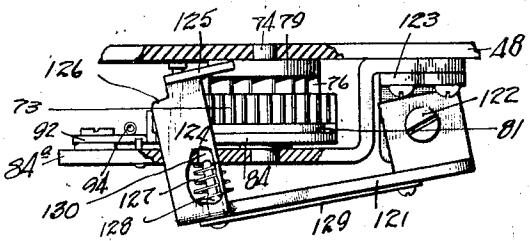


FIG. 8.

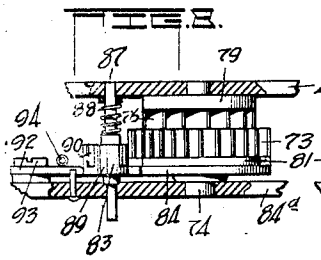


FIG. 9.

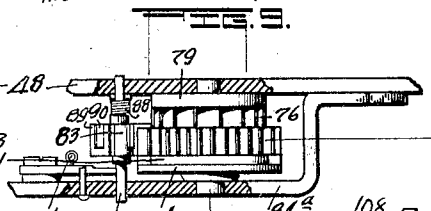
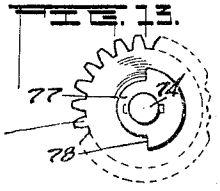


FIG. 13.



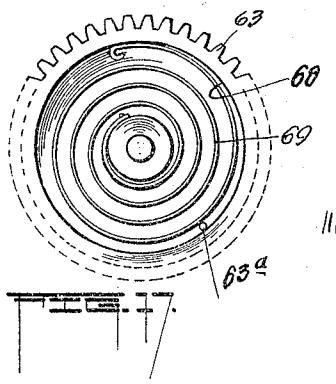
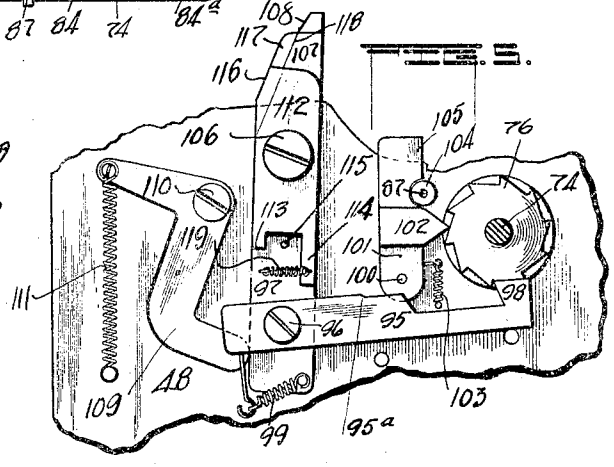


FIG. 11.

FIG. 5.



Witnesses:
Miles O. Green
D. A. Wilson.

Inventor
John M. Daly.
By Chas. F. LaPorte
Atty.

UNITED STATES PATENT OFFICE.

JOHN M. DALY, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO CHRISTOPHER L. DALY, OF PEORIA, ILLINOIS.

COMPUTING-MACHINE.

994,823. Specification of Letters Patent. Patented June 13, 1911.

Application filed June 7, 1909. Serial No. 500,788.

To all whom it may concern:

Be it known that I, JOHN M. DALY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Computing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to a computing machine and relates particularly to a device for equating train tonnage or for measuring the resistance of railway trains.

The results to be obtained by the present device is in a great many respects similar to to those obtained by machines upon which patents have already been granted to me, and by others upon which applications for patent are now pending. The patents referred to are numbered 715,197; 715,199 and 715,201, dated respectively December 2, 1902. The applications for patent to which reference has been made were filed April 11, 1904, Serial No. 202,553; January 4, 1906, Serial No. 294,662, and March 5, 1909, Serial No. 481,511.

The object of the present invention is to provide mechanism coöperating with the register operating means for automatically controlling the distance of movement of said register operating means, whereby, after a predetermined number of operations of said operating means, the distance which the operating means may be moved will be greater than before.

The invention has for a further object a movable stop member coöperating with the register operating means and associated with mechanism for controlling and limiting the movement of said stop member; said controlling means arranged to be automatically operated after a predetermined number of operations of the register operating means.

A further object of the invention is to provide for the automatic release of the stop member controlling and limiting mechanism at the time of the release of the registering mechanism when it is desired to return said registering mechanism to zero, whereby said controlling and limiting mechanism may return to its normal or initial position.

For a further and full description of the invention herein and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a top plan view of so much of the machine necessary to illustrate the application of my improvements, with a portion of the casing and register operating means and scale broken away to disclose a part of the interior mechanism; Fig. 1ª is a top plan view of the operating mechanism as it appears when the casing inclosing the same has been removed; the removal of the casing, removing the center plate, scale ring and register operating plate; Fig. 2 is a bottom plan view of the covering or casing of the machine, showing the means for securing the center and register operating plates in place; also showing the general arrangement of the stop member controlling and limiting mechanism, which is suitably retained in or secured to said casing; Fig. 3 is a plan view of certain of the parts of the controlling and limiting mechanism seen in Fig. 2, but on a much larger scale; Fig. 4 is a view somewhat similar to Fig. 3, and includes more of the mechanism shown in Fig. 2, than is shown in Fig. 3, with parts broken away to show the association of such parts; Fig. 5 is a view of parts seen in Fig. 3, after the operation of the register operating means; Fig. 6 is a detail side elevation of the gearing which is actuated with each operation of the register operating means, and which, at predetermined intervals operates the stop-member controlling and limiting mechanism; the view also disclosing a brake member in operative engagement with such gearing; Fig. 7 is a view similar to Fig. 6 except that the brake is in an inoperative position; Fig. 8 is a view of the gearing shown in Fig. 6 and showing a locking pinion for said gearing, on line *w*—*w* Fig. 4; Fig. 9 is a view similar to Fig. 8 but showing the pinion in unlocked relation; Fig. 10 is a vertical sectional view of parts seen in Fig. 6, on line *z*—*z* Fig. 4; Fig. 11 is a detached view showing in perspective, the gearing illustrated in Figs. 6 to 10; Fig. 12 is a per-

spective view of one of the gears seen in Fig. 11; Fig. 13 is a detail of part of the gear seen in Fig. 11; Fig. 14 is an end view of Fig. 11, looking at the spring; Fig. 15 is a vertical section as the same would appear if taken on the line X—X of Fig. 1; Fig. 16 is a cross section on the line Y—Y of Fig. 2; Fig. 17 is a face view of the gear and the spring carried thereby which is employed for returning the controlling and limiting mechanism to normal or initial position; Fig. 18 is a fragmentary perspective view looking at the bottom of the operating plate and devices which are set in operation by the stylus just prior to the stylus engaging with the stop member.

In constructing railroads, special care is exercised to avoid as far as possible curves of all kinds, and especially reverse curves; also, to obtain the lowest possible grades, for the reason that both curves and grades effect and control the speed and hauling capacity and where grades are necessary, advantage is taken, by having a series of ascending grades rather than one long grade. This is done in order to obtain momentum down the first grade to assist up the second grade. The momentum a train gets depends largely on the length of the train which is controlled by the number of cars in the train. For example, a train of 30 cars light weight, 20 tons each, loaded with 40 tons each, equals 60 tons each, or all told 1800 tons. This train is about 1200 feet long, hence, when 600 feet is over the top of first grade, the engine gets assistance from the train to create speed and momentum to assist it over the second grade, but if the train has the same tonnage, 1800 gross tons in 60 cars, 20 tons per car plus 10 tons of freight, the length of train is 2400 feet, or twice as long as the first train; hence, when one half of train is over the top of first grade the engine is 1200 feet down the grade, and receives but one half the momentum of the first train. Again, in long curves or reverse curves, the train of 30 cars can only bind in one half the points a train of 60 cars will bind, and the friction created on the rear half of train tends to increase the friction on the forward half of train, consequently to adjust or equalize the resistance of long and short trains it is necessary to make an arbitrary allowance for wheel friction for each car in trains according to the distance from the engine, and as the resistance increases as the distance of car from engine increases, it is therefore necessary to increase the allowance per car, as the distance from an engine increases. If this adjustment is not made, the result will be that engines hauling 1800 gross tons in 30 cars will be underloaded, or the same engine when hauling a train of 1800 gross tons in 60 cars will be overloaded as the wheel friction, length of train and wind resistance are factors, based on the number of cars in train.

To determine the resistance and to equate or adjust the cars and tonnage in all kinds of trains, one method is to test engine with a train composed of the greatest weight of cars, using that as a basing or rating unit. Therefore, if a locomotive can haul 30 cars, 60 gross tons each, and make the required speed of 12 miles per hour and the dynamometer indicates engine used tractive power equal to overcoming a tonnage resistance of 1870 tons, the 1800 tons for dead weight and the 70 tons for wheel friction, we would then rate the engine at 1870 tons and arrange to allow the 70 tons of wheel friction to cars, according to the location of cars from the engine, viz—

First	10 cars from engine	allow	1 ton each	=10 tons
Second	10 " "	"	2 tons each	=20 tons
Third	10 " "	"	4 tons each	=40 tons

Total allowance for the 30 cars..... 70 tons.

Hence, instead of rating engine at 1800 tons, we rate it at 1870 tons, based on weight of car, contents, and other resistance factors. Consequently in computing the resistance on the machine, in a manner which will be described, the first ten cars will add and register 61 tons each; the second ten cars will add and register 62 tons each, and the third ten cars will add and register 64 tons each. Total, 1870 gross tons, which is the maximum the engine can haul and make the speed required. The next train with the same engine is made up of cars, weighing 30 gross tons each, 20 tons of car and 10 tons of load. The machine will adjust or equate this train as follows:—

First	10 cars add on register 31 tons each,	equal to 310 tons
Second	10 cars add on register 32 tons each,	equal to 320 tons
Third	10 cars add on register 34 tons each,	equal to 340 tons
Fourth	10 cars add on register 36 tons each,	equal to 360 tons
Fifth	10 cars add on register 39 tons each,	equal to 390 tons
Sixth	4 cars add on register 42 tons each,	equal to 168 tons

54 total as shown by computing machine.. 1888

The rules provide to give or take 20 tons above or below the rating, which brings 1888 within the rating. The train above referred to has 54 cars × 30 tons, equals 1620 tons, but the length of train and wheel friction makes it use the same tractive power of engine that the 1800 ton train used.

Having described the method of determining the ratings of engines and the arbitrary allowance allowed to the cars according to their position in the train, I will now proceed to describe the machine by which I adjust or equate the tonnage in trains, and will ask that it be borne in mind, that while the machine is automatically adjusted so that with each tenth car placed in a train an increased allowance is made to each car, it does not follow that I am necessarily limited to this arrangement, as the devices which control the operation of the machine in this respect may be modified and the machine

changed so that an allowance is made with every fifth car, twentieth, thirtieth, etc., as I desire it to be understood that the machine and parts thereof may be modified and adjusted to fit any and all kinds of grades, curves, etc.

The general make up of the machine, not including the movable stop and parts cooperating therewith, by which an increased arbitrary allowance is made to each car, after a predetermined number of cars have been placed in a train, is substantially like that structure shown and described in the application filed by me on March 5th, 1909, bearing Serial No. 481,511, therefore it will not be necessary to describe in detail all of the mechanism included in the registering mechanism, operating means therefor, and the mechanism for returning such devices to zero.

The frame or casing of the machine, comprises a base plate 1, which supports and to which is secured the tonnage registering and car tallying mechanism. The top or covering for the machine consists of the box like casing 2 provided with a plurality of posts 3, having reduced threaded ends 4, which, when the casing is in position on the base plate 1, passes through openings 5 in the base plate and nuts 6, are screwed on to the threaded ends of said posts, which serve to secure the parts and inclose the operative parts within said casing. The top of the casing 2 is cut out, as at 7, to form an annular opening in which are retained the fixed center plate 8, and the revoluble operating plate 9. To secure the center plate 8 to the casing 2, I secure in a suitable manner to the plate 8, bars 10, which said bars are in turn secured to a ring like plate 11 which is fastened to the lower face of the top of the casing, see Figs. 2 and 15. The inner face of the plate 11 is preferably in the same vertical plane with the wall of the annular opening 7 in the casing, and the wall 7 and the inner face of the plate 11 are preferably oppositely beveled, as shown in Fig. 15, which, together serve as a bearing for rolls or balls 12 which are interposed between said bearing and a beveled face of the operating plate 9. The plate 9 has the inwardly projecting flange portion 13 lying beneath and in juxtaposition to the lower face of center plate 8, and it is also provided with the upwardly extending ring like portion 14 and the depending flange portion 15, said flange portion 15 provided with the teeth 16 forming a gear adapted to intermesh with and communicate motion to gearing to be described. The ring like portion 14 of the plate 9, is provided with a plurality of annular rows, preferably two, of perforations 17, and 18, which extend through the body of the plate, into any one of which may be inserted the end of a suitable stylus, not shown, for rotating said plate.

The top of the casing 2 is provided with an annular flange 19 and a shoulder or ledge 20. The distance from the upper face of the ledge 20 to the top of the flange 19, preferably conforms to the thickness of the scale-ring 21, which rests upon and is secured to said ledge, which will bring the top face of the scale-ring in the same plane with the top face of the center plate 8 and top face of flange 19, see Fig. 15. Although I have not detailed or described the mode of attaching the ring 21 to the machine, or how the ring 21 may be removed and another substituted therefor, it is understood that in this respect, the machine has all of the advantages described for the scale rings shown in the application bearing Serial No. 481,511, previously referred to. The scale ring 21 is provided with a tonnage scale 22 composed of numerals ranging from "15" to "85" and of lines intended to coincide with the perforations 17 and 18 of the operating plate and extending radially across the ring terminating at the numbers thereon. In adjusting the ring 21 on the machine, it is arranged that numeral "15" of the scale will be opposite a perforation in the operating plate 9, which, if the stylus is inserted into said perforation opposite numeral "15" on the scale and the plate 9 be moved until the stylus is stopped by engagement with the stop member, the registering mechanism would register "16" or one more ton for the car than called for. In like manner, if the plate 9 was operated from any point on the scale 22, up until ten (10) cars had been placed in a train, which means ten operations of the machine, the register would add one ton per car more than called for on the scale, which is the arbitrary allowance given to each of the first ten cars placed in a train, as clearly explained above. The allowance for each of the next ten cars would be two (2), the next ten, four (4), and so on. The mechanism which makes this possible, being hereinafter more fully described.

The registering and tallying mechanism, which is identical with that shown and described in the application referred to, bearing Serial No. 481,511, is shown in a general way in Fig. 1ª of the drawings, and so much of said mechanism will be described as will show how movement is imparted from the plate 9 for equating the train tonnage and tallying each movement of the plate. This mechanism shown in Fig. 1ª forms no part of the present invention except as some such mechanism is necessary to form a complete structure and produce an operative machine, for the purposes intended; although, a part of such mechanism is essential to the operation of certain of the devices embodied in

the present invention, whereby they may be returned to their normal or initial positions.

23 denotes a frame attached to or forming a part of the base 1 and said frame supports the registering and tallying devices arranged to be operated by the plate 9. 24 designates a sleeve of the frame 23, which serves as a bearing for a short shaft 25, and on the outer end of said shaft is a gear 26, which, when the casing and the gear 16 are in position on the base plate 1, will mesh with said gear 16 and respond to any movement imparted to said gear. On the inner end of the shaft carrying gear 26 is a gear 27, which is shown to be in mesh with a gear 28, carried on a shaft 29, having its opposite ends journaled in the frame 23. On this shaft 29 are carried a plurality of inter-coöperating numbering wheels 30, 31, 32 and 33, the wheel 30 being affixed to the shaft 29, while the remaining three gears are carried loose on the shaft and coöperating with said wheels are the pinions 34 for transmitting motion between adjacent wheels at intervals or after each wheel has made a predetermined number of revolutions. On the left hand end of the shaft 29 is affixed gear wheel 35 movable with the shaft 29 and in mesh with an idler gear 36, which is shown in mesh with a gear 37 affixed to a shaft 38, also journaled in the frame 23. The shaft 38 is shown spaced from and in parallelism with the shaft 29 and carries the two numbering wheels 39 and 40, which serve as the car numbering or tallying device, said wheels are both carried loose on the shaft 38 and the wheel 39 is operated intermittently through a suitable pawl and ratchet mechanism, which I have not thought necessary to illustrate in detail, and with each complete revolution of the wheel 39, the wheel 40 is given a partial revolution through a pinion 41 coöperating with said wheels.

It will be understood that with each operation of the plate 9, the gear 16 thereon will impart movement to the shaft 25 through the gear 26, and said shaft will in turn impart movement to the wheel 30 through the gears 27 and 28. When the wheel 30 is completing a revolution, the pinion 34 cooperating with it and the wheel 31 will be actuated to impart movement to said wheel 31, and likewise as the wheel 31 is completing a revolution, the pinion 34 coöperating with it and the wheel 32 will be actuated to impart movement to said wheel 32. This operation may be continued in like manner between the wheels 32 and 33 and the pinion 34 coöperating therewith.

The numbering wheels 30, 31, 32 and 33 constitute the tonnage registering wheels, while the wheels 39 and 40 constitute the car tallying wheels. As shown, the tonnage registering wheels are operated by suitable gearing which is actuated by the gear 16 on the register operating plate 9. The car tallying wheels are operated through the movement of a lever, which said lever is engaged and thrown by the stylus in the hands of the operator, when the plate 9 is operated to actuate the register wheels. This lever is indicated as 42, see Fig. 1ª and is operatively connected, in a suitable manner, with the ratchet and pawl devices, above referred to, for operating the wheels 39 and 40. The free end of this lever 42 lies across and beneath the rows of perforations 17 and 18 in the operating plate 9, in such a manner that its free end will be engaged by the end of the stylus, when used for operating the plate 9, which engagement will move said lever and cause the wheel 39 to be partially rotated. As the wheel 39 completes a revolution motion will be imparted to the wheel 40 through the pinion 41.

The numbering wheels 30, 31, 32 and 33, and the wheels 39 and 40 and coöperating parts, are associated with a suitable mechanism for returning the wheels to zero, by a reverse operation of the plate 9. This mechanism, while parts of it may be seen in Fig. 1ª, has not been detailed nor will any extended reference be made to the same, on account of its having been fully shown and described in the application bearing Serial No. 481,511, and for the further reason, that such mechanism forms no part of the invention herein, except, as above stated, so far as it is essential to the operation of certain parts, that they may be returned to their initial or normal positions.

To the frame 23 is pivotally attached at 43 a lever 44, the lower end of which, indicated as 45, will be referred to as the acting portion, and its opposite upper end is formed with the right angle engaging portion 46. An edge view of this lever is seen in plan in Figs. 1 and 1ª. The engaging portion 46 of the lever 44, as shown in Fig. 1, is directly beneath a perforation 47 in the center plate 8, so that an operator upon inserting the stylus through the perforation 47 will engage the portion 46 of the lever, depressing that end of the lever and raise the opposite end thereof. This lever, in the application No. 481,511 referred to, coöperates with certain zero setting devices which are associated with the registering and tallying wheels and when depressed in the manner above referred to places the zero setting devices into such a position that the operator upon reversing the operation of the operating plate may return all the numbering wheels to zero. This mechanism would also form a part of the present construction, considering it to be a complete machine, but such devices, with the exception of the lever 44 do not form a part of the present invention except so far as they may be necessary to produce an operative structure and

it has not been thought necessary to go into or illustrate such mechanism in detail. When the lever 44 is operated for placing the zero setting devices in a position that the numbering wheels may be returned to zero, it operates parts, in a manner, as I shall explain further on, so that they may be returned to their normal or initial positions.

I will now describe the movable stop member and the mechanism coöperating therewith by means of which an arbitrary allowance is made to the first ten cars placed in a train and how such mechanism is automatically adjusted to increase such allowance after each succeeding tenth car has been placed in a train. While I have selected and arranged the mechanism to change the allowance after each tenth car placed in a train, it will be understood that such mechanism may be modified so that such allowance may be made after any given number of cars have been placed in the train.

48 denotes a supporting plate which is arranged at one end of the casing 2 and preferably attached to the ring like plate 11. On the upper side of this plate is carried the movable stop member 49, see Fig. 1, while on the lower side is arranged the mechanism coöperating therewith for controlling and limiting the movement of said member, see Fig. 2. The stop member 49 is preferably curved as shown in Fig. 1 and when moved, moves in an arc of a circle. It is formed with the off-set or shoulder portions 50 and retained in operative position and guided by the flanged rollers 51 suitably secured to the plate 48, see Figs. 1 and 15. The engaging portion of said member is designated as 52 and projects laterally from the upper face thereof, at or near one end, so that it lies directly beneath the rows of perforations 17 and 18 in the operating plate 9. When an operator inserts a stylus in any one of the perforations 17 or 18 and moves the plate 9 in the direction of the arrow on Fig. 1, it will be observed that the end of the stylus, which will project down through the perforation in the plate 9, will be moved into engagement with the portion 52 of the member 49. Attached or secured to the member 49 and depending therefrom is a pin 53, see Figs. 1, 2 and 15, which said pin projects through and has movement in a slot 54 in the plate 48, see Fig. 2, and it also projects through and has movement in a slot 55 formed in the outer end of an arm 56 which has a pivotal connection with one of the corner posts 3 of the casing 2. The stop member 49 is normally held projected forwardly, being that position in which the member is shown in full lines in Fig. 1, by the spring 57, having one end attached to the arm 56, see Fig. 2, and its opposite end attached to the plate 48, and said spring operates after each movement of the member 49, when the same has been moved by engagement of the stylus, to return the member 49 to its normal position.

58 denotes a bar, pivotally connected at 59 with the arm 56 and said bar crosses the axis of a stem 60, which said stem is secured to and depends from a plate 61 which, in turn, is secured to the plate 48 and spaces the bar 58 from the plate 48. The bar 58 is provided with an elongated longitudinal slot 62, which will allow the bar to have longitudinal movement across the axis of the stem 60, see Figs. 2, 3 and 4. Carried on the stem 60 just beneath the bar 58 is a gear wheel 63 and secured, attached to, or formed on the lower face of said gear wheel is a stop plate 64. The wheel and stop plate held in operative position on the stem 60 by the nut 65. The stop plate 64 is provided with an irregular periphery, which consists in providing the periphery of the plate 64 with a series of graduated off-sets or shoulders 66, intermediate of which is a smooth peripheral face 67, each succeeding face 67, struck on an arc of a circle the center of which is the center of the stem 60 and the distance from the center of the stem 60, to each succeeding face 67 is less than to the preceding face 67, for a purpose which will soon become apparent.

The gear wheel 63 is formed with an annular recess 68 in its upper face, in which is carried a flat coiled spring 69, one end of which is attached or secured to the hub of the gear wheel, see Fig. 17, while its opposite end is attached or secured to a pin 70, see Fig. 4, depending from the plate 48. The function of this spring 69 will be further explained.

To the outer end of the bar 58, and on the under side thereof is secured a plate 71, having the finger or engaging end portion 72 which is adapted to engage successively the faces 67 of the stop plate 64 during the operation of the machine. When the machine and its parts are in a normal position and before any operation thereof to compute train tonnage, the face 67, which for convenience I will designate as *a*, see Fig. 2, is opposite the finger 72 of plate 71. The plate 9 being operated, the stylus will engage with and move the stop member 49, which, being connected with the bar 58 in manner described, will move the bar until the finger 72 of the plate 71 attached to said bar contacts or engages with the face 67 of the portion *a* of the plate 64. After a predetermined number of operations of the plate 9 and the stylus engaging the member 49, the plate 64 will be actuated so as to bring the portion *b* of the plate 64, having the face 67 opposite the end of the finger 72 of plate 71. This operation is continued until all of the faces

67 of plate 64 are brought into a position to be engaged by the finger 72, or until the parts are returned to their initial or normal positions.

In mesh with the gear wheel 63 is a smaller gear wheel 73, and this gear wheel 73 is carried loose on a short shaft 74. Through the hub of the wheel 73 and on the shaft 74 is a sleeve 75, see Fig. 10, and connected to one end of the sleeve on one side of said wheel is a ratchet wheel 76, while to the other end of the sleeve and on the other side of the wheel is connected a plate 77 provided with the off-set or shoulder portions 78, see Fig. 13. The ratchet wheel is formed with a radially projecting flange 79 forming an annular casing in which is carried a flat coiled spring 80, one end of which is attached to the shaft 74 and its opposite end attached to the flange 79. Keyed to the shaft 74 and adjacent to the plate 77 is a mutilated gear 81, provided with two diametrically opposed recesses 82 serving as teeth which will mesh with the teeth of a mutilated pinion 83. The remainder of the periphery of said gear 81 presenting a smooth face as at 84, see Figs. 11 and 12. The lower face of the gear 81, being that face adjacent to the plate 77, is recessed as at 85 to receive and cover the plate 77, and carried in said recess is a lug 86 adapted to be engaged by one or the other of the off-set or shoulder portions 78 of the plate 77.

The pinion 83 is carried on a vertically movable spindle 87, see Figs. 8 and 9, one end of which has a bearing in the plate 48, while its opposite end has a bearing in a frame 84^a. Coiled around the spindle 87 between the pinion 83 and the plate 48, is a spring 88, which retains the spindle 87 and pinion 83 projected downwardly or in that position seen in Fig. 8. The teeth of this pinion 83 are irregular. That is to say, it is provided with alternately long and short teeth 89 and 90. The short teeth being intended to mesh with the teeth of the small gear wheel 73 and be intermittently engaged by the shoulders 91 of the gear wheel 81, see Fig. 12, which will operate the pinion 83 and cause a long tooth 90 to have a meshing engagement with a recess 82 in said wheel 81, which will allow the pinion 83 to be partially rotated. The long teeth 90 while arranged to have a meshing engagement with the recesses 82 in the wheel 81, also ride on the smooth periphery thereof when not in mesh with such recesses, producing a sort of cam engagement with the wheel 81. The pinion 83 is locked against rotation, which will also prevent movement of the gear wheel 73 until the wheel 81 is operated by the pressure of the off-set or shoulder portion 78 of the plate 77 against the lug 86 in said wheel 81 which will impart sufficient power to cause a shoulder 91 of the wheel 81 to bear against one of the short teeth 90 of the pinion 83, releasing it from the locking means, to be described, and operate the gear 73 which will transmit a similar movement to the gear wheel 63. The lock referred to, consists of a dog 92 pivoted at 93 to the frame 84^a, its free end normally held in a position to enter between two teeth of the pinion 83, see Fig. 4, by means of a spring 94, attached at one end to the frame 84, its opposite end attached to the dog. With the dog 92 held in the position seen in Fig. 4, by the spring 94, it will be easily seen that until sufficient power is imparted to the pinion 83 to overcome the strength of the spring, the pinion 83 nor the gear 73 can turn, thereby retaining the parts in operative position and preventing their accidental displacement. After each operation of the pinion 83 through the wheel 81, in manner described, the spring 94 will return the dog 92 to locking engagement with said pinion 83.

I will now describe how the ratchet wheel 76 is operated with each operation of the operating plate 9.

95 denotes a ratchet bar, see Fig. 3, the same being pivoted at 96 to a lever 97, and one edge of said bar is provided with a series of irregular cut out portions, as shown, leaving an engaging tooth 98 at its forward end. The irregular cut out portions referred to, prevent the edge of the ratchet bar from engaging with the teeth of the ratchet wheel 76 while the tooth 98 is intended to have an intermittent engagement with said teeth, whereby a step by step rotative movement may be imparted to said wheel. The free end of the bar 95, which has the tooth 98, is normally retained in operative position by means of a spring 99, attached at one end to the inner end of lever 97, its opposite end connected to the pivoted end of the bar 95, see Fig. 3. When the lever 97 and bar 95 are in their normal position, being that position seen in Fig. 3, the tooth 98 of the bar does not engage with the teeth of the ratchet wheel 76, owing to a shoulder 95^a of said bar 95 engaging with a pivot pin 100, which prevents the free end of the bar 95 being projected into a position to engage the ratchet teeth of the wheel 76, under the influence of the spring 99.

To prevent any reverse operation of the ratchet wheel 76, except when it is desired to return the parts to their normal or initial positions, I provide the bar 101 carried at one end on the pivot pin 100, referred to. This bar is provided with a tapered dog 102 which normally projects into the path of the teeth of the ratchet wheel 76. A spring 103 attached to bar 101 and plate 48, holds the bar up against a stop 104, with the dog 102 projecting into the path of the teeth on wheel 76, and while the teeth on wheel 76

may ride past the dog 102, during the forward movement of wheel 76, moving the bar 101 on its pivot, the wheel will be held against backward movement. The backward movement of the bar 101, caused by the teeth on the wheel 76 riding past the dog 102 of said bar, is limited by a pin 101ª, see Fig. 3, with which said bar 101 engages when swung on its pivot as previously stated. However, it is intended that the bar 101 with its dog 102 may be swung outwardly, when it is desired to return the parts to their normal or initial position, and the mechanism for doing this will be hereinafter referred to. The outer end of the bar 101, as shown in Figs. 2, 3 and 4 is beveled or tapered as at 105, for a purpose to be further explained.

The lever 97 is shown pivoted at 106 to the plate 48 and extending beyond the inner edge of said plate is bent upwardly as at 106ª and formed with a shoe 107 lying in juxtaposition to the under side of the operating plate 9, as best seen in Fig. 18. The outer edge of the shoe 107 has a beveled face 108, which will be engaged by the stylus if projected through any one of the perforations 18 in plate 9 and the plate 9 moved to operate the registering mechanism. The stylus engaging the beveled face 108 of the shoe 107 will oscillate the lever 97 on its pivot 106, moving the inner end thereof outwardly and throw the bar 95 for operating the ratchet wheel 76. The lever 97 is retained in its normal or operative position, being that position shown in Figs. 2, 3 4 and 8, by a lever 109, pivoted at 110 to plate 48, its inner end engaging and bearing against the inner end of lever 97, its outer end having attached thereto a spring 111 which has its opposite end attached to the plate 48. Thus it will be seen that when the inner end of lever 97 is moved outwardly, it throws the lever 109 so as to expand the spring 111, and when the lever 97 is released, the spring 111 immediately contracts for moving the lever 109 to return the lever 97 to its normal position.

Having a pivotal connection with the plate 48 and lever 97 at 106, being the pivot of the lever 97, and overlying the inner portion of said lever 97 is a lever 112, its outer end formed with the bifurcated extensions 113 and 114 between which projects a pin 115 depending from the lever 97. The inner end of lever 112 is bent upwardly as at 116, similar to the bent portion 106ª of lever 97 and is also provided with a shoe 117, somewhat similar to the shoe 107 of the lever 97. The shoe 117 of lever 112 has its inner face beveled as at 118 so as to normally lie in juxtaposition to the outer beveled face 108 of the shoe 107, being held or returned to that position by means of a spring 119 connected at one end to the extension 114 of lever 112 and connected at its opposite end to the lever 97. The upper face of the shoe 117 of lever 112 is cut out as at 120, see Fig. 18, forming a groove to allow for the passage of the stylus, if projected through a perforation 18 in plate 9 and caused to engage the shoe 107 of the lever 97 for oscillating said lever. Such movement will separate the inner ends of the levers 97 and 112, throwing the pin 15 against the extension 113 of the lever 112 and expand the spring 119, which will return the lever 112 to its normal position as soon as the lever 97 is released. If the stylus is projected through any one of the perforations 17 in the plate 9 and said plate be moved to operate the registering mechanism, the stylus will engage and bear against the outside face of the shoe 117, which is beveled to correspond to the bevel of its inner face, moving both the levers 97 and 112 and operating the bar 95 so as to impart movement to the ratchet wheel 76.

Assuming the lever 97 to be moved by the stylus engaging either the lever 97 or lever 112 in manner previously described, the ratchet wheel 76 will be moved one tooth with each forward movement of the bar 95 and when the ratchet wheel 76 has been moved the distance of five teeth the plate 77 attached to the ratchet wheel will have been moved to a position to cause a shoulder 78 of said plate to engage the pin 86 of the gear wheel 81 which will impart movement to the gear wheel 73 through the operation of pinion 83, and the gear wheel 73 will move the gear wheel 63 the distance of two teeth and with it the stop plate 64, which, however, will only move a distance equal to one half the distance between two of the offset or shoulders 66 of said stop plate. Thus it will be seen that, under the present arrangement of parts, the ratchet wheel 76 must be given a complete revolution before the wheel 63 will be moved far enough to move the stop plate so as to advance the plate 64 a distance which will bring the successive offset portions thereof, opposite the finger 72 to be engaged thereby. There are shown ten teeth on the ratchet wheel 76, therefore it requires that, in the present construction, the registering mechanism must be operated ten times to change the position of the stop plate so that the allowance made to each additional ten cars placed in a train will be more than allowed to each preceding ten cars. When the stylus engages the engaging portion 52 of the stop member 49, the finger 72 connected with the bar 58, will be moved into engagement with the stop plate 64 and limit the movement of the operating plate 9, as will be understood.

With each movement of the ratchet wheel 76, the spring 80 is wound on the shaft 74 and when the wheel 81 is moved, by the engagement of a shoulder 78 of plate 77

with the pin 86 in the wheel 81, to operate the pinion 83, the wheel 81 having freed itself from a toothed engagement with pinion 83 will, together with its shaft 74 to which it is keyed, through the release of spring 80, advance one half a revolution and bring a tooth 82 to a position to engage a tooth of pinion 83 and advance the pin 86 of wheel 81 so that the plate 77 will be required to again make one half of a revolution before the gear wheel 73 will be operated to partially rotate the wheel 63 and the stop plate 64, in manner described.

I will now describe how the stop plate 64 and coöperating parts are returned to their initial or normal position, at the same time that the registering mechanism and parts are adjusted to be returned to zero. It will be understood in this connection, that as the wheel 63 is operated during the operation of the registering mechanism, the spring 69 is being wound preparatory to operating the wheel 63 and coöperating parts, when the pinion 83 is released, or moved out of locking engagement with the wheel 81, being that position of the parts, shown in Figs. 6 and 9.

121 denotes a frame which is pivoted at 122 to a bracket 123 secured to and depending from the frame 84^a, previously referred to. This frame 121 at its forward end lies across the projecting end of spindle 87 carrying the pinion 83, and has a right angle extension 124 which, at its forward end is bent at right angles forming an engaging finger 125 which normally overlies the acting portion 45 of the lever 44, see Fig. 1, where the finger 125 is shown overlying said acting portion of the lever 44. The extension 124 of said pivoted frame 121 is also provided with the off-set or shoulder portion 126 disposed in proximity to and below the beveled or tapered portion 105 of the bar 101, see Figs. 1 and 2. When the stylus is inserted into the perforation 47 of the center plate 8 and brought to bear on the engaging portion 46 of the lever 44, for setting certain coöperative parts of the registering mechanism preparatory to such parts being returned to their initial or normal positions, the acting portion 45 of said lever 44 will be raised, engaging the finger 125 of the pivoted frame 121, oscillating said frame on its pivot 122 and causing the frame 121 to depress or move the spindle 87 and with it the pinion 82, which will move from locking engagement with the wheel 81, as shown in Fig. 8. At the same time, the off-set or shoulder portion 126 of said frame 121 will bear against the beveled or tapered portion 105 of bar 101 moving it and the dog 102 outwardly, into the position shown in dotted lines in Fig. 3, removing the dog from out of the path of the teeth of the ratchet wheel 76, this will remove all resistance to the spring 69, allowing it to expand or unwind which will return the wheel 63 and parts coöperating therewith to their initial or normal positions. The return movement of the wheel 63 is stopped when it reaches its normal or initial position by a pin 63^a of the gear wheel 63 engaging with a stop pin 63^b attached to the plate 48, see Figs. 4 and 17. When the lever 44 is released, the spring 88 on the spindle 87 returns the spindle and pinion 83 to locking engagement with the wheel 81, while the spring 103, see Fig. 3, returns the bar 101 and its dog 102 to working engagement with the ratchet wheel 76. The pivotal frame 121 is returned to inoperative position, being that position shown in Fig. 7, by a spring 127 bearing between the frame 84^a and pivoted frame 121. The spring being retained in working position by a pin 128 which passes through the pivoted frame 121, its outer end attached to a spring plate 129 attached to the pivoted frame 121, while the inner end of said pin is adapted to pass through a perforation 130 in the frame 48^a, see Fig. 7, and frictionally bear against the face of wheel 81, when the forward end of frame 121 is elevated and the pinion 83 released from locking engagement with said wheel 81, which will hold the wheel 81 against rotation, while the gear wheel 73 and pinion 83 are being reversed.

In Fig. 2, the wheel 63 and stop plate 64 are shown in that position in which they would appear if the machine had been operated to register fifty one (51) fifteen (15) ton cars placed in a train, and in Fig. 1 the register shows fifty one (51) cars, equaling nine hundred and twenty one (921) tons. One ton being allowed to each of the first ten cars, two tons allowance to the second ten, three tons allowance to the third ten, four tons allowance to the fourth ten, five tons allowance to the fifth ten, and six tons to the fifty first car, making a total of 921 tons.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent of the United States, is:—

1. In a computing machine, in combination, a register operating plate, a stop member for limiting the movement of said plate and movable therewith, and means operated by the movement of said stop member for limiting the movement thereof.

2. In a computing machine, in combination, a register operating plate, a stop member capable of being moved in the direction of movement of said plate and arranged to limit the movement thereof, and means operated by the movement of said member for limiting the movement of said member.

3. In a computing machine, in combination, registering mechanism, means for operating said mechanism, means for limiting the movement of said register operating

means, and mechanism coöperating with said limiting means for automatically adjusting said limiting means, after a predetermined number of operations of said register operating means.

4. In a computing machine, in combination, a register operating plate arranged to be actuated by a stylus, a stop member adapted to be engaged by said stylus for limiting the movement of the plate, controlling means for said stop member, and means operated by engagement of the stylus for adjusting said controlling means.

5. In a computing machine, in combination, a register operating plate, a stop member for limiting the movement of the plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, and mechanism adapted to be operated after a predetermined number of operations of the operating plate, for adjusting said stop-plate.

6. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels, registering in uniform sequence, a revoluble plate operatively connected with said wheels, a stop member capable of being moved in the direction of movement of said plate, and arranged to limit the movement thereof, and means operated by the movement of said member for limiting the movement of said member.

7. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels, registering in uniform sequence, a revoluble plate operatively connected with said wheels, said plate arranged to be actuated by a stylus, a stop member adapted to be engaged by said stylus for limiting the movement of the plate, controlling means for said stop member, and means operated by engagement of the stylus for adjusting said controlling means.

8. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, an operating plate geared to said registering wheels, a stop member for limiting the movement of the plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, and mechanism adapted to be operated after a predetermined number of operations of the operating plate, for adjusting said stop-plate.

9. In a computing machine, in combination, a register operating plate, a member having a scale associated with said register operating plate and serving as a guide to the operation of the same, a stop member for limiting the movement of said plate, and movable therewith, and means coöperating with said stop member for limiting the movement thereof.

10. In a computing machine, in combination, a register operating plate, a member having a scale associated with said register operating plate and serving as a guide to the operation of the same, a stop member capable of being moved in the direction of movement of said plate and arranged to limit the movement thereof, and means cooperating with said member for limiting the movement of said member.

11. In a computing machine, in combination, a register operating plate arranged to be actuated by a stylus, a member having a scale associated with said register operating plate and serving as a guide to the operation of the same, a stop member adapted to be engaged by said stylus for limiting the movement of the plate, controlling means for said stop member, and means operated by engagement of the stylus for adjusting said controlling means.

12. In a computing machine, in combination, a register operating plate, a member having a scale associated with said registering operating plate and serving as a guide to the operation of the same, a stop member for limiting the movement of the plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, and mechanism adapted to be operated after a predetermined number of operations of the operating plate, for adjusting said stop plate.

13. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, means for operating said mechanism, a member having a scale associated with said register operating means and serving as a guide to the operation of the same, a stop member for limiting the movement given to the register operating means, and means for operating said stop member for limiting the movement thereof.

14. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, means for operating said mechanism, a member having a scale associated with said register operating means and serving as a guide to the operation of the same, a stop member capable of being moved in the direction of movement of said register operating means and arranged to limit the movement thereof, and means for operating said member for limiting the movement of said member.

15. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering

in uniform sequence, means for operating said mechanism, a member having a scale associated with said register operating means and serving as a guide to the operation of the same, means for limiting the movement of said register operating means, and mechanism coöperating with said limiting means for automatically adjusting said limiting means, after a predetermined number of operations of said register operating means.

16. In a computing machine, in combination, register operating means, a stop member for limiting the movement of said register operating means and movable therewith, means operated by the movement of said stop member for limiting the movement thereof, and means for returning said stop member to its normal position after each operation of said register operating means.

17. In a computing machine, in combination, registering mechanism, means for operating said mechanism, a stop member for limiting the movement of said register operating means and movable therewith, means operated by the movement of said stop member for limiting the movement thereof, and means for returning said stop member to its normal position after each operation of said register operating means.

18. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said wheels, a stop member for limiting the movement of said plate and movable therewith, means operated by the movement of said stop member for limiting the movement thereof, and means for returning said stop member to its normal position after each operation of said plate.

19. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said wheels, a member having a scale associated with said register operating means, and serving as a guide to the operation of the same, a stop member for limiting the movement of said plate and movable therewith, means coöperating with the said stop member for limiting the movement thereof, and means for returning said stop member to its normal position after each operation of said plate.

20. In a computing machine, in combination, registering mechanism, a revoluble plate operatively connected with said mechanism and arranged to be actuated by a stylus, a stop member adapted to be engaged by said stylus for limiting the movement of the plate, controlling means for said stop member, means operated by engagement of the stylus for adjusting said controlling means, and means for returning said stop member to its normal position after each operation of said plate.

21. In a computing machine, in combination, registering mechanism, comprising a plurality of numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said wheels and arranged to be actuated by a stylus, a stop member adapted to be engaged by said stylus for limiting the movement of the plate, controlling means for said stop member, means operated by engagement of the stylus for adjusting said controlling means, and means for returning said stop member to its normal position after each operation of said plate.

22. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said wheels and arranged to be actuated by a stylus, a member having a scale associated with said plate and serving as a guide to the operation of the same, a stop member adapted to be engaged by said stylus for limiting the movement of the plate, controlling means for said stop member, means operated by engagement of the stylus for adjusting said controlling means, and means for returning said stop member to its normal position after each operation of said plate.

23. In a computing machine, in combination, a register operating plate, a stop member for limiting the movement of the plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, mechanism adapted to be operated after a predetermined number of operations of the operating plate for adjusting said stop plate, and means for returning said stop-plate to its normal position.

24. In a computing machine, in combination, a register operating plate, a stop member capable of being moved in the direction of movement of said plate and arranged to limit the movement thereof, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, mechanism adapted to be operated after a predetermined number of operations of the operating plate for adjusting said stop-plate, means for returning said stop member to its normal position after each operation of said operating plate, and means for returning said stop-plate to its normal position.

25. In a computing machine, in combination, a register operating plate, a member having a scale associated with said register operating plate and serving as a guide to the operation of the same, a stop member for

limiting the movement of the plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, mechanism adapted to be operated after a predetermined number of operations of the operating plate for adjusting said stop-plate, and means for returning said stop-plate to its normal position.

26. In a computing machine, in combination, a register operating plate, a member having a scale associated with said register operating plate and serving as a guide to the operation of the same, a stop member capable of being moved in the direction of movement of said plate and arranged to limit the movement thereof, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, mechanism adapted to be operated after a predetermined number of operations of the operating plate, for adjusting said stop-plate, means for returning said stop member to its normal position after each operation of said operating plate, and means for returning said stop-plate to its normal position.

27. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said registering wheels, a member having a scale associated with said plate and serving as a guide to the operation of the same, a stop member capable of being moved in the direction of movement of said plate and arranged to limit the movement thereof, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, mechanism adapted to be operated after a predetermined number of operations of the operating plate, for adjusting said stop-plate, means for returning said stop member to its normal position after each operation of said register operating plate, and means for returning the stop-plate to its normal position.

28. In a computing machine, in combination, a register operating plate, a stop-member for limiting the movement of said plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, gearing associated with said stop-plate, means operated during the operation of the operating plate for actuating said gearing, whereby, after a predetermined number of operations of said operating plate, said stop-plate is adjusted for allowing greater movement of the operating plate.

29. In a computing machine, in combination, a register operating plate, a stop member for limiting the movement of said plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, gearing associated with said stop-plate, means operated during the operation of the operating plate for actuating said gearing, whereby, after a predetermined number of operations of said operating plate, said stop-plate is adjusted for allowing greater movement of the operating plate, means for locking the gearing against backward movement, means for releasing said locking means, and means for automatically returning said gearing and stop-plate to their normal position when said locking means is released.

30. In a computing machine, in combination, registering mechanism, a revoluble plate operatively connected with said mechanism, a member having a scale associated with said plate and serving as a guide to the operation of the same, a stop member for limiting the movement of said plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, gearing associated with said stop-plate, means operated during the operation of the operating plate for actuating said gearing, whereby, after a predetermined number of operations of said operating plate, said stop-plate is adjusted for allowing greater movement of the operating plate.

31. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said wheels, a member having a scale associated with said plate and serving as a guide to the operation of the same, a stop member for limiting the movement of said plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, gearing associated with said stop-plate, means operated during the operation of the operating plate for actuating said gearing, whereby, after a predetermined number of operations of said operating plate, said stop-plate is adjusted for allowing greater movement of the operating plate.

32. In a computing machine, in combination, registering mechanism, a revoluble plate operatively connected with said mechanism, a member having a scale associated with said plate and serving as a guide to the operation of the same, a stop member for limiting the movement of said plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, gearing associated with said stop-plate, means operated during the operation of the operating plate for actuating said gearing, where-

by, after a predetermined number of operations of said operating plate, said stop-plate is adjusted for allowing greater movement of the operating plate, means for locking the gearing against backward movement, means for releasing said locking means, and means for automatically returning said gearing and stop-plate to their normal position when said locking means is released.

33. In a computing machine, in combination, registering mechanism comprising a plurality of numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said wheels, a member having a scale associated with said plate and serving as a guide to the operation of the same, a stop member for limiting the movement of said plate, a stop-plate, means coöperating with the stop member adapted to engage with the stop-plate at each operation of the operating plate, gearing associated with said stop-plate, means operated during the operation of the operating plate for actuating said gearing, whereby after a predetermined number of operations of said operating plate, said stop-plate is adjusted for allowing greater movement of the operating plate, means for locking the gearing against backward movement, means for releasing said locking means, and means for automatically returning said gearing and stop-plate to their normal position when said locking means is released.

34. A tonnage registering device, comprising registering mechanism, a revoluble plate operatively connected with said mechanism for operating the same, a member having a scale associated with said plate and serving as a guide to the operation of the same, means for limiting the movement of said plate, said means so arranged relative to the movement of said plate as to cause said registering mechanism to register with each operation of said plate, for a predetermined number of operations thereof, one ton more than the amount selected for the operation of said plate, and means for automatically adjusting said limiting means after a predetermined number of operations of said plate, whereby said registering mechanism will be caused to register two or more tons in addition to the amount selected for the operation of said plate.

35. A tonnage registering device, comprising a plurality of numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said wheels for operating the same, a member having a scale associated with said plate and serving as a guide to the operation of the same, means for limiting the movement of said plate, said means so arranged relative to the movement of said plate as to cause said registering mechanism to register with each operation of said plate, for a predetermined number of operations thereof, one ton more than the amount selected for the operation of said plate, and means for automatically adjusting said limiting means after a predetermined number of operations of said plate, whereby said registering mechanism will be caused to register two or more tons in addition to the amount selected for the operation of said plate.

36. A tonnage registering device, comprising registering mechanism, a revoluble plate operatively connected with said mechanism for operating the same, a member having a scale associated with said plate and serving as a guide to the operation of the same, means for limiting the movement of said plate, said means so arranged relative to the movement of the plate, that with each operation of the plate, for a predetermined number of operations, an arbitrary allowance is made to the amount selected for the operation of the plate, and means for automatically adjusting said limiting means, after a predetermined number of operations of said plate, whereby an additional allowance is made at intervals during the operation of said plate, and after a predetermined number of operations thereof.

37. A tonnage registering device, comprising a plurality if numbering wheels registering in uniform sequence, a revoluble plate operatively connected with said wheels for operating the same, a member having a scale associated with said plate and serving as a guide to the operation of the same, means for limiting the movement of said plate, said means so arranged relative to the movement of the plate, that with each operation of the plate, for a predetermined number of operations, an arbitrary allowance is made to the amount selected for the operation of the plate, and means for automatically adjusting said limiting means, after a predetermined number of operations of said plate, whereby an additional allowance is made at intervals during the operation of said plate, and after a predetermined number of operations thereof.

38. A tonnage registering device, comprising registering mechanism, a revoluble plate operatively connected with said mechanism for operating the same, a member having a scale associated with said plate and serving as a guide to the operation of the same, means for limiting the movement of said plate, means for intermittently adjusting the limiting means to allow additional movement to be given to the plate during the successive operations thereof, said adjusting means being governed by the operation of said plate, and so arranged relative to the movement thereof, that the operation of the plate during the first ten movements thereof, will cause the registering mechanism to indicate one ton more than called for by the

number selected for the operation of said plate, and as said plate is successively operated, said plate will move a distance to cause said registering mechanism to indicate an increased amount, for each succeeding ten movements given to said plate.

39. In a computing machine, in combination, a register operating plate, a stop member for limiting the movement of said plate, a stop-plate, means operated by the stop member with each operation of said plate for engaging the stop-plate and thereby limit the movement of the stop member, means for automatically changing the position of the stop-plate after a predetermined number of operations of said operating plate, whereby greater movement is allowed said stop member, and means for returning said stop-plate to its normal position.

40. In a computing machine, in combination, a register operating plate, a stop member for limiting the movement of said plate, a stop-plate, means connected with the stop member and arranged to have engagement with the stop-plate during the successive operations of the operating plate, gearing connected with said stop-plate, and means adapted to be actuated during the operation of said operating plate for imparting movement to said gearing, and thereby change the position of the stop-plate, for allowing greater movement of said stop member and said operating plate.

41. In a computing machine, in combination, a register operating plate, a stop member for limiting the movement of said plate, a stop-plate, means connected with the stop member adapted to engage the stop-plate with each operation of said operating plate, gearing connected with said stop-plate, a lever adapted to be operated with each operation of the operating plate, and means connected with said lever arranged to operate said gearing, whereby after a predetermined number of operations of said lever, said gearing will operate to change the position of the stop-plate, for allowing greater movement of the stop member and also said operating plate.

In testimony whereof I affix my signature, in presence of two witnesses.

JOHN M. DALY.

Witnesses:
THOMAS F. BRENNAN,
CARLTON M. COLLINS.