J. M. DALY.

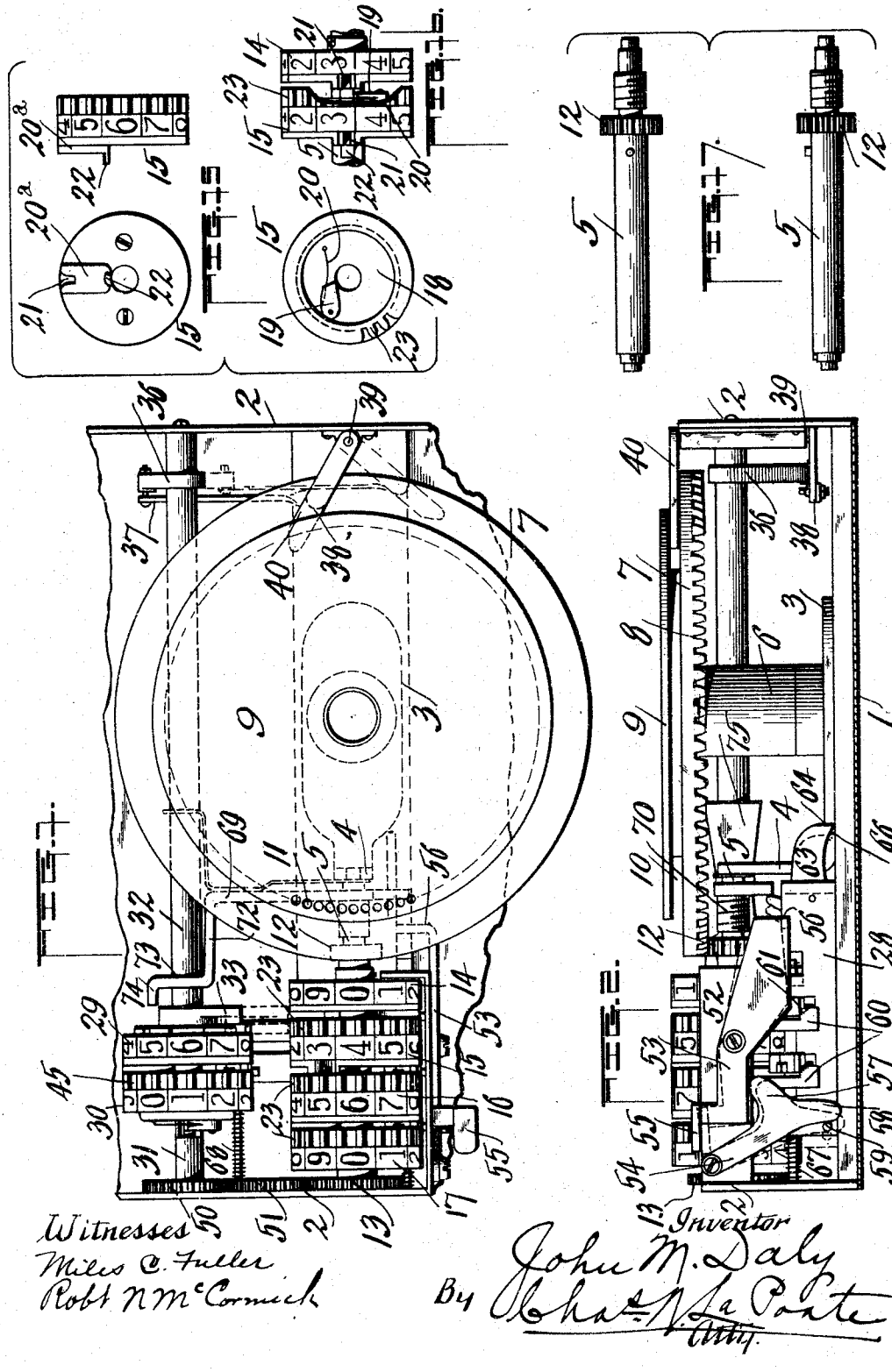
COMPUTING MACHINE.

APPLICATION FILED JAN. 30, 1907.

956,689.

Patented May 3, 1910.

3 SHEETS—SHEET 1.



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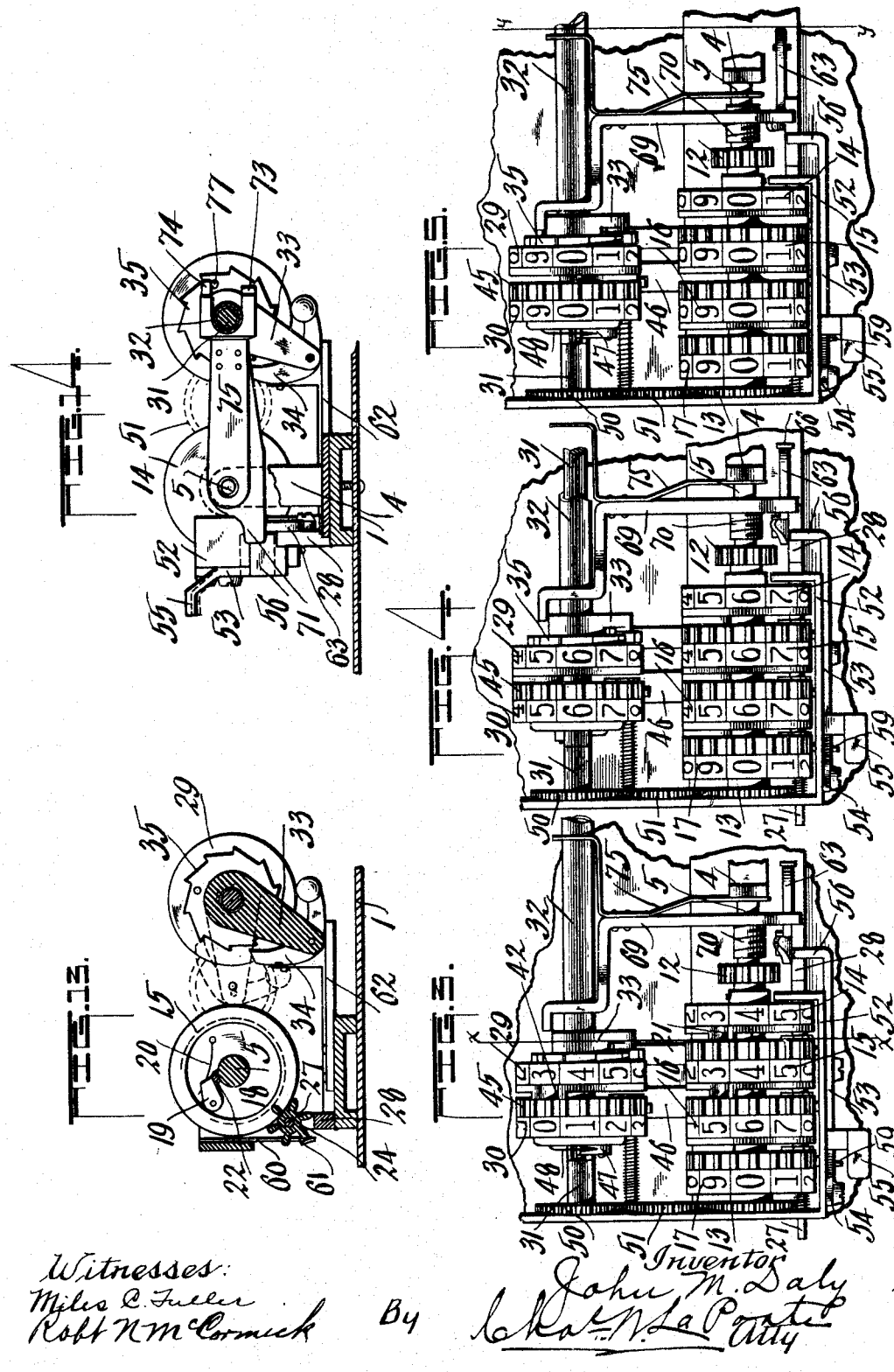

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

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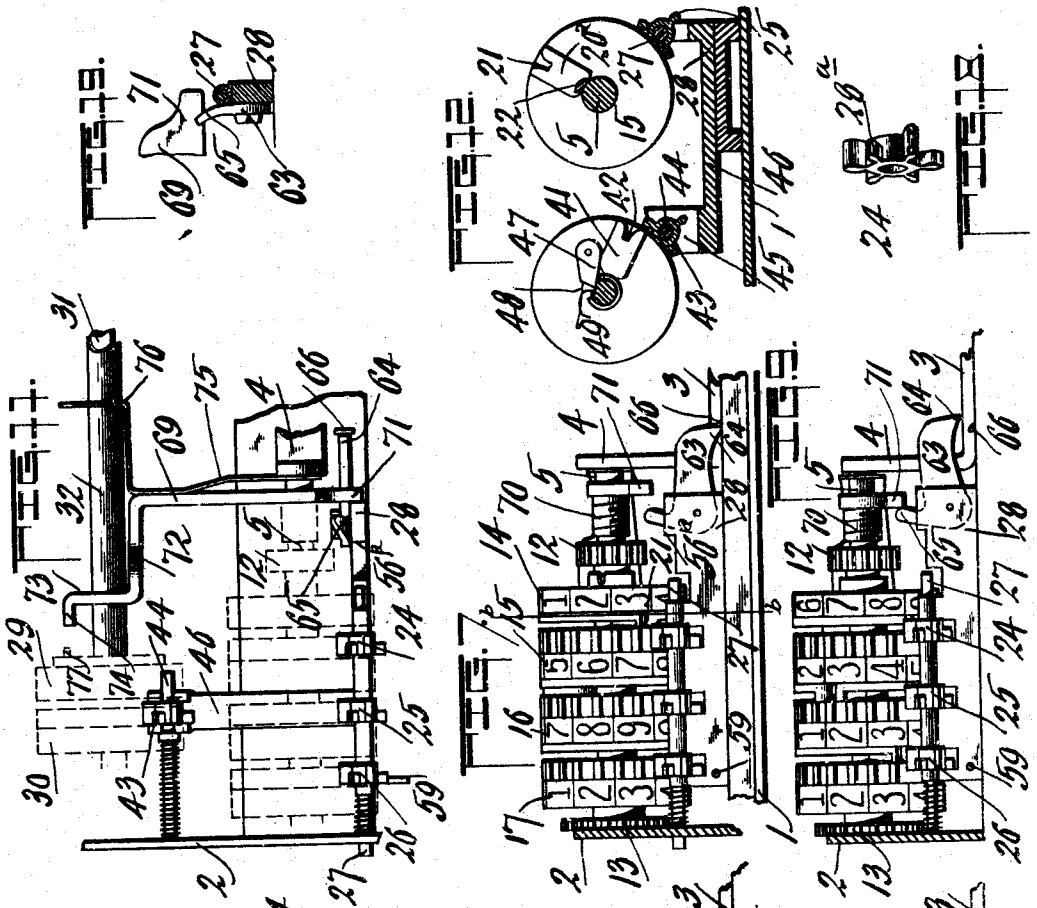

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UNITED STATES PATENT OFFICE.

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COMPUTING-MACHINE.

956,689. Specification of Letters Patent. **Patented May 3, 1910.**

Application filed January 30, 1907. Serial No. 354,908.

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 improvements in computing machines and relates particularly to certain mechanical devices for returning the registering wheels, numbering wheels or other similar computing parts thereof to zero.

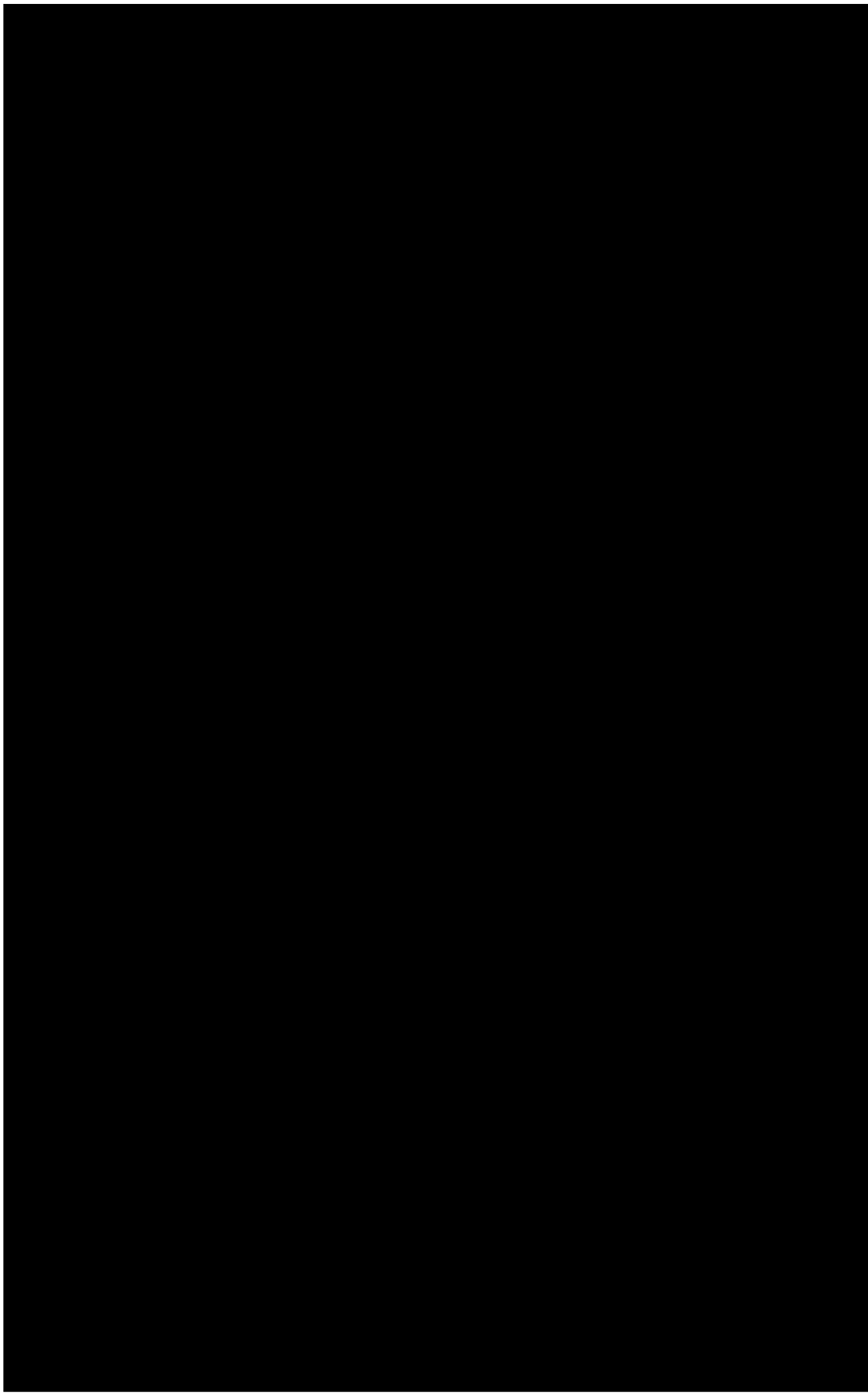
One of the objects of the present invention is to so arrange the mechanical devices for returning the registering wheels to zero, that the said wheels may be arranged in sets or in series of sets, one set serving as registering devices and the other as numbering devices; the operation of such mechanical devices for returning the wheels to zero acting to operate and return said wheels to zero simultaneously.

A further object of the invention is a locking and unlocking device coöperating with said registering wheels or component parts, adapted to be actuated by manually operated means for so fixing said registering wheels that they may be simultaneously returned to zero, without in any way affecting parts coöperating with each of said registering wheels, whereby each of said wheels is successively operated by the preceding wheel; said locking and unlocking device adapted to be automatically returned to its initial position through a partial movement of certain of said registering wheels through the operation of the means for actuating the said wheels.

The invention herein, the details of which will be more particularly specified in their preferred arrangement are adapted to various forms of computing or registering devices, although the same has been designed and is here shown in connection with a machine for registering the tonnage resistance in trains of cars in lieu of the gross weight of car and contents; certain of the wheels of such registering devices indicating such resistance while certain other of said wheels indicate each operation of said registering devices which represents the number of cars placed in a train.

That the invention may be more fully understood, reference is had to the accompanying drawings, in which:—

Figure 1 illustrates in plan so much of a computing machine as is necessary to show the application of my invention thereto; Fig. 2 is an elevation of the parts seen in Fig. 1; Figs. 3, 4 and 5 are detached plan views of the registering and numbering wheels of a computing machine, such as illustrated in Fig. 1 and the locking and unlocking device coöperating with the same; the several views showing different steps in the return of the registering wheels to zero and corresponding positions of the locking and unlocking device; Fig. 6 is an elevation of the registering wheels and parts of the locking device and they appear in full lines in Fig. 2, certain other parts of said figure being omitted; Fig. 7 is an elevation of the registering wheels and parts of the locking device as they appear in dotted lines in Fig. 2, certain other parts of said figure being omitted; Fig. 8 is an elevation of the parts shown in Fig. 5, with certain of said parts being omitted; Fig. 9 is a view similar to Fig. 8, but showing the position of certain of the parts after a partial rotation of the large disk shown in Fig. 1, being the means employed in this instance for imparting motion to the registering wheels; Fig. 10 is a plan view of a sliding cradle or gear holder, and gears supported thereby as the same appear in Figs. 1 and 2, and views similar to these two figures; Fig. 11 is a view similar to Fig. 10 with the exception that the sliding cradle or gear holder has been moved from the position shown in Fig. 10 and said view also shows certain parts of the locking device seen in Fig. 1 and similar figures; Fig. 12 is a vertical transverse sectional view as the same would appear in full lines on the line *a*—*a* of Fig. 10; Fig. 13 is a transverse sectional view as the same would appear on the line *x*—*x* of Fig. 3; Fig. 14 is a vertical transverse section as the same would appear on the line *y*—*y* of Fig. 5; Fig. 15 shows edge and opposite face views of either the second or third of the registering wheels; Fig. 16 shows two numbering wheels in juxtaposition and one of said wheels partially broken away for showing certain parts of said wheels, the

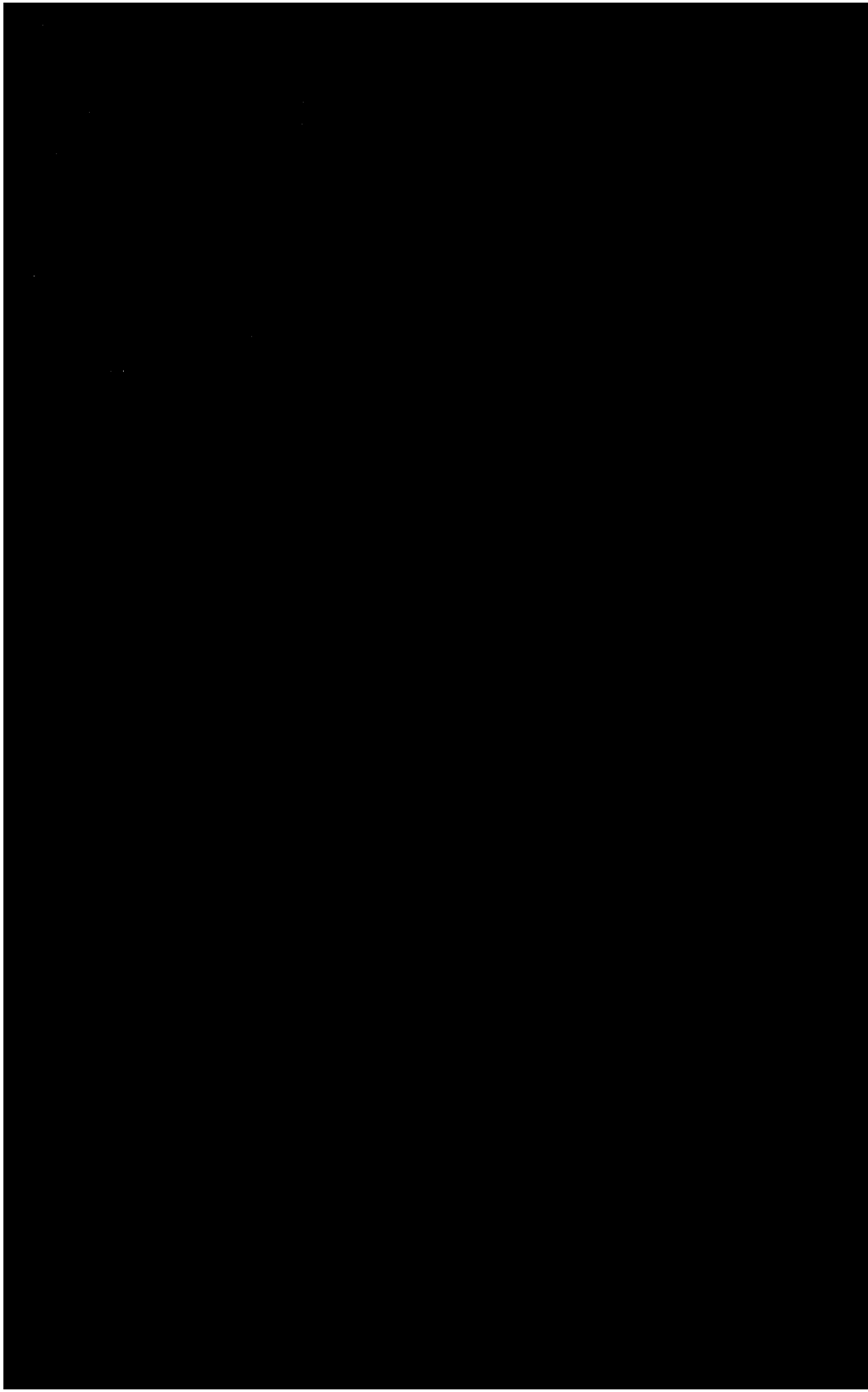


continuous intermeshing of the wheels 15, 16, and 17, with said gear pinions and for an intermittent connection only between the wheels 14, 15, and 16, with said gear pinions. That is to say, the wheel 15, through its gear is in continuous mesh with the pinion 24; the wheel 16, through its gear is in continuous mesh with the pinion 25 and the wheel 17 is in continuous mesh with the pinion 26. And the spacing of the teeth 28[a], on each of the said pinions 18, is such that as the smooth faces of the wheels 14, 15 and 16, ride on the gear pinions, they act as a lock for holding the pinions against rotation until the teeth 21, of the lug 20[a], coincide with one of the full width teeth of the said pinions when a partial rotation is imparted to the same and likewise a corresponding movement imparted through the adjacent registering wheel through its connection by means of the gear 23 thereon with the pinion, at this time being actuated. In this way, as will be understood, the operation of the disk 7, in the manner hereinbefore described will impart movement to the wheel 14, for registering the movement of said disk, and the wheel 14, in turn, by means of its tooth 21, will operate the pinion 24, and it in turn will transmit motion to the wheel 15. Such movement being successively carried out by the teeth 21, of the wheels 15 and 16, coöperating with the pinions 25 and 26 and they in turn coöperating with the gears of the adjacent registering wheels. It is needless to mention that each of the registering wheels which have been referred to are provided with suitable characters such as numerals, by means of which an operator is enabled to read the amount registered by the joint operation of the disk 7, and said registering wheels; and it is immaterial in this instance whether said registering wheels are employed for registering tons of resistance in trains of cars in lieu of the gross weight thereof, or whether they are employed or the devices herein in connection with a computing machine where it is intended to add or to multiply.

In connection with my improvements there may be employed, in fact in this instance, there is employed a numbering device comprising a pair of numbering wheels 29 and 30, which indicate or register each distinct and separate operation of said disk 7. When using the computing machine in connection with or for the purpose of registering the tonnage resistance in trains of cars, where each operation of the machine computes the amount of each car placed in the train it is preferable, although it may not be deemed necessary, to indicate by the registering mechanism the number of cars placed in a train. For the reason, that train length may make considerable difference in the computation of the resistance in the said train, and for this purpose the numbering wheels 29 and 30, have been provided.

The wheels 29 and 30 are loosely carried on a longitudinaly disposed shaft 31, the opposite ends of which are journaled in the end walls 2, of the housing or casing comprising the closure for the operative parts of said machine; and carried by the said shaft and extending from the end wall 2 to the right, to the numbering wheel 29, is a sleeve 32. On the inner ends of this sleeve is carried a crank arm 33, to the free end of which is pivotally attached a weighted pawl 34. This weighted pawl is adapted with each movement of the sleeve 32, in a manner to be described, to engage with the teeth of a ratchet wheel 35, secured to the outer face of the numbering wheel 29, and by such engagement impart a partial rotation to the said wheel.

The manner of operating the sleeve 32 for the purpose of imparting movement to the numbering wheel 29 and thereby register each movement of the disk 7 is as follows: Attached to the sleeve 32 at or near the outer end thereof is a crank arm 36, and to the free end of said crank arm is pivotally attached or connected a bar 37 which extends inwardly and at its opposite end is pivotally connected to a crank arm 38, best seen in Fig. 2 and in dotted lines in Fig. 1. This last mentioned crank arm is connected with the lower end of a spindle 39 which has a suitable bearing on the inner face of the end wall 2 and to the upper end of said spindle there is attached an arm 40. The arm 40 in its normal position is best seen in Figs. 1 and 2, the same crossing the upper face of the disk 7 and operating in the groove 10 between the matching faces of the disks 7 and 9 and lies in the path of the metal pencil hereinbefore referred to which it is adapted to insert into one of the perforations 11 of the disk 9 whereby the disk 9 and the disk 7 may be rotated; and as the pencil engages with the arm 40 the said arm will be thrown in a position substantially as shown in dotted lines in Fig. 1, thereby operating the bar 37 and it in turn operating the crank arm 36 for rocking or partially rotating the sleeve 32 on the shaft 31. This operation of the sleeve 32, as will be seen, will elevate the crank arm 33, into the position shown in dotted lines in Fig. 13 and in so doing the weighted pawl 34 will engage with a ratchet tooth of the ratchet 35 of the numbering wheel 29 and impart a partial rotation to said numbering wheel. The first operation of the disk and the shaft 32 will indicate by the movements of the numbering wheel 29, "1" and with each successive operation of the said disks and sleeve 32 the numbering wheel 29 will correspondingly indicate the movements thereof. After the said disks and the sleeve 32 have been operated for



The lever 54 is shaped somewhat as shown in Fig. 2 having an upwardly extended or inclined portion 57 which is disposed beneath a horizontally disposed portion of the lever 53; and the said lever 54 is further provided with the depending portion 58 adapted to have engagement with a laterally extended stud or pin 59 projecting outwardly from the cradle or gear holder, see Fig. 2.

The operation of the levers 53 and 54 may be understood as follows: An operator desiring to return the registering and numbering wheels to zero will insert the metal pencil, above referred to, through an aperture (not shown) in the top wall of the casing of the machine which is preferably disposed above the plate portion 55 of the lever 53; and pressing down on the said pencil, he will rock or oscillate the lever 53 on its pivot and in so doing will raise the extension 56 from engagement with the upper edge of the cradle or gear holder and the horizontal portion of the said lever will press down on the upwardly extended portion 57 of the lever 54 and cause the said lever to be swung on its pivot. Such movement of the lever 54 will, by the engagement of the portion 58 thereof with the stud or pin 59 of the cradle or gear holder 28 cause the gear holder to be moved toward the left, looking at Fig. 2. This movement of the gear holder will cause the gear pinions 24, 25 and 26 as well as the shaft 27 supporting the same to be correspondingly moved, and places the said gear pinions out of alinement with the smooth surfaces of the wheels 14, 15 and 16; however, it is intended that the said gear pinions will not be moved out of alinement with the single teeth 21 of the lugs 20^a attached to the wheels 14, 15 and 16 aforesaid. That is to say, if the parts are placed in the positions just described and the mechanism is operated to reverse the movement of the registering wheels to bring them to zero, the teeth 21 as well as the gears 23 of each of the registering wheels co-act with the teeth of the said gear pinions during each complete rotation of the wheels 14, 15, 16 and 17 as they are reversed, the purpose of which, is to so retain the gear pinions 24, 25 and 26 that when the cradle or gear holder is released, in a manner to be described, and said gear holder is returned to the position shown in full lines in Fig. 2, the full width teeth of said gear pinions will move across the face of the wheels 15, 16 and 17 to assume their normal or natural positions on said wheels. The movement of the gear pinions across the face of the said wheels being similar to the position of the wheels and gear pinions shown in Fig. 12. It is understood that whatever movement is imparted to the gear pinions 24, 25 and 26 by the reciprocation of the gear holder 28 to the left is correspondingly imparted to the gear pinion 43, which cooperates with the numbering wheels 29 and 30 and that the return of the gear pinion 43 with respect to the wheels 29 and 30 is in all respects similar to the return of the gear pinions 24, 25 and 26.

I have employed a series of flat springs 60 which are intended to coöperate with the gear pinions 24, 25 and 26, said springs being secured at one end to the plate 52 and depend therefrom, see Fig. 2. When the sliding cradle or gear holder has been shifted to the left by the operation of the levers 53 and 54, as above explained the gear pinions are moved by the said cradle or gear holder into a position where portions 61 of said flat springs 60 enter in between the teeth of the said gear pinions. In addition to serving as a brake for the gear pinions and wheels coacting therewith when the same are reversed for the purpose of turning the registering wheels to zero, the portions 61 of the said springs serve as a lock against the registering wheels being moved forwardly; that is to say, if said springs are engaging the pinions in the manner just explained it would be impossible for a person to rotate the disk 9 to the right for the purpose of operating the registering wheels. And while there has not been shown in the drawings any such spring or equivalent device in connection with the pinion 43 which coöperate with the numbering wheels 29 and 30, yet, it is to be understood that any suitable brake or locking means may be used in connection therewith.

To prevent the weighted pawl 34, previously described, engaging with the teeth of the ratchet wheel 39 attached to the numbering wheel 29, when the same is being returned to zero, I have provided a strap or bar 62, see Figs. 13 and 14, which is attached to a cross piece in the machine or to any other suitable part thereof and the forward end of said strap or bar is so arranged that when the crank arm has been raised for the purpose of causing the pawl 34 to engage with the teeth of the ratchet wheel 35, and the said arm returns to its normal or lower position, the weighted end of the pawl 34 will engage with the strap or bar 62 and cause the said weighted pawl to be oscillated on its pivot and disengage the engaging portion of said pawl from the ratchet teeth of the ratchet wheel 35, or rather move the engaging portion of said pawl out of the path of travel of said teeth so that as the wheel 29 is reversed the teeth of the ratchet wheel cannot possibly engage with the acting portion of said pawl.

Pivotally connected to the inner face and the inner end of the cradle or gear holder 28 is shown a pawl 63, which has an acting portion 64 and a vertical extension 65. The

normal position of this pawl 63 when the cradle or gear holder 28 is in its inner projected or normal position, is substantially that position shown in Figs. 2 and 6, with the acting portion 64 of said pawl overlying a lug or extension 66 of one of the cross pieces of the casing. When the cradle or gear holder 28 has been moved to the left in the manner hereinbefore stated, the said gear holder operates against coil springs 67 and 68 on the shafts 27 and 44 respectively, and such movement of the gear holder 28 will carry with it the pawl 63, causing the acting portion 64 thereof to ride over and lock against the lug or extension 66 just referred to. The pawl 63 will thus operate to retain the gear holder and the gear pinions carried thereby in their shifted positions.

I will now describe the mechanism for releasing the pawl 63 from the lug or extension 66 to allow the springs 67 and 68 to return the gear holder and parts carried thereby to their normal position.

69 indicates a locking lever, best seen in plan in Figs. 1, 3, 4, 5 and 11 and one end of the said lever is adapted to have a threaded engagement with a threaded portion 70 of the shaft 5 and projecting beyond the shaft 5 on one side is provided with a finger 71, the opposite end of the said lever 69 being carried adjacent to the sleeve 32, then parallel and alongside the same for a short distance as at 72 and then bent at right angles as at 73 in the form of a yoke which rides on the sleeve 32 and the end of said yoke portion, preferably the upper part thereof, is provided with a laterally extended finger 74.

Coöperating with the locking lever 69 is a flat spring 75, best seen in plan in Figs. 1, 3, 4, 5, and 11 and in elevation in Figs. 2 and 14. One end of said spring is carried on the shaft 5 and the opposite end thereof is shaped somewhat like the corresponding end of the locking lever 69, except that it extends in the opposite direction, being provided with a yoke portion 76 to ride on the sleeve 32. And adapted to coöperate with the finger 74 of said locking lever is a pin or lug 77 projecting outwardly from the ratchet wheel 35 attached to the numbering wheel 49.

In Figs. 5 and 8 the registering and numbering wheels appear at zero; in which position the lug or pin 77 on the ratchet wheel 35 will engage the finger 74 of the locking arm 69, the position which the pin 77 will assume after the registering and numbering wheels have been reversed to zero. The position of the locking arm 69 when the registering and numbering wheels are at zero is such that the finger 71 thereof is engaging the extension 65 of the pawl 63 retaining the same in the elevated position, shown more particularly in Fig. 8. As the disk 9 is operated and movement is imparted to the shaft 5 through the gear 12 thereon, the threaded portion 70 of the said shaft is unscrewed from the locking lever 69, causing the said locking lever to be projected inwardly into the position shown in Fig. 11. In Fig. 9 the shaft 5 has made about one and one half revolutions allowing the pawl 63 to assume the position shown in said figure, and when the shaft 5 has made on or about three revolutions the pawl 63 will be in the position shown in Figs. 1, 2 and 6 and the locking lever in the position shown in Fig. 11, in which position the end 74 of the locking lever has moved out of the path of the pin 77 on the ratchet wheel 35 so as not to interfere with the forward movement of the numbering wheels 29 and 30. The movement of said locking lever 69, just described, compresses the spring 75 into the position shown in Fig. 11, and said spring serves to hold the locking lever in engagement with the threaded portion of the shaft 5, and while the shaft 5 may have a continuous forward movement for an indefinite period and retain the locking lever 69 and the spring 75 in the positions shown in Fig. 11, yet, immediately upon a reverse operation being imparted to the disk 9 and the shaft 5 through the gearing between the shaft and disk, the locking lever 69 through the pressure of the spring 75 thereon will take hold of the threads 70 on the shaft 5 and be screwed on to the said shaft until the inner end of the locking lever is placed in a position where the pin 77 on the ratchet wheel 35 will engage the same, when such parts connected with the ratchet wheel 35 have been returned to zero. It is understood that before a reverse operation is imparted to the disk 9 the lever 53 has been depressed in the manner stated which will shift the parts coöperating with the registering and numbering wheels into a position to enable the operator by a reverse movement of the disk to return the registering and numbering wheels to zero. When the locking lever reaches its extreme inner position, or that position which will place the inner end thereof in the path of movement of the pin 77 of the ratchet wheel 35, the finger 71 of said locking lever will engage with the extension 65 of the pawl 63 and elevate or disconnect the acting portion 64 of said pawl from the lug or extension 66, when the spring 67 and 68 will relax and force the cradle or gear holder back into its normal position, when the parts will assume that position shown more particularly in Figs. 5 and 8.

In the forward movement of the registering wheels the pawls 19 will ride over the extensions or fingers 22, of the lugs 20^a, somewhat in the manner seen in Fig. 13 and as the shaft 31 is rotated with each forward movement of the shaft 5 through and by

means of the train of gearing described, the notches 49 in the shaft 31 will ride beneath the pawls 47; but it will be understood that to take up and return the registering and numbering wheels to zero by reverse motion of the shaft 5 the extensions or fingers 22 of the lugs 20^a will engage with the pawls 19 and the notches 49 in the shaft 31 will engage with the pawls 47, which are pressed into the said notches by means of the springs 48, and in this manner simultaneously reverse the operation of the registering and numbering wheels and gather the same to zero.

While I have stated that it is through the dropping of the crank 33 to which the weighted pawl 34 is attached which causes the rocking of the sleeve 32 to return the arm 40 to the position shown in full lines in Fig. 1 yet, it is to be understood that such operation need not necessarily rely on the dropping of the crank arm 33 as a spring or some other suitable means (not shown) may be employed for returning the sleeve 32 and parts connected therewith to their normal positions.

It is obvious from the foregoing description of my improvements that the application of the same need not necessarily be confined in connection with a computing machine of the type herein described as the same will be found applicable to other and various types of computing machines; it is also obvious that the result herein aimed at may be accomplished by modifying the construction of the elements composing the said invention or by adopting equivalents thereof and I do not wish to be confined to the exact details of construction shown and described.

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, registering mechanism, comprising numbering wheels operating in uniform sequence, means for operating said wheels, pinions associated with said wheels, a support for said pinions, means for moving said support and pinions axially of said wheels, means for automatically locking said support, and means dependent upon a reverse operation of said register operating means for releasing said locking means.

2. In a computing machine, registering mechanism, comprising numbering wheels operating in uniform sequence, means for operating said wheels, pinions associated with said wheels, a reciprocally arranged support for said pinions, means for reciprocating said support, means for automatically locking said support, and means dependent upon a reverse operation of said register operating means for releasing said locking means.

3. In a computing machine, registering mechanism, comprising numbering wheels operating in uniform sequence, pinions associated with said wheels for imparting movement to adjacent wheels, instrumentalities for accomplishing a forward and reverse movement of said wheels and pinions, a support for said pinions, a lever for moving said support and pinions axially of said wheels, means for locking said support, means controlled by the instrumentalities aforesaid for releasing said locking means, and means for automatically returning the support and pinions upon the release of the locking means.

4. In a computing machine, registering mechanism, comprising numbering wheels operating in uniform sequence, pinions associated with said wheels for imparting movement to adjacent wheels, instrumentalities for accomplishing a forward and reverse movement of said wheels and pinions, a reciprocally arranged support for said pinions, a lever for reciprocating said support, means for locking said support, means controlled by the instrumentalities aforesaid for releasing said locking means, and means for automatically returning the support and pinions upon the release of the locking means.

5. In a computing machine, the combination of registering mechanism, comprising numbering wheels operating in uniform sequence, a tallying device also comprising numbering wheels operating in uniform sequence, means for simultaneously operating the register and tallying wheels, gearing interposed between said register and tallying wheels, pinions associated with both sets of wheels, a support for said pinions, means for moving said support and pinions axially of the wheels, means for automatically locking said support, and means dependent upon a reverse operation of said register and tallying operating means for releasing said locking means.

6. In a computing machine, the combination of registering mechanism, comprising numbering wheels operating in uniform sequence, a tallying device, also comprising numbering wheels operating in uniform sequence, means for simultaneously operating the register and tallying wheels, gearing interposed between said register and tallying wheels, pinions associated with both sets of wheels, a reciprocally arranged support for said pinions, means for reciprocating said support, means for automatically locking said support, and means dependent upon a reverse operation of said register and tallying operating means for releasing said locking means.

7. In a computing machine, the combination of registering mechanism, comprising numbering wheels operating in uniform se-

quence, a tallying device, also comprising numbering wheels operating in uniform sequence, means for simultaneously operating the register and tallying wheels, gearing interposed between said register and tallying wheels, pinions associated with both sets of wheels, a support for said pinions, means for moving said support and pinions, means for automatically locking said support means dependent upon a reverse operation of said register and tallying operating means for releasing said locking means, and means for automatically returning the support and pinions upon the release of the locking means.

8. In a computing machine, registering mechanism, comprising numbering wheels operating in uniform sequence, a tallying device also comprising numbering wheels operating in uniform sequence, independently arranged mechanism for imparting a forward movement to the register and tallying wheels, means for simultaneously operating such mechanism, and devices common to all of said numbering wheels, whereby they may be returned to zero simultaneously, by a reverse operation of said numbering wheel operating means.

9. In a computing machine, the combination of a plurality of sets of numbering wheels operating in uniform sequence, independently arranged mechanism for imparting a forward movement to each of said sets of wheels, means for simultaneously operating such mechanism, devices common to all of said numbering wheels, whereby they may be returned to zero simultaneously, by a reverse operation of said numbering wheel operating means, mechanism coöperating with said numbering wheels for releasing said wheels when they are moving forwardly, but adapted to be moved into a position for locking and retaining said numbering wheels, as they are gathered to zero.

10. In a computing machine, comprising a plurality of successively operated numbering wheels operating in uniform sequence, pinions associated with said wheels for imparting motion to adjacent wheels, a revolubly supported disk, gearing interposed between said disk and numbering wheels, a support for said pinions, means independent of the disk for moving said support and numbering wheels, and locking means associated with said support, said locking means capable of being released only by a reverse operation of said disk and interposed gearing.

11. A computing machine, comprising a plurality of wheels provided with indicating characters, a slidably supported member, means carried by said member and coöperating with said wheels, whereby the said wheels may be successively operated at predetermined intervals through the operation of its preceding wheel, mechanism for operating said wheels, a depressible member, means operated by said member when depressed for moving the slidable member and with it the parts supported thereby, means operated by the wheel actuating mechanism aforesaid for releasing said member, and mechanism acting automatically to return said slidable member to its normal position upon the release of said member.

12. A computing machine, comprising a plurality of registering wheels arranged with gear teeth, a movably supported member, a plurality of gear pinions supported by said member and adapted to not only have a coacting relation with the teeth of said wheels, but also adapted to have a cam relation with a smooth face of said wheels, mechanism for operating the said wheels, means for moving said member and with it the gear pinions, for the purpose of removing said gear pinions from a cam relation with the wheels aforesaid, means for locking the member, a releasing means for said member, adapted to be operated at predetermined intervals by said wheel operated mechanism, and means for returning said member and gear pinions to their normal positions.

13. A computing machine, comprising a plurality of sets of numbering wheels, one of said sets of wheels being the registering means, the other of said sets of wheels tallying each operation of the first set of wheels, a movably supported member, a plurality of gear pinions supported by said member and adapted not only to have a coacting relation with the teeth of each set of wheels, but also adapted to have a cam relation with a smooth face of said wheels, mechanism for operating the said wheels, means for moving said member and with it the gear pinions, for the purpose of removing all of said gear pinions from a cam relation with the numbering wheels aforesaid, means for locking the member, releasing means for said member, adapted to be operated at predetermined intervals by said wheel operated mechanism, and means for returning said member and pinions supported thereby to their normal position.

14. In a computing machine, the combination of a plurality of numbering wheels operating in uniform sequence and provided with gear teeth, a gear pinion support mounted for reciprocation across the face of said numbering wheels, gear pinions mounted on said support and having a coacting relation with the teeth of said numbering wheels and also a cam relation with a smooth face of said wheels, mechanism for reciprocating said support and with it said gear pinions to release said pinions from cam engagement with said wheels, and means for returning the said support to its normal position at predetermined intervals to resume

the cam relation between the pinions and wheels.

15. In a computing machine, the combination of a plurality of coöperating register wheels, gear pinions associated with said wheels to transmit motion between adjacent wheels, a reciprocally mounted support upon which said pinions are mounted, a lever for locking said support in operative position, means operated by a depression of said lever for reciprocating said support and with it said pinions, and means for returning said support and pinions to their normal positions.

16. In a computing machine, the combination of a plurality of coöperating register wheels, means for operating said wheels, gear pinions associated with said wheels to transmit motion between adjacent wheels, a support for said pinions, a lever for locking said support in operative position, means operated by said lever for reciprocating said support and with it said pinions, means for locking said support in its shifted position, means dependent upon a reverse operation of the wheel operating means for releasing said locking means, and means for automatically returning said support and pinions to their normal position.

17. In a computing machine, the combination of a plurality of coöperating register wheels, means for operating said wheels, gear pinions associated with said wheels to transmit motion between adjacent wheels, a support for said pinions, a pawl pivotally attached to said support, a lever for locking said support in operative position, means operated by said lever for moving said support and with it the pinions, a stop with which said pawl will engage when the support is moved, to lock said support in its shifted position, means operated by a reversal of the wheel operating means for releasing the pawl from the stop, and means operating upon the release of said pawl for returning the support and pinions to their normal positions.

18. In a computing machine, the combination of a plurality of coöperating register wheels, means for operating said wheels, gear pinions associated with said wheels to transmit motion between adjacent wheels, a support for said pinions, a pawl pivotally attached to said support, a lever for locking said support in operative position, a second lever, means on said support with which said second lever may engage, said second lever operated with each depression of said locking lever for reciprocating said support and pinions, a stop with which said pawl will engage when the support is reciprocated, to lock said support in its shifted position, means operated by a reversal of the wheel operating means for releasing the pawl from the stop, and means operating upon the release of said pawl for returning the support and pinions to their normal positions.

19. In a computing machine, the combination of a plurality of spaced numbering wheels, coöperating means between said numbering wheels, certain of said wheels provided with circumferentially arranged gears on one side, and a single gear tooth on their opposite sides spanning the space between adjacent wheels, and certain of said wheels provided only with such single tooth, means for operating said wheels, a plurality of gear pinions normally in mesh with said circumferentially arranged gears and so constructed as to have a cam relation with the smooth peripheral faces of certain of said wheels, and to mesh with said single teeth aforesaid when said wheels are operated, means for moving said pinions across the faces of said wheels for destroying the cam relation between pinions and wheels, but retaining a meshing relation between the circumferentially arranged gears and said pinions, means for gathering the wheels to zero, and means for returning the pinions to their normal positions.

20. In a computing machine, the combination of a plurality of spaced numbering wheels, coöperating means between said numbering wheels, certain of said wheels provided with circumferentially arranged gears on one side, and a single gear tooth on their opposite sides spanning the space between adjacent wheels, and certain of said wheels provided only with such single tooth, means for operating said wheels, a plurality of gear pinions normally in mesh with said circumferentially arranged gears and so constructed as to have a cam relation with the smooth peripheral faces of certain of said wheels, and to mesh with said single teeth aforesaid when said wheels are operated, a reciprocally arranged support for said pinions, means for locking said support with the pinions in their normal positions, means for moving said support to destroy the cam relation between pinions and wheels, but retaining a meshing relation between the circumferentially arranged gears and said pinions, means for gathering the wheels to zero, and means for returning the support and pinions to their normal positions.

21. In a computing machine, the combination of a plurality of spaced numbering wheels, coöperating means between said numbering wheels, certain of said wheels provided with circumferentially arranged gears on one side, and a single gear tooth on their opposite sides spanning the space between adjacent wheels, certain of said wheels provided only with such single tooth, means for operating said wheels, a plurality of gear pinions normally in mesh with said circumferentially arranged gears and so constructed as to have a cam relation with the

smooth peripheral faces of certain of said wheels, and to mesh with said single teeth aforesaid when said wheels are operated, a reciprocally arranged support for said pinions, means for locking said support with the pinions in their normal positions, means for moving said support to destroy the cam relation between pinions and wheels, but retaining a meshing relation between the circumferentially arranged gears and said pinions, means for locking the support with the pinions moved from a cam relation with said wheels, means dependent upon a reverse operation of the wheel operating means for releasing said last mentioned locking means, and means operating upon the release of the support for returning said support and pinions to their normal positions.

22. In a computing machine, the combination of a plurality of spaced numbering wheels, coöperating means between said numbering wheels, certain of said wheels provided with circumferentially arranged gears on one side, and a single gear tooth on their opposite sides spanning the space between adjacent wheels, and certain of said wheels provided only with such single tooth, means for operating said wheels, a plurality of gear pinions normally in mesh with said circumferentially arranged gears and so constructed as to have a cam relation with the smooth peripheral faces of certain of said wheels, and to mesh with said single teeth aforesaid when said wheels are operated, means for moving said pinions across the faces of said wheels for destroying the cam relation between pinions and wheels, but retaining a meshing relation between the circumferentially arranged gears and said pinions, means for engaging the pinions when so moved to prevent their rotation in but one direction, means for gathering the wheels to zero, and means for returning the pinions to their normal positions.

23. In a computing machine, the combination of a plurality of spaced numbering wheels, coöperating means between said numbering wheels, certain of said wheels provided with circumferentially arranged gears on one side, and a single gear tooth on their opposite sides spanning the space between adjacent wheels, and certain of said wheels provided only with such single tooth, means for operating said wheels, a plurality of gear pinions normally in mesh with said circumferentially arranged gears and so constructed as to have a cam relation with the smooth peripheral faces of certain of said wheels, and to mesh with said single teeth aforesaid when said wheels are operated, a reciprocally arranged support for said pinions, a lever for locking said support with the pinions in their normal positions, means operated through the actuation of said lever for reciprocating said support and thereby destroying the cam relation between pinions and wheels, but retaining a meshing relation between the circumferentially arranged gears and said pinions, means for gathering the wheels to zero, and means for returning the support and pinions to their normal positions.

24. In a computing machine, the combination of a plurality of sets of numbering wheels, the wheels of each set provided with suitable gearing arranged circumferentially thereof, gearing between said sets of wheels, gear pinions associated with said sets of wheels, and so constructed as to normally have a cam relation with the peripheral faces of certain of the wheels of each set, mechanism for operating said sets of wheels, means for moving said pinions axially of said wheels to destroy the cam relation between pinions and wheels, but retain a meshing relation between the gearing of wheels and pinions, means for locking the pinions from a cam relation with said wheels, means dependent upon a reverse operation of the wheel operating means to release said locking means, and means operating upon the release of the locking means for returning said pinions to their normal positions.

25. In a computing machine, the combination of a plurality of sets of numbering wheels, the wheels of each set provided with suitable gearing arranged circumferentially thereof, gearing between said sets of wheels, gear pinions associated with said sets of wheels, and so constructed as to normally have a cam relation with the peripheral faces of certain of the wheels of each set, mechanism for operating said sets of wheels, a common support for all of said gear pinions, a lock for retaining the support and pinions in their normal positions, means operated upon the release of said lock for reciprocating said support and thereby destroy the cam relation between pinions and wheels but retain a coöperative relation between the gearing of wheels and pinions, means for automatically locking and holding the support when the pinions have moved from a cam relation with said wheels, means dependent upon a reverse operation of the wheel operating means to release said last mentioned locking means, and means operating upon the release of said locking means for returning said support and pinions to their normal positions.

26. In a computing machine, the combination of a plurality of sets of numbering wheels, the wheels of each set provided with suitable gearing arranged circumferentially thereof, gearing between said sets of wheels, gear pinions associated with said sets of wheels, and so constructed as to normally have a cam relation with the peripheral faces of certain of the wheels of each set, mechanism for operating said sets of wheels,

means for moving said pinions axially of said wheels to destroy the cam relation between pinions and wheels, but retain a meshing relation between the gearing of wheels and pinions, means for engaging certain of said pinions when so moved to prevent their rotation in but one direction, means for locking the pinions from a cam relation with said wheels, means dependent upon a reverse operation of the wheel operating means to release said locking means, and means operating upon the release of the locking means for returning said pinions to their normal positions.

27. In a computing machine, the combination of a plurality of sets of numbering wheels, the wheels of each set provided with suitable gearing arranged circumferentially thereof, gearing between said sets of wheels, gear pinions associated with said sets of wheels, and so constructed as to normally have a cam relation with the peripheral faces of certain of the wheels of each set, mechanism for operating said sets of wheels, a common support for all of said gear pinions, a lever for locking the support and pinions in their normal positions, a second lever in operative connection with said support and adapted to be operated upon when said first mentioned lever is released, for reciprocating said support and thereby destroy the cam relation between pinions and wheels, but retain a coöperative relation between the gearing of wheels and pinions, means for automatically locking and holding the support when the pinions have moved from a cam relation with said wheels, means dependent upon a reverse operation of the wheel operating means to release said last mentioned locking means, and means operating upon the release of said locking means for returning said support and pinions to their normal positions.

28. In a computing machine, the combination of two sets of numbering wheels, each set comprising a plurality of coöperating wheels, gearing between the sets of wheels, one wheel of one set provided with a laterally extended stop pin, a shaft for the other set of wheels having one end threaded and a gear on said shaft, means in operative connection with said gear and with said other set of wheels for operating the same, a plurality of gear pinions associated with said wheels and normally having a cam relation therewith, a reciprocally mounted support for said pinions, a lock for holding said support in its normal position, means operated by the release of said lock for reciprocating said support and separating said pinions from a cam relation with said wheels, a pawl pivotally attached to said support and a stop with which the pawl will engage when said support has been moved as aforesaid for locking the support in such position, an arm carried one end on the aforesaid shaft and its opposite end movable into and out of the path of the stop pins on said wheel, said arm controlled by the operation of the said shaft through the thread thereon, and during a portion of its movement adapted to have engagement with said pawl, substantially as and for the purposes specified.

29. In a computing machine, in combination, the shaft 5, the numbering wheels thereon, the cradle 28, the shaft 27 thereon, the pinions on said shaft in mesh with said numbering wheels, the lever 54 for shifting said cradle, the lever 53 for operating the lever 54, means for locking the cradle when shifted, means for releasing the cradle locking means, and means for returning the cradle when the locking means is released.

30. In a computing machine, in combination, the shaft 5 and gear 12 thereon, the numbering wheels 14, 15, 16 and 17 on said shaft, the cradle 28, the shaft 27 thereon, the pinions on said shaft in mesh with said numbering wheels, the disk 7 having gear teeth in mesh with the gear 12, the lever 54 adapted to move the cradle, when operated, the lever 53 for operating the lever 54, means for locking the cradle when shifted, means operated by the shaft 5 for releasing the cradle locking means, and means for returning the cradle when the locking means is released.

31. In a computing machine, in combination, the shaft 5 having the gear 12, and threaded for a portion of its length, a plurality of numbering wheels on said shaft, the cradle 28, the shaft 27 thereon, the pinions on said shaft in mesh with said numbering wheels, the disk 7 having gear teeth in mesh with the gear 12, the lever 54 adapted to move the cradle, when operated, the lever 53 for operating the lever 54, means for locking the cradle when shifted, means operated by the shaft 5 for releasing the cradle locking means, and means for returning the cradle when the locking means is released.

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

JOHN M. DALY.

Witnesses:
WILLIAM G. THOMSON,
ARTHUR JONG.