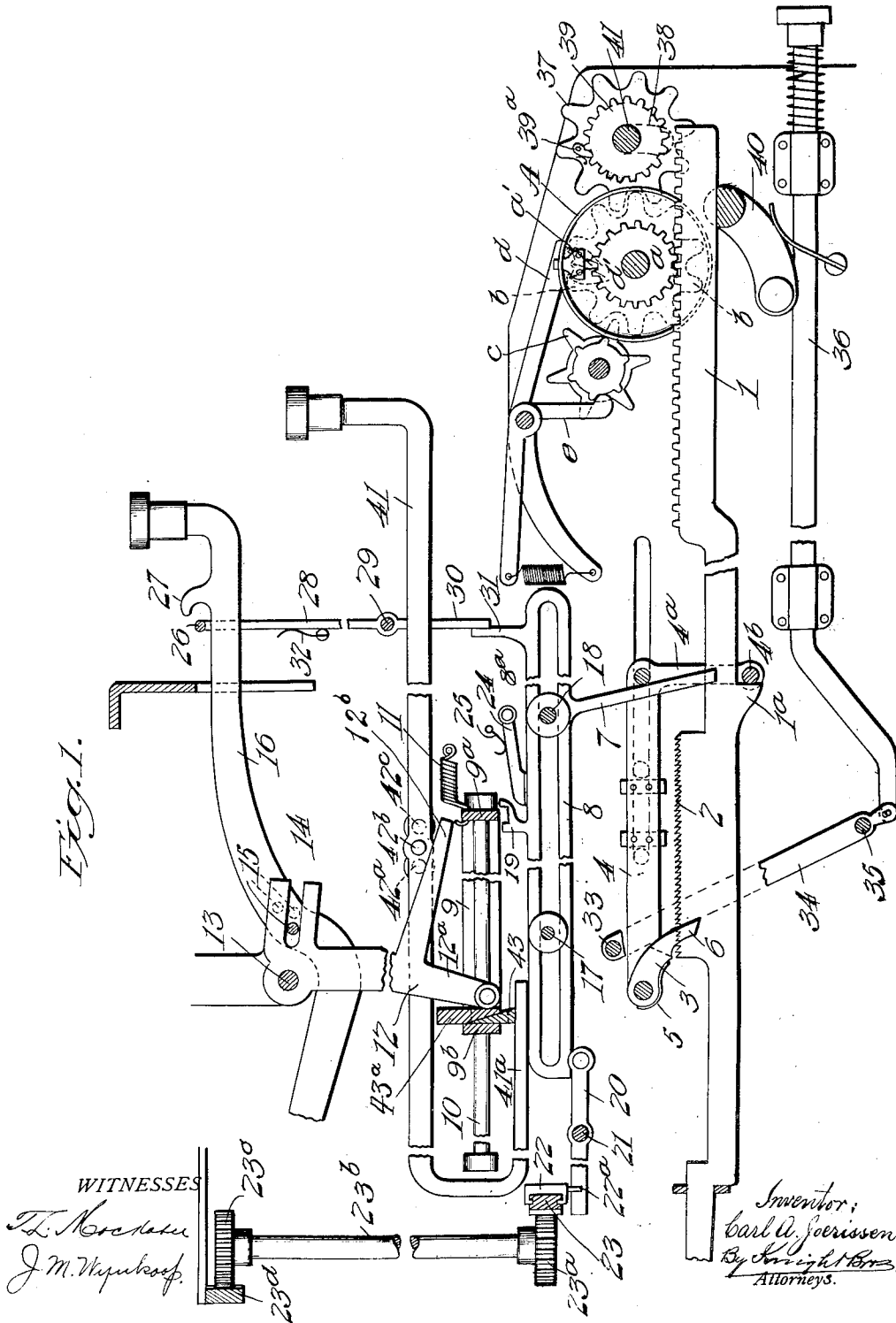
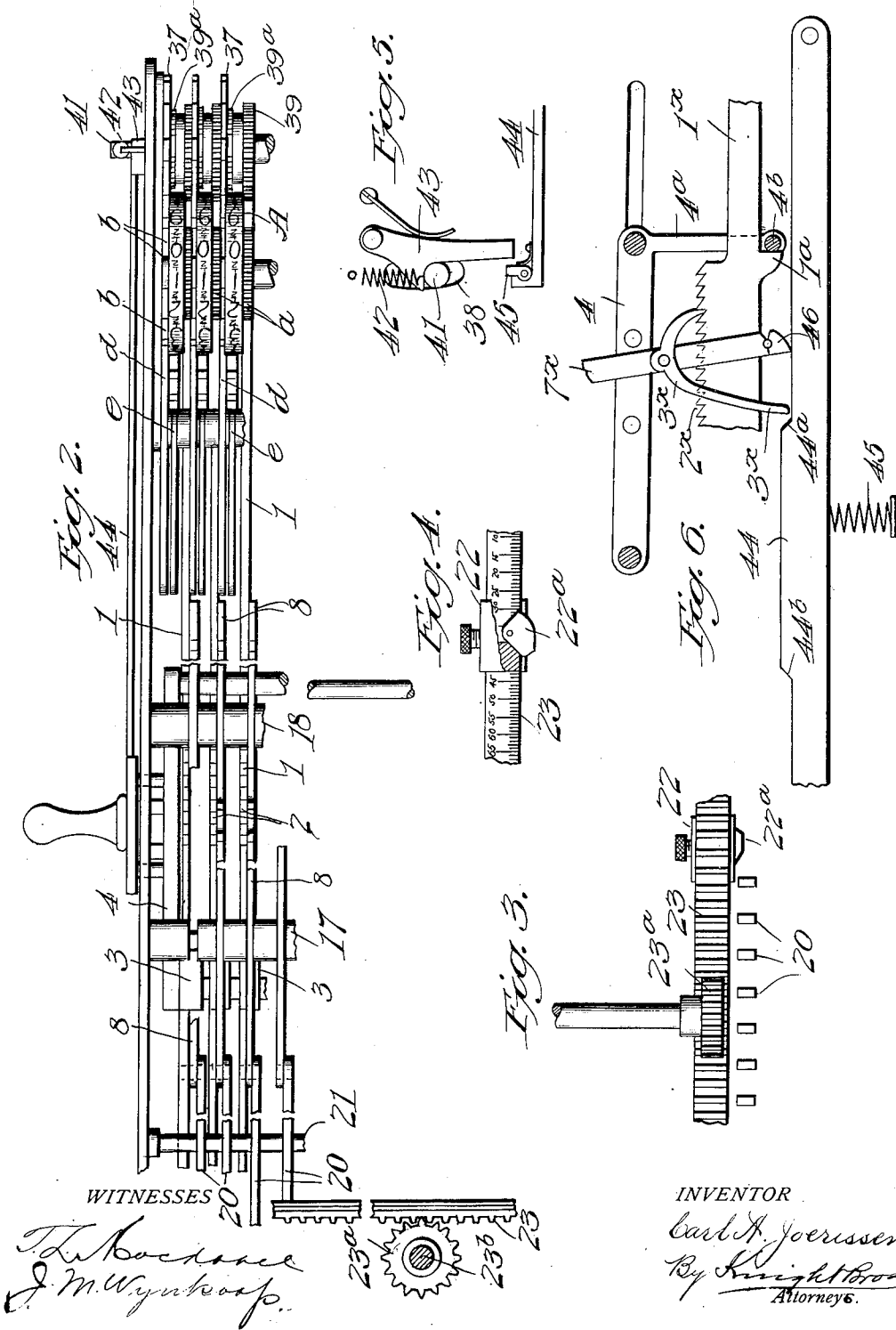


1,007,576.

Fig. 1.



1,007,576.



# UNITED STATES PATENT OFFICE.

CARL A. JOERISSEN, OF WASHINGTON, DISTRICT OF COLUMBIA.

## COMPUTING-MACHINE.

1,007,576.

Specification of Letters Patent.

Patented Oct. 31, 1911.

Application filed March 8, 1911. Serial No. 613,174.

### *To all whom it may concern:*

Be it known that I, CARL A. JOERISSEN, a citizen of the United States, residing at 1206 F street northwest, in the city of Washington, District of Columbia, have invented certain new and useful Improvements in Computing-Machines, of which the following is a specification.

This invention relates to a computing machine adapted to be associated with a typewriting machine, in such relation that the position of the paper carriage will act as a selector for the denomination, while the operation of the figure keys will act to determine the value of movement to be imparted to the character wheels when the universal operating member imparts the totalizing throw.

The objects of the invention are to greatly simplify the construction of a machine having these several functions, and reduce the number of parts incident thereto; also to provide a simple form of reversing or subtracting means; also to provide simple means whereby fractional values may be introduced into the addition or subtraction; also to provide a suitable locking means which will be automatically thrown in each time the denominational selector introduces the units tripper, in order that the figure keys may be locked until after the totalizing member is operated.

In carrying out the invention, I employ some or all of the following mechanisms, to wit:—computing wheels of a known type, which are operated by a pinion for each wheel, engaged by a reciprocating rack for each wheel, which receives a throw proportional to the angular movement to be imparted to the wheel and to actuate the racks, each is constructed with ratchet teeth adapted to be engaged by the corresponding one of a series of pawls, all mounted on a universal totalizing carriage; said pawls, all moving at each throw of said totalizing carriage, but only that pawl being depressed into engagement with its rack, whose tripper has previously been set by a figure key, in the path of said pawl, and being made to engage the ratchet only after moving against the tripper, at its set position and moving the rack only from then on to the end of the throw of the carriage; in other words, during a greater or less proportion of the throw of the totalizing carriage, according to the position of the tripper previously deter-

mined by the particular figure key of the typewriter, that has been depressed; there being one rack-bar, one pawl and one tripper for each denominational wheel; all the figure keys acting through the medium of a universal key bar adapted to impart setting movement to any tripper that may be interposed in its path; a denominational selector operated by the position of the paper carriage being provided to determine which of the trippers shall be brought within the sphere of influence of the universal key actuated setting bar, and therefore determining which denominational computing wheel is to receive the setting movement of the key depressed; a filler piece adapted to be introduced between the universal setting bar and the figure key connections, whereby the movement of the setting bar will be given a value equal to a fraction of a unit in addition to that determined by the key lever; a universal locking rod for all the figure keys having a controlling bar engaged by the units tripper so that whenever the number is completely expressed on the typewriter, the figure keys will remain locked until the totalizing carriage has been actuated and an idler gear wheel adapted to be introduced between the rack and the computing wheel pinion, so as to reverse the driving effect of the rack for purposes of subtraction.

The invention will be fully understood upon reference to the accompanying drawings, in which—

Figure 1 is a detail view of the parts of a typewriter and of a computing machine concerned with my present invention; Fig. 2 is a horizontal section on the line 2—2, Fig. 1, looking downward; Fig. 3 is a detail view showing the relation of the denominational selector levers to the rack-bar which operates them; Fig. 4 is a detail of the cam through which the rack-bar depresses the selecting levers; Fig. 5 is a detail view of the connection through which the machine is restored from subtracting to adding position each time the totalizing carriage is operated; and Fig. 6 is a detail view of a modified form of rack-bar operating pawl and parts associated therewith.

A represents a group of computing wheels of any approved construction, which correspond in number to the denominational spaces required in the use of the machine, say nine in number, so as to express cents and dollars up to one million. Each of these

computing wheels carries an actuating pinion *a*, connected to the wheel by a ratchet which permits the pinion to idle in one direction and to drive in the other. Wheels *b* and *c* are transfer wheels through which to drive from one denomination to the next after complete rotation of the driving wheel. Pawls *d* and *e* act to hold the adjustments of the wheels *A* and *c*. These parts form no portion of my present invention.

1 represents a rack-bar adapted to mesh with the pinion *a* and to move in the direction of its length a sufficient distance to impart a complete revolution to the wheel *A*. In order to move the bars 1, each bar is provided with a ratchet 2, adapted to be engaged by an independent pawl 3, which is carried by a universal totalizing carriage 4, which reciprocates a distance sufficient to develop a complete revolution of one of the wheels *A*. In order to determine how much of the complete distance any bar 1 is to be moved by its pawl 3, said pawl is held by a spring 5 normally out of engagement with the rack 2, and is only brought into engagement with its rack when a tail 6, on a pawl impinges against a tripping arm 7 on the reciprocating tripper 8. In order to impart different positions to the tripper 8, according to the figure key that is depressed, and therefore to lend to the throw of the bar 1 a driving value corresponding to the figure on the key depressed, a universal setting frame 9 on bar 10, or other suitable mounting, is adapted to be moved in opposition to its return spring 11, by any one of a series of levers 12, corresponding in number to the ten figure keys (nine digits and zero), fulcrumed at 13 and having bifurcated ends 14 that receive the pins 15, located at such different positions on the key levers 16 as to give a specific value of throw from each key lever 16 to the operating lever 12. Each lever 12 has an arresting tail 12<sup>b</sup> entering the path of the front bar 9<sup>a</sup> of the setting frame when the lever enters into action, so as to prevent the frame overrunning the throw imparted to it, and inasmuch as the notched projection 19 engages both in front and in rear of the bar 9<sup>a</sup>, there is a like accurate positioning restraint on the trippers 8.

In order to select the computing wheel *A* corresponding in denominational position to the printing position of the carriage at the time any figure lever is depressed and thus cause the digit registered to assume the proper relation in the count, each tripper 8 is supported on its bearings 17, 18 with a sufficient degree of vertical movement, particularly at its rear bearing 17, to permit its notched projection 19 to enter the path of the forward bar 9<sup>a</sup> of the universal setting carriage 9, and there is provided for the trippers 8, means actuated by the tripper carriage for lifting each tripper as the cor-

responding tabular point of the carriage reaches the printing point; said means being conveniently provided by levers 20, one for each tripper, fulcrumed at 21 and projecting into the path of a cam 22, mounted to travel with the rack 23, so that whenever the paper carriage is at rest, the cam 22 stands above one of the levers 20 and is holding the projection 19 of the corresponding tripper 8, into the path of the bar 9<sup>a</sup> where it remains until a key lever 16 is depressed and the next throw to the setting frame 9 and corresponding movement to the tripper 8 is imparted, after which the spacing movement of the carriage moves the cam 22 off the principal lever 20 and on to the next, allowing the tripper 8 to again settle to its lower position, but in the set position which has been imparted to it and by which the value of the throw transmitted from the totalizing carriage 4 to the rack-bar 6 will be determined. If it be desired that cam 22 act upon the levers 20 only in the direction of feeding movement of the carriage, its cam face is provided with a dog 22<sup>a</sup>, rigid in one direction but yielding in the opposite direction. Rack 23 is driven by pinion 23<sup>a</sup> carried on the lower end of shaft 23<sup>b</sup>, whose upper end carries a pinion 23<sup>c</sup> meshing with a rack 23<sup>d</sup>, carried by the paper carriage. The racks 23<sup>a</sup> and 23 are on opposite sides of the shaft 23<sup>b</sup> in order that the movement imparted to the rack 23 and the order in which the denominational wheels are affected will be the same as the reading direction of the imprint on the paper which, of course, is opposite to the movement of the carriage by which the printing point is shifted. In order that the cam 22 may be set at any desired position on the rack 23, corresponding to the tabular location of the computation to be printed, it carries a set screw 22<sup>b</sup> which affords convenient means for fixing it in any position to which it may be shifted and in this connection, the rack-bar 23 may be calibrated in accordance with the graduation bar on the front of the typewriter (see Fig. 4). In order to hold the tripper 8 in its adjusted position, yieldingly, and insure depression of the pawl 3 upon the rack 2, yet without sufficient resistance to arrest the totalizing carriage 4, a friction pawl 24 under the influence of a spring 25, normally rests in the undulated upper surface 8<sup>a</sup> of the tripper 8, and tripper 8, which has been advanced from the normal or unaffected position shown in Fig. 1, for the purpose of throwing in the pawl 3 on the carriage 4, will be returned to its normal position by the throw of the carriage 4 engaging the tripper through said pawl, and the tripper arm 7, the friction pawl 24 being designed merely to return the tripper yieldingly in any position to which it may be moved by the setting frame 9.

In order that the figure keys may be

locked after the several digits have been expressed and until the totalizing carriage has been thrown to register the number expressed, a locking bar 26 extends across all the figure keys, beneath shoulders or hooks 27 on said keys, and for conveniently operating the same, said bar is mounted upon levers 28 fulcrumed at 29 and having an end 30 entering the path of a projection 31 on the units or lowest tripper 8, a spring 32 being positioned to press the bar 26 beneath the hooks 27 whenever said tripper leaves its normal position and retain it as a lock to said key levers until the throw of the totalizing carriage restores the zero or lowest tripper 8 to initial position and withdraws said locking bar.

It frequently happens that a number is expressed incorrectly or other reason arises which makes it desirable to delete or eliminate the number expressed without having it enter into the computation; for this purpose an eliminating bar 33 extends across all of the trippers 8 so as to be adapted to move them all back to normal position; this bar being conveniently mounted upon supporting levers 34, fulcrumed at 35 and extending beyond the fulcrum into the path of a push bar 36.

To restore all of the rack-bars 1 to initial position, the totalizing carriage 4 has downwardly projecting arms 4<sup>a</sup>, at each end, one only being shown, which support the universal bar 4<sup>b</sup> in position to encounter shoulders 1<sup>a</sup> on the rack-bars 1.

In order to transmit the graduated movements of the rack-bars with the value or effect of subtraction rather than addition, in the wheels A, idlers 37, normally in mesh with the gear wheels A, are adapted to move in arcuate slots 38, concentric with the wheels A until their pinions 39 not only intermesh with the rack-bars 1, but press said rack-bars, in opposition to the spring pressed supports 40, out of mesh with the pinion *a*, so that each outward throw of the rack bar 1, transmitted through the pinion 39, will be reversed in its effect upon the wheel A. It is to be understood that the pinions 39 and *a* are provided with ratchets 39<sup>a</sup> and *a'*, whereby they drive in one direction, but idle in the other direction with reference to the gear wheels 37 and *a* which they drive.

As will be seen in Fig. 5, the shaft 41 of pinion 39 is drawn normally upward by springs 42 (one only being shown) but is provided with spring pressed retaining latches 43 so that when said idler is depressed, it will be retained in its depressed position with subtraction effects until the latch 43 is released. This may be done automatically by the act of throwing the totalizing carriage, for which purpose said totalizing carriage is provided with bar 44 carry-

ing a pawl 45 into whose path the latch 43 projects, but which is yielding on the forward or totalizing movement of the totalizing carriage and maintains the subtracting conditions until after the throw of said carriage is complete, but which said pawl 45 is rigid in the return movement of the totalizing carriage and by such movement trips latch 43 and allows the series of idlers to return to normal position.

The mechanism is adapted to register fractions of a unit as well as whole units by providing means whereby the tripping arms 7 may be adjusted distances corresponding to the fractions to be registered, instead of whole units, in which event, the number of teeth on the ratchet 2 will not only be equal to the number of unit teeth in the wheel A but as many times that number as the divisions of a unit desired to be registered; that is to say, if it be desired to register halves as well as whole units, there will be twice as many teeth in the ratchet 2 as there are unit teeth in the wheel A, and if it be desired to measure quarters, there will be four times as many teeth in the ratchet 2 as there are unit teeth in the wheel A. To provide for holding the wheel A at fractional adjustments, the pawl *d* may be provided with depressions such as *d'*, which will adapt it to rest upon the top of a unit tooth *b* in the wheel A and thus arrest the latter in an intermediate position, or it will be provided with three set depressions *d'*, which will adapt it to hold a tooth in three positions intermediate between the whole unit positions. To adapt the setting frame 9 to move the tripping arm 7 to these fractional positions, said frame is provided with a filler bar 43 adapted to enter between the bar 9<sup>b</sup> of the setting frame and the end 12<sup>a</sup> of the lever 12 and to be introduced at will by the depression of a fractional key lever 41. By constructing the bar 43 with a wedging section, as shown, it is obvious that it may space the bar 9<sup>b</sup> at different distances from the end 12<sup>a</sup>, according to the extent of insertion of the bar 43, which in turn is rendered electively possible by mounting different keys 41 on different fulcrums 42<sup>a</sup>, 42<sup>b</sup> or 42<sup>c</sup>, so as to give their ends 41<sup>a</sup> different throws. If the fractional key levers 41 alone be manipulated, the tripping arm 7 will receive only a fractional adjustment; but if a whole figure key lever 16 be depressed simultaneously with or preceded by depression of a fractional lever 41, the adjustment of the tripping arm 7 will have the value of the whole figure plus the fraction.

The operation of the mechanism is as follows. Whenever one of the figure keys 16 is depressed, the lever 12 will be thrown a greater or less distance according to the position of the operating pin 15, located to accord with the figure to be expressed by

the key and the lever 12 in turn imparts a throw to the setting frame 9, which also varies according to the particular figure key depressed. The frame 9, in moving (to the left in Fig. 1) engages the projection 19 on that one of the trippers 18 which corresponds to the denominational position which the printing point of the carriage is occupying for the time being, owing to the corresponding positioning of the cam 22 above the particular lever 20 which controls said tripper. This results in the arm 7 corresponding to the particular denomination being moved (to the left in Fig. 1) a distance corresponding to the figure value of the key 16 depressed. Immediately on completion of the stroke of the key 16, and the printing stroke of the typewriter (not shown) resulting therefrom, the paper carriage feeds one space in the usual manner and removes the cam 22 from above the lever 20 for the time being affected, so that the particular tripper 8 can drop back out of the path of the setting frame 9 and the tripper 8 will be left in the position to which it is set. This operation is repeated until sufficient of the figure keys have been depressed to express the entire number to be registered, and until the units key has been operated, by which the key lock 26, 28 will be moved beneath the hooks 27. The totalizing carriage is then moved for the purpose of transmitting to the respective registering wheels, rotary movement corresponding to each of the figure values represented by the positions of the arm 7 corresponding to the different denominational points. In moving the totalizing carriage 4, all of the pawls 3 are given the full throw of the carriage. But no pawl transmits any movement to the corresponding rack-bar 1 until it first encounters the arm 7 of its own particular tripper, after which continued movement of the pawl will be transmitted to the rack-bar 1 and through it to the registering wheel 8 and as each arm 7 has previously assumed a position corresponding to the particular digital value to be expressed in the particular denominational position, it follows that the register wheel in each denominational position will receive the intended advance, if the operation is one of addition, or retrogression, if the wheel 37 has been thrown in to make the operation one of subtraction. If the number to be expressed involves a fractional unit, such for instance as one half, the key 41 is depressed which causes the lever end 42 to rise and introduce a universal filler bar 43 to force its way between the rear bar 9<sup>b</sup> of the setting frame 9 and all of the lever ends 12<sup>a</sup> of the levers 12 so as to give to the throw of the setting frame 9 a value of one tooth measured on the ratchet 2, equal to the particular fraction of a tooth of the wheel A which the lever 41 and bar 43 is

designed to effect; thus if lever 41 is designed to effect a change of one half of one unit in the wheels A, there will be twice as many teeth in the ratchet 2 as in the wheel A and the thickness of the bar 43 will be sufficient to advance the arm 7 a distance of one of the teeth of the ratchet, but if the key 41 be intended to express quarters, as one quarter, two quarters or three quarters, there will be four times as many teeth in the ratchet 2 as there are in the wheel A and the bar 43 will be tapered so as to effect different spacing between the end 12<sup>a</sup> of lever 12 and the bar 9<sup>b</sup>, and the quarter, half and three quarter keys 41 will be adapted to interpose the bar 43 different distances, corresponding to the fraction to be expressed. In registering fractions of units on the wheel A, the pawl *d* will be adapted to hold the wheel at different fractional positions, as for instance, by providing it with a notch *d*<sup>1</sup>, which adapts it to rest on top of one of the teeth *b*, for arresting the wheel at a revolution equal to half of one of the teeth *b* or by making three such notches if the pawl is to be adapted to arrest the wheel after a revolution of one fourth, two fourths or three fourths.

According to the modification shown in Fig. 6, the bar 7 carries the pawl for engagement with the ratchet and this pawl is made to engage the ratchet in any position to which the arm 7<sup>\*</sup> is adjusted, so that as soon as the totalizing member 4 encounters the arm 7<sup>\*</sup>, the rack-bar begins to move and has imparted to it a throw proportional to the previous adjustment of the pawl effected by the figure keys. To force the pawl into engagement, a bar 42 is located in the path of the tail of the pawl and this serves not only the purpose of throwing the pawl into engagement, but throwing it out of engagement on the backward movement of the parts.

When it is desired to write all the digits of a number to be expressed and correspondingly set all of the operating connections previous to transmitting the appropriate throw to the register wheels in the different denominational positions, it will be necessary to employ any of the usual means for transmitting from each lower register wheel to that in the next higher position, rotary movements corresponding to any number of units in excess of nine that may be imparted to the lower wheel. In order that this may be done without interfering with the registering movement that may for the time being, be imparted to the higher wheel by its own independent driving rack, the transfer means will preferably act, as heretofore, on the return or idling movement of the wheel operating racks.

I claim:—

1. A computing machine comprising a plurality of registering means, representing

a series of denominations in a number to be expressed, individual actuating members for the respective registering members, normally disengaged individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them adapted to have driving connection with any of the actuating members, a series of individually adjustable tripping members adapted to throw the respective connecting members into engagement and thereby establish said driving connection, a setting means for positioning the tripping members and a denominational selecting means introducing the different tripping members to the influence of the setting means.

2. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, normally disengaged individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them driving any of the actuating members when the corresponding connecting member is thrown into driving engagement, a series of individually adjustable tripping members for throwing the respective connecting members into driving engagement and a setting means for positioning the tripping members; said setting means being constructed to be brought under the control of the figure keys of a typewriter.

3. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members and a denominational selecting means introducing the different tripping members to the influence of the setting means; said setting means being common to all the tripping members.

4. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping

members for the respective connecting members, a setting means for positioning the tripping members and a denominational selecting means introducing the different tripping members to the influence of the setting means; said setting means being common to all the tripping members and said denominational selecting means having connections through which it is moved by the operation of a typewriter, into successive controlling relation to the respective trippers.

5. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members and a setting means for positioning the tripping members and means imparting a fractional variation in the throw of the setting member, whereby the normal setting movement will have a fractional effect on the tripping members and through them have a fractional registering effect in the register actuating members.

6. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members, individual driving connections for the setting member corresponding in number to the figure keys of the typewriter and constructed to impart to the setting means different throws corresponding in value to the digits of the number keys.

7. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members, individual driving con-

nections for the setting member corresponding in number to the figure keys of the typewriter, constructed to impart to the setting means different throws corresponding in value to the digits of the number keys and means varying the connection between the setting member and the several key actuated driving connections, whereby the influence of the latter upon the shifting member is modified to a degree corresponding to a fraction of a unit.

8. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members, individual driving connections for the setting member corresponding in number to the figure keys of the typewriter, constructed to impart to the setting means different throws corresponding in value to the digits of the number of keys and means varying the connection between the setting member and the several key actuated driving connections, whereby the influence of the latter upon the shifting member is modified to a degree corresponding to a fraction of a unit; said means comprising a filling piece having means for interposing it between the setting member and the key actuated driving connections.

9. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members, individual driving connections for the setting member corresponding in number to the figure keys of the typewriter, constructed to impart to the setting means different throws corresponding in value to the digits of the number keys and means varying the connection between the setting member and the several key actuated driving connections, whereby the influence of the latter upon the shifting member is modified to a degree corresponding to a fraction of a unit; said means comprising a filling piece having means for interposing it be-

tween the setting member and the key actuated driving connections, said filling piece being wedge-shaped, whereby it has different modifying effects upon the connection according to the degree of its insertion.

10. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members, individual driving connections for the setting member corresponding in number to the figure keys of the typewriter, constructed to impart to the setting means different throws corresponding in value to the digits of the number keys and means varying the connection between the setting member and the several key actuated driving connections, whereby the influence of the latter upon the shifting member is modified to a degree corresponding to a fraction of a unit; said means comprising a filling piece having means for interposing it between the setting member and the key actuated driving connections, said filling piece being wedge-shaped, whereby it has different modifying effects upon the connection according to the degree of its insertion, and there being a plurality of fractional figure keys respectively adapted to impart the different degrees of movement to the wedge-shape filling piece.

11. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members, said trippers being individually movable into the path of the setting member and there being for each of said trippers a connection for imparting said movement into the path of the setting member and a cam common to all of said moving connections, encountering them successively as the paper carriage progresses.

12. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for



the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members, a lifting lever for each of said trippers, a cam traversing the ends of the lifting levers and successively depressing them for the purpose of introducing the tripper into the path of the setting member and connections through which the cam is caused to traverse the levers, by the movement of the paper carriage.

13. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members, a setting means for positioning the tripping members, a lifting lever for each of said trippers, a cam traversing the ends of the lifting levers and successively depressing them for the purpose of introducing the tripper into the path of the setting member and connections through which the cam is caused to traverse the levers, by the movement of the paper carriage, comprising a rack-bar upon which said cam is mounted, a pinion imparting movement to said rack-bar and driving connections between the shaft of the pinion and the paper carriage.

14. A registering mechanism comprising register wheels corresponding in number to denominations in a number to be expressed, actuating members for the respective registering wheels and means for reversing the driving connection between the actuating members and the register wheels, comprising idlers movable into and out of simultaneous mesh with said actuating members and register wheels.

15. A registering mechanism comprising register wheels corresponding in number to denominations in a number to be expressed, actuating members for the respective registering wheels and means for reversing the driving connection between the actuating members and the register wheels, comprising idlers movable into and out of simultaneous mesh with said actuating members and register wheels and adapted by its movement into mesh, to displace the engagement of the actuating members with the register wheels.

16. In a registering mechanism, the combination of register wheels, actuating members for the respective register wheels, reversing connections movable into and out of transmitting relation between the actuating members and the register wheels, an operating member through which movement is imparted to the actuating members for driving the register wheels and a connection between said operating member and the reversing connections, whereby the reversing connections are thrown out of transmitting relation by the movement of the operating member.

17. In a registering mechanism, the combination of register wheels, rack-bars adapted to rotate said register wheels, and idlers movable into transmitting relation between the rack-bars and register wheels, whereby the driving effect of the rack-bar is reversed.

18. In a registering mechanism, the combination of register wheels, rack-bars adapted to rotate said register wheels, and idlers movable into transmitting relation between the rack-bars and register wheels, whereby the driving effect of the rack-bars is reversed; said idlers being normally in mesh with the registering wheels and moving concentric therewith in establishing and interrupting the reversing connections.

19. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members and a setting means for positioning the tripping members; said register wheel actuating members being constructed with ratchets and said connecting members comprising pawls forced into engagement with the ratchets by encountering the tripping members and thereby made to impart to the actuating members a length of throw determined by the previously set position of the tripping member.

20. A computing machine comprising a plurality of registering means, representing a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping members for the respective connecting members

and a setting means for positioning the tripping members; said register wheel actuating members being constructed with ratchets and said connecting members comprising  
 5 pawls forced into engagement with the ratchets by encountering the tripping members and thereby made to impart to the actuating members a length of throw determined by the previously set position of the  
 10 tripping member; said tripping members being returned to zero position with the movement of the actuating members.

21. A computing machine comprising a plurality of registering means, representing  
 15 a series of denominations in a number to be expressed, individual actuating members for the respective registering members, individual connecting members for the respective actuating members, a driving member  
 20 common to all the connecting members and through them receiving driving connection with any of the actuating members, a series of individually adjustable tripping mem-

bers for the respective connecting members and a setting means for positioning the tripping members; said register wheel actuating members being constructed with ratchets and said connecting members comprising  
 25 pawls forced into engagement with the ratchets by encountering the tripping members and thereby made to impart to the actuating members a length of throw determined by the previously set position of the  
 30 tripping member; said tripping members being returned to zero position with the movement of the actuating members and means being provided for returning the tripping members to zero position, independently of the movement of the actuating  
 35 members, whereby the adjustment of the tripping members may be eliminated without actuating the registering mechanism.  
 40

CARL A. JOERISSEN.

In presence of—

HERVEY S. KNIGHT,  
 BENNETT S. JONES.