

J. G. VINCENT.

ADDING MACHINE.

APPLICATION FILED FEB. 7, 1908.

Patented Dec. 29, 1908.

6 SHEETS—SHEET 1.

908,430.

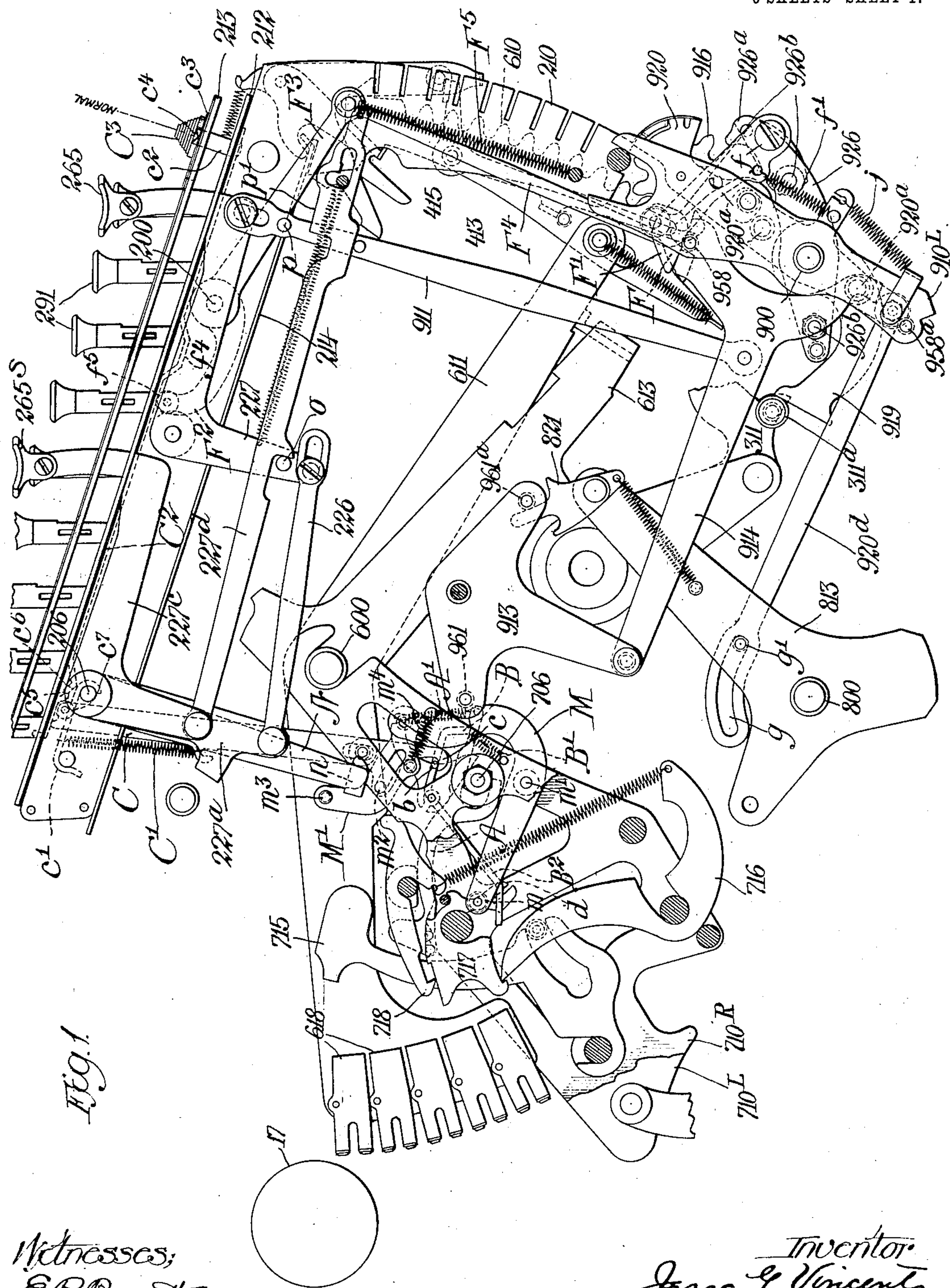


Fig. 1.

Witnesses;
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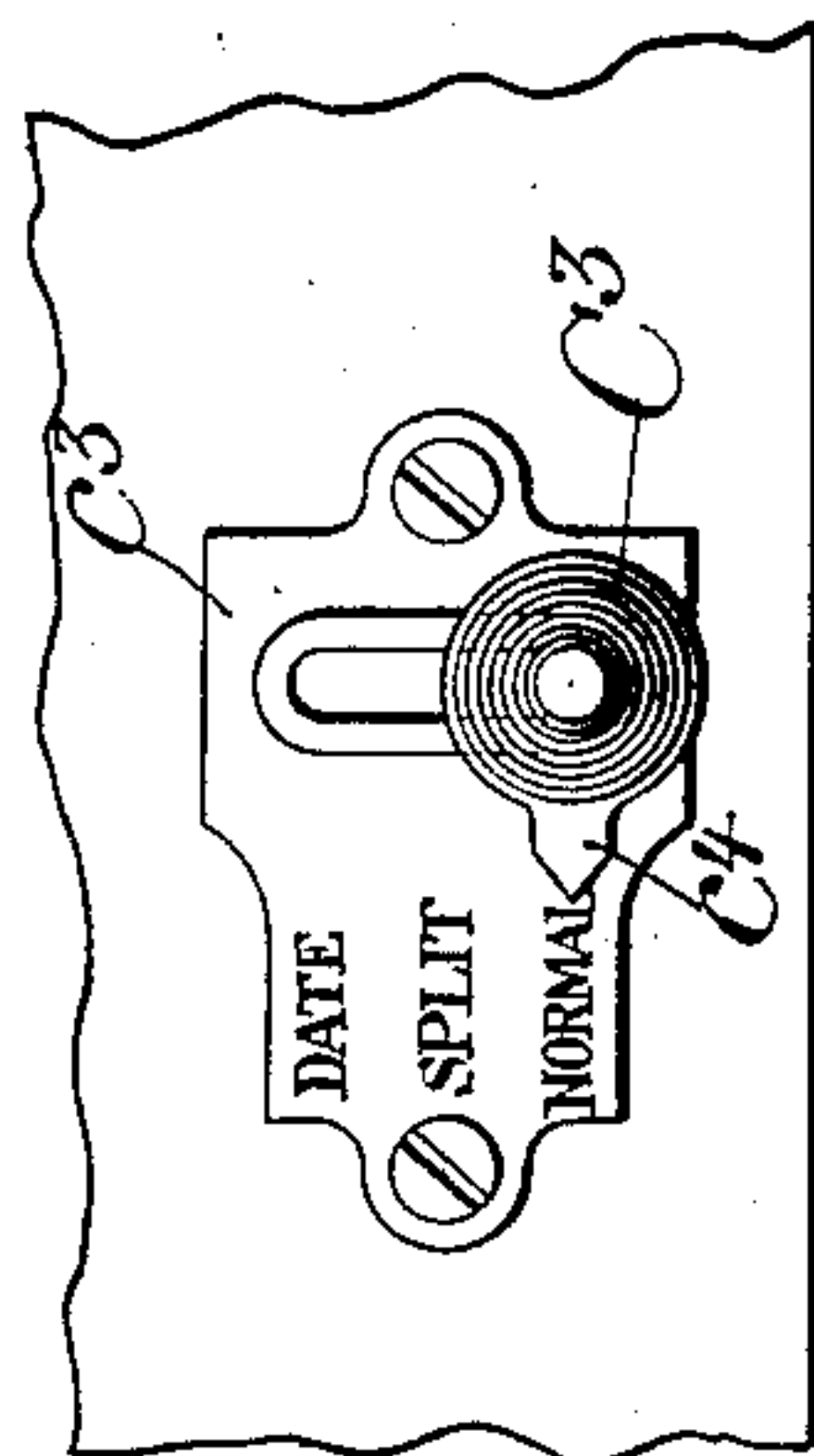
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6 SHEETS—SHEET 2.

908,430.



503.

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6 SHEETS—SHEET 3.

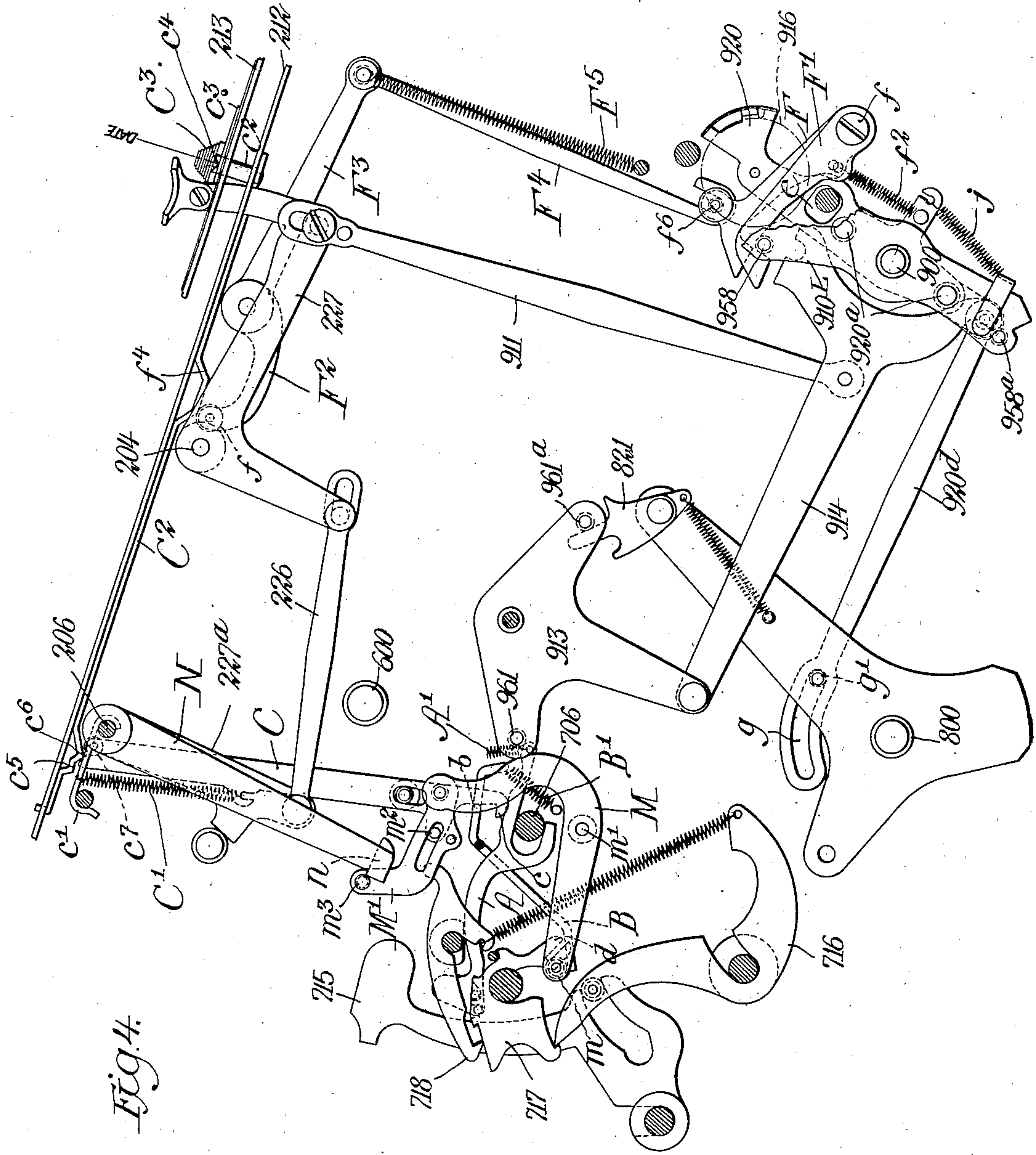


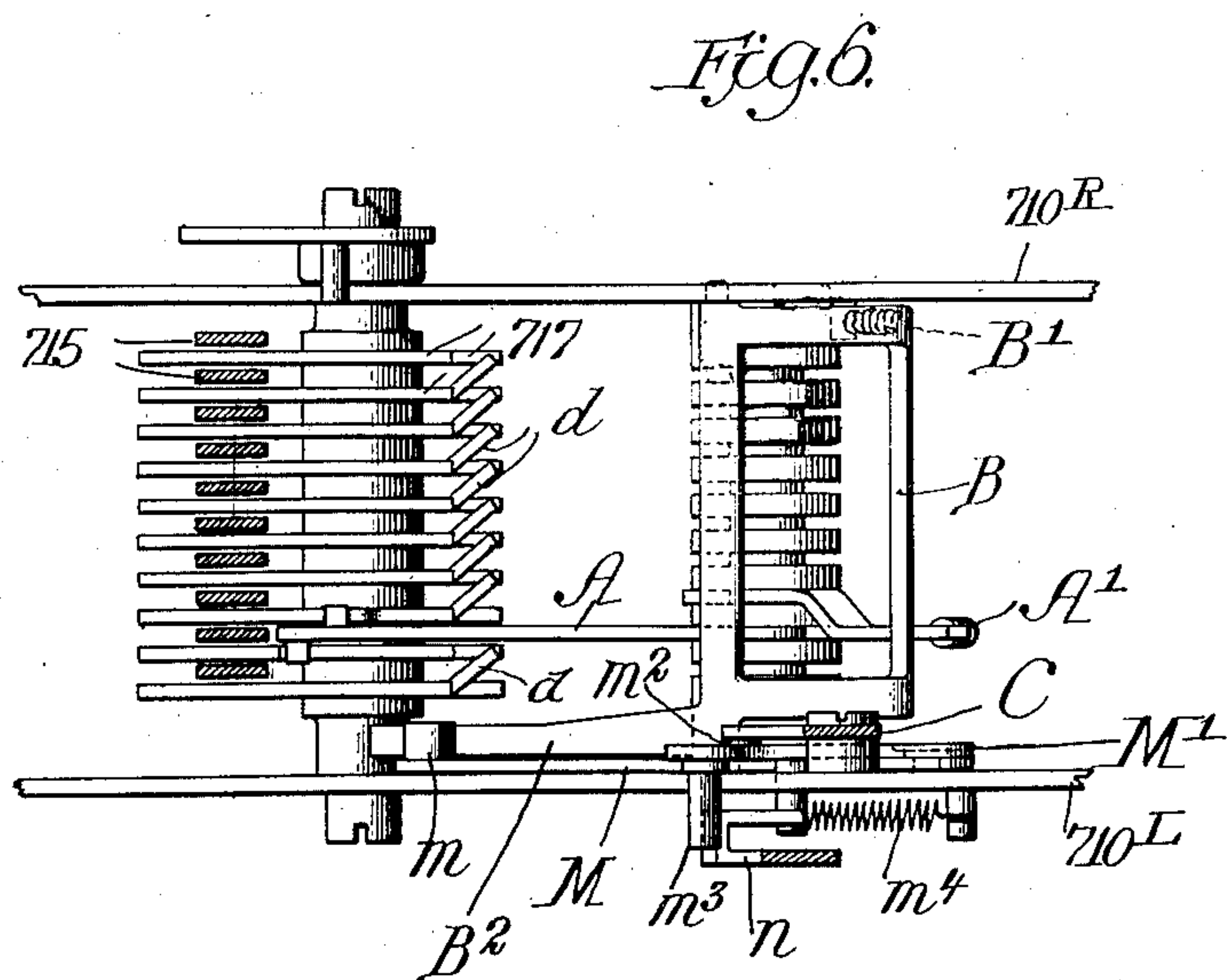
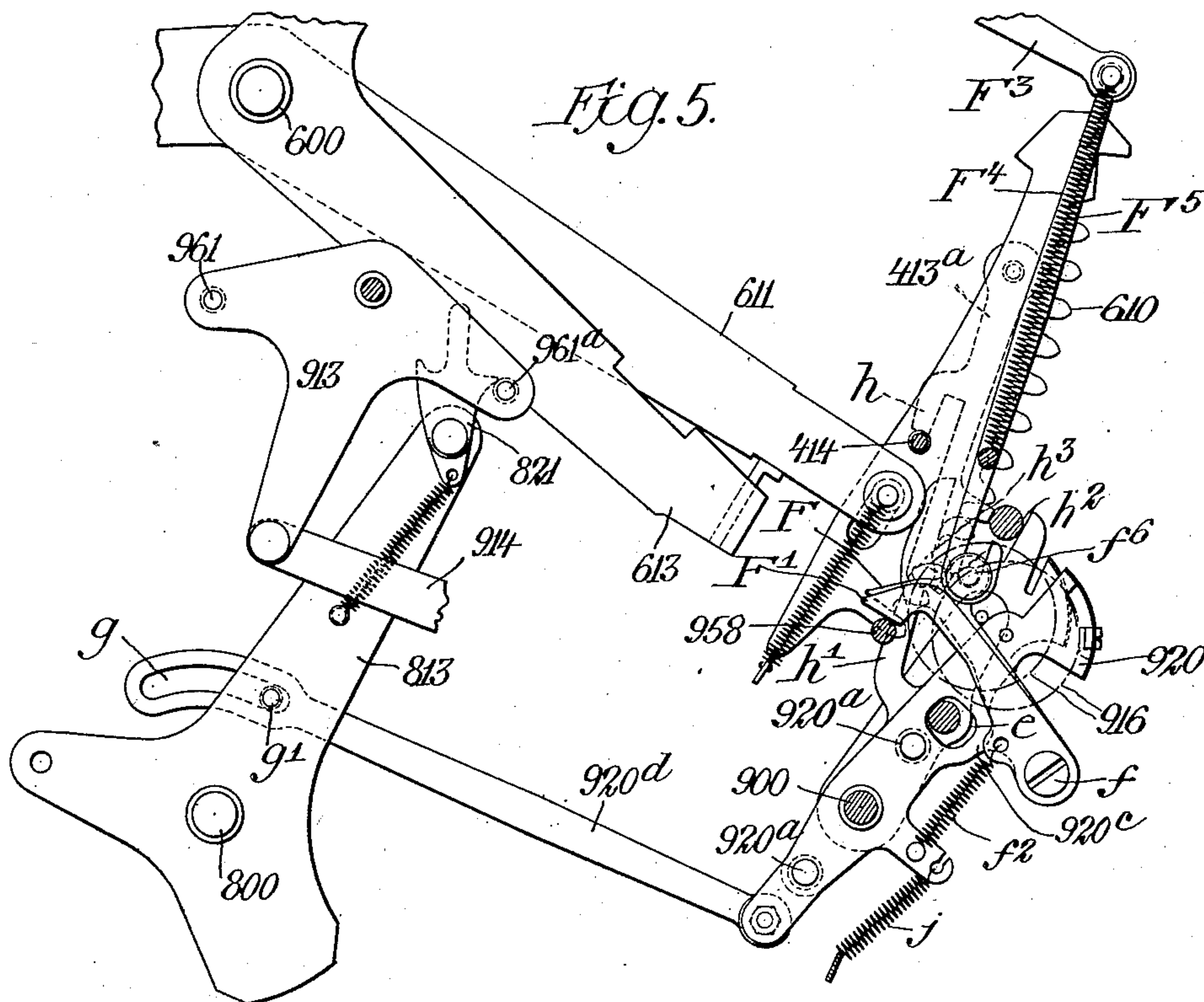
Fig. 4.

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6 SHEETS—SHEET 4.



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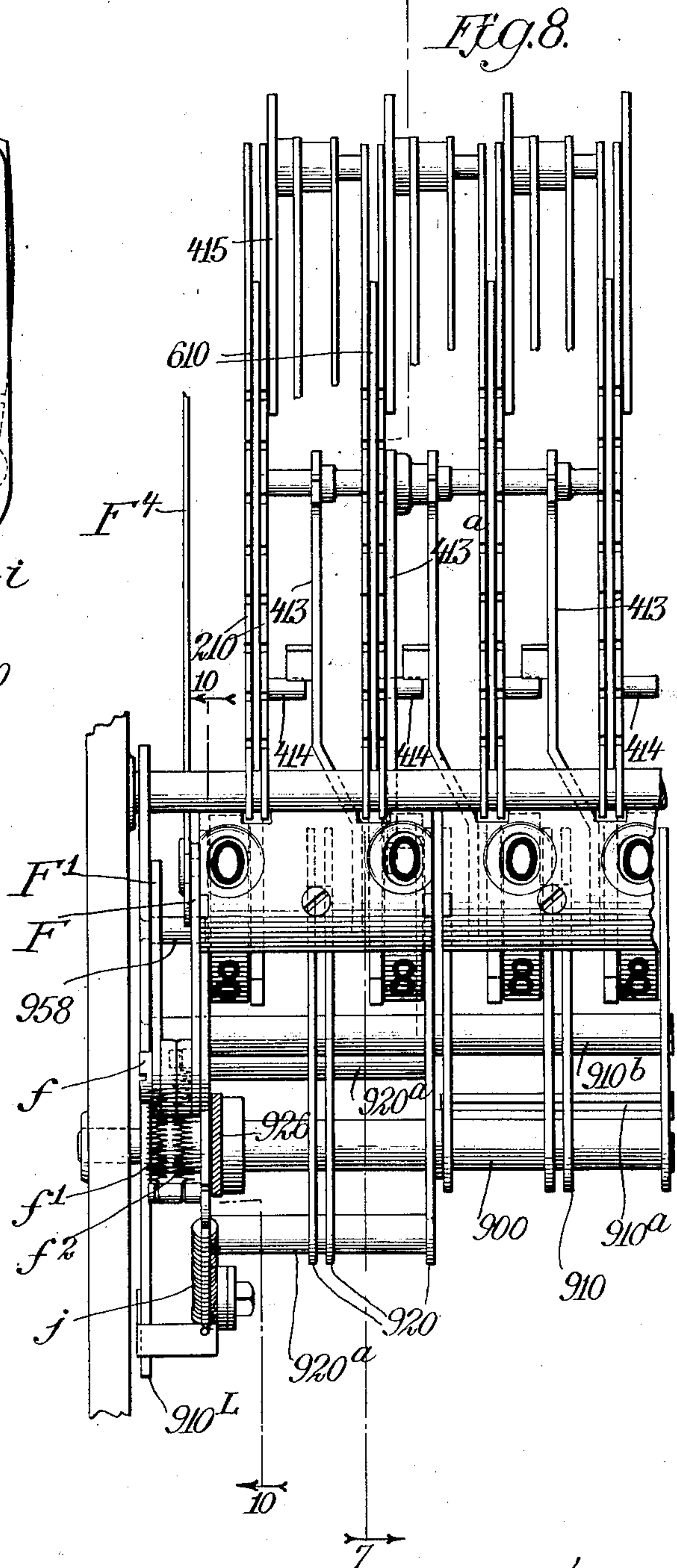
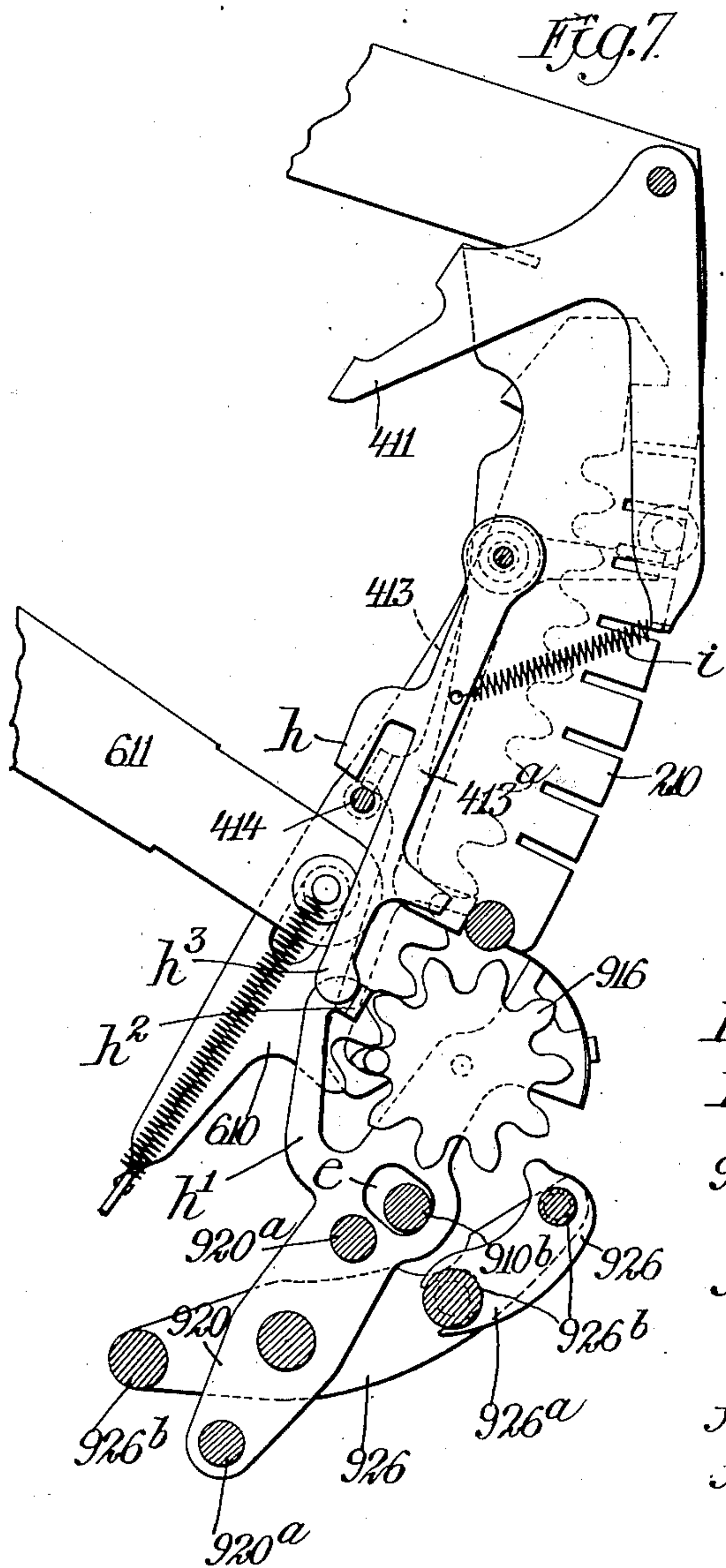
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6 SHEETS—SHEET 5.

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6 SHEETS—SHEET 6.

908,430.

Fig. 9.

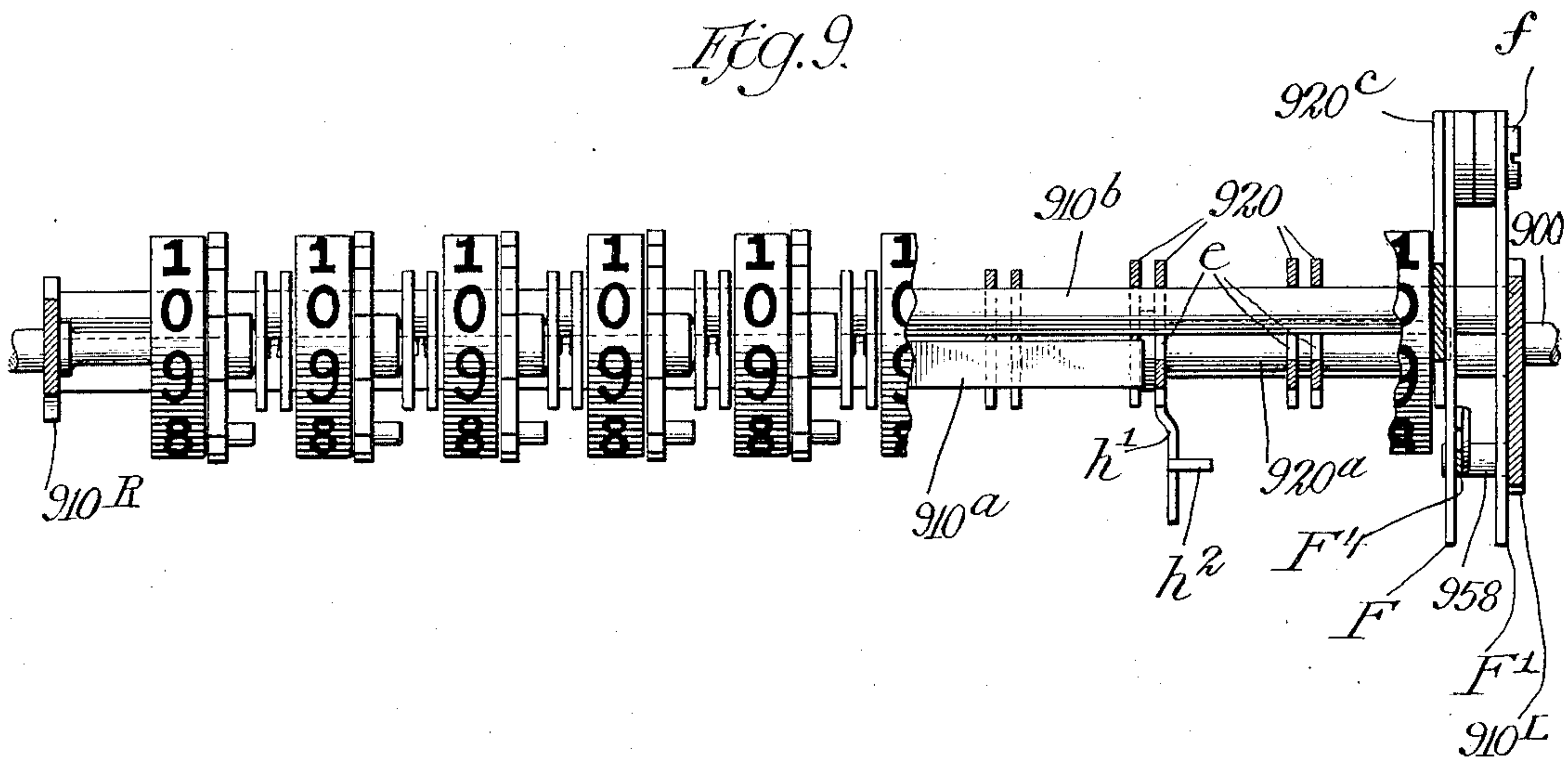
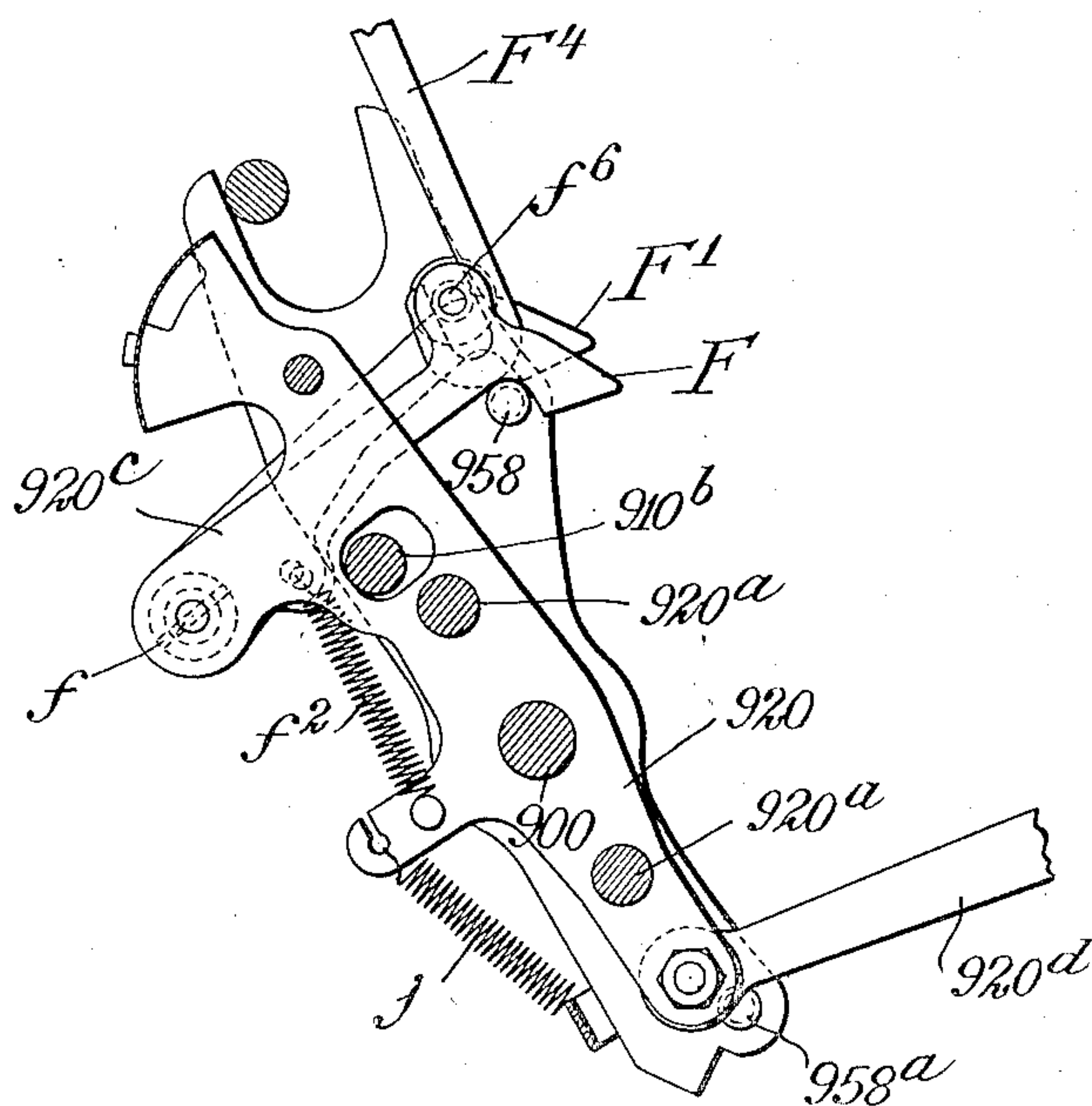


Fig. 10.



Witnesses

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UNITED STATES PATENT OFFICE.

JESSE G. VINCENT, OF DETROIT, MICHIGAN, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ADDING-MACHINE.

No. 908,430.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed February 7, 1908. Serial No. 414,793.

To all whom it may concern:

Be it known that I, JESSE G. VINCENT, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

In adding and listing machines of that type in which a plurality of rows of amount keys are employed and a corresponding number of registering wheels together constituting the accumulator, and a corresponding number of type carriers, it is customary to provide for so-called "splitting" of the machine, which means interrupting the co-operation between the impression-making devices whereby automatic printing of ciphers is accomplished. Thus two or more columns of imprints can be run in the same series of operations of the machine, one column representing for example dates and the other amounts opposite those dates. Or the one column may represent measures as for instance car loads while the other represents amounts opposite such numbers. In the latter case the totals of both columns will ordinarily be desired whereas when the first column represents dates no total need appear as a footing of such column. As these machines are usually constructed, however, the total of the date numbers would be accumulated upon the wheels corresponding with the columns of keys set apart for the date printing. The capacity of the balance of the accumulator for running up a total of amounts is under such circumstances necessarily limited. In other words a total exceeding the capacity of those wheels would not be taken care of by the wheel or wheels to the left associated with the column or columns of keys used for date printing purposes because that wheel or those wheels would contain the total of the date numbers. As a total of date numbers is useless, addition might just as well be dispensed with on the wheels corresponding to the rows of keys used for dates, and those wheels reserved for extension of the total being accumulated on the balance of the wheels.

The object of the present invention is to provide improved means for accomplishing this extending of the total whereby when the machine is operated under a split adjustment for the printing of dates or other numbers not to be accumulated, the total of the

amounts accumulated as a result of depression of keys in the balance of the rows and operations of the machine with such keys depressed as well as keys in the row or rows devoted to dates, may exceed the capacity of the wheels associated with the amount rows of keys, to the full capacity of the machine when operating at normal or without a split. It follows that two columns of imprints having been run off, one representing dates and the other amounts, a total of the latter can be printed, which total may run to the left below the column of dates, thus

12	5,667.00	
13	6,770.00	70
14	9,007.00	
15	9,654.00	
15	9,650.00	
16	9,753.20	
17	9,753.00	75
18	9,764.00	
19	9,865.00	
20	9,654.00	
21	9,860.00	
22	9,540.30	80

108,937.50*

At the same time the machine is capable of operating without a split or with a split without extending the total but accumulating two separate totals, one for each column of imprints, and operating under either of these last-mentioned adjustments will perform the same as though the devices were not present for accomplishing the extending of the total.

An important new result obtained by the present invention is the complete filling in of ciphers automatically when printing the extended total notwithstanding the listing has been done with a split and consequent elimination of ciphers between the columns, all as indicated by the above example of work,—and this too, without requiring any readjustment as by restoring the machine to the normal unsplit condition.

The accompanying drawings which form part of this specification illustrate the invention as embodied in an adding and listing machine of the well-known Burroughs type as exemplified in William S. Burroughs patents 504,963 and 505,078, issued September 12, 1893, but it is to be understood that the invention is not necessarily limited

to employment in just this particular construction of adding and listing machines.

Of said drawings Figure 1 represents a machine of the Burroughs type in left-side elevation with the improvements of the present invention applied thereto and some parts omitted which do not require illustration or description in order to make clear the application of the present invention to the Burroughs machine. In this figure of the drawings the parts are represented as at normal under an adjustment which provides for the use of the machine as an ordinary Burroughs machine, that is without a split; Fig. 2 is a somewhat similar left-side elevation not, however, illustrating so many parts as are illustrated in Fig. 1 and moreover showing the condition when the machine is adjusted to split though not for the extended total; Fig. 3 is a fragmentary top plan view illustrating the manipulating device by which the different adjustments are obtained; Fig. 4 is a view similar to Figs. 1 and 2, representing the condition when the adjustment for the extended total exists and the total key has been depressed preparatory to printing the total; Fig. 5 is likewise a left-side elevation illustrating some of the same parts which appear in Figs. 1, 2 and 4 but representing a changed relation of these parts to-wit that which exists in an itemizing operation when the operating handle is about to complete its return movement; Fig. 6 is a sectional plan view taken substantially on the line 6—6 of Fig. 2; Fig. 7 is a left-side elevation on a somewhat enlarged scale as compared with Figs. 1, 2, 4 and 5 and confined to the front portion of the machine for the purpose of illustrating more particularly a peculiarity in the transfer or carrying devices due to the employment of the extended total means; Fig. 8 is a partial front elevation of the machine; Fig. 9 an axial section of the accumulator and its rocking supports; and Fig. 10 a sectional elevation on line 10—10 of Fig. 8 looking in the direction of the arrows.

Before proceeding to describe the special devices employed for carrying out the present invention, some of the usual parts of a Burroughs adding machine will be pointed out. Amount keys 291 arranged in several rows on the keyboard operate as usual when depressed to set stops guided by slots in the upright plates 210 at the front of the machine and the depression of these keys also trips the usual latches 415 through the medium of sliding strips 214, said latches releasing the racks 610. The latter are as usual mounted through slot-and-pin connections upon levers 611 loosely mounted independently of each other upon a central rock shaft 600 to which is fastened the restoring bail 613. The rear ends of the levers 611 carry the usual segmental series of type

plates 618 to be driven against the roller platen 17 by hammers 715.

The numeral 716 designates the usual hammer drivers, 717 the latches which normally restrain said drivers and 718 the usual pawls which trip said latches, the heels of said pawls coöperating as usual with inclined shoulders on the levers 611 so as to be disabled unless the latter move past the zero position. However, the latches 717 trip each other from left to right as usual for the filling in of ciphers through the medium of the usual overlapping tails *d* and a coupling device A, such for example as illustrated in the Gooch Patent No. 825,205, dated July 3, 1906. The latch to the left of this coupling device has no overlapping tail (see Fig. 6) but this latch and the next one to the right are notched for the engagement of pins or studs on the coupler and the latter is mounted to slide upon a shaft 706 so that it can constitute a connecting link between these latches serving the purpose of the overlapping tail. The disengagement of this coupling device from the latches obviously interrupts the tripping of latches from left to right and thus the split can be established. A spring A' fastened to the coupler forward of the shaft 706 normally enforces the engagement between the coupler and the latches. A bail B is pivotally mounted between the side plates 710^L and 710^R of that portion of the framework of the machine which supports the impression devices, and this bail lies over the front end of the coupler so that when depressed it may rock the latter and effect the split. The bail is drawn downwardly by a spring B' which is superior to the spring A' but the bail is normally upheld so as to prevent said spring from acting. A vertical slide bar C is formed with a hook *c* at its lower end which engages under a pin *b* on the left-hand side of the bail and through this means the latter is normally upheld as shown in Fig. 1, the slide bar being drawn up by a spring C' which is superior to the spring B'. The bar C is suitably guided through slot-and-pin connection with the side plate 710^L and by running through a slot in a bridge-piece *c'* below the upper part of the keyboard.

All of the parts thus far specified are substantially the same in form and arrangement as those commonly employed in Burroughs machines. Means modified for co-operation therewith according to the present invention will next be described.

Against the under-side of the lower keyboard plate 212 there is arranged a slide strip C² extending from front to rear, its rear end being upturned and confined in a slot of said keyboard plate 212 while its front end has fastened to it an upright post *c*² occupying slots in the two keyboard plates 212 and 213 and a slot in an index plate *c*³ secured to

the upper side of the keyboard plate 213 just below the amount keys. The post c^2 is surmounted by a knob C^3 carrying a pointer c^4 to travel along the inscriptions on the index plate c^3 , said inscriptions being arranged in a row from front to rear and reading "Normal", "Split" and "Date" (see fig. 3). By sliding the knob C^3 back and forth the strip C^2 is slid back and forth. The rear portion of the latter is given an irregular shape forming steps c^5 and c^6 . This irregular portion of the strip coöperates with a small roller c^7 in the upper end of the vertical bar C. When the strip C^2 is in its upmost position this roller is in contact with the strip just beyond the said irregular portion thereof as illustrated in fig. 1 where the vertical bar C is in its uppermost position holding the bail B away from the coupler A. When the knob C^3 is slid from a position indicating "normal" to a position indicating "split," which would bring it to its middle position, the lower one of the two steps formed by the irregular portion of the strip C^2 , to-wit the step designated c^5 , will be forced above the roller c^7 and depress the vertical bar C as illustrated in fig. 2, thus lowering that bar and permitting the bail B to be drawn down by its spring B' and the coupler A thus displaced. Under the last-mentioned adjustment two separate columns of imprints will be made, ciphers being omitted between them, and the numbers or amounts will be separately accumulated. The operation of the machine with the usual total key 265 depressed will then result in the printing of the two totals, one as a footing for one column and the other as a footing for the other column.

All of the results above described have been attained in prior machines though some of the devices mentioned for producing the results vary from those heretofore used as already specified. In prior machines it has also been possible to prevent the printing of a total at the foot of the left-hand column and this has been accomplished by an adjustment effected by movement of some such device as the knob C^3 to an extreme position. In the present instance such movement of the knob C^3 i. e. its movement to the upper end of the slot in the index plate c^3 bringing its pointer opposite the inscription "Date", will result not only in doing away with the printing of the total of the numbers in the left-hand column, but will also provide for extending the total of the amounts in the right-hand column.

It has been before stated that the racks 610 have the usual slot-and-pin connection with the levers 611. These racks are as usual spring-drawn in upward direction for the purpose of carrying as in the ordinary Burroughs machine and they are normally restrained from movement under the impulse of the springs by the usual transfer

pawls 413. The racks coöperate severally with pinions 916 and the latter have the usual transfer projections for tripping the pawls 413. In the present instance, however, the pinions do not all remain at all times axially alined as in previous machines. They do so remain as long as the knob C^3 is not moved to the "date" position but when the knob is moved to the latter position the two pinions and the number wheels carried by them, which belong to the two left-hand rows of keys i. e. the rows to the left of the split, may remain out of engagement with the racks 610 while the remaining pinions move into engagement with their racks. Thus the racks to the left of the split may return to normal without affecting their pinions and the only movement imparted to the pinions will be that which takes place by reason of the over-running of the pinions to the right of the split. Thus it will be obvious that a total to the right of the split can be extended to the left of the split.

All of the pinions 916 are mounted in a rocking frame of the usual type, the left-hand side plate of which appears in Figs. 1, 2 and 4 of the drawings designated 910^L, and the rocking of this frame about the pivot shaft 900 is done in the usual way. Thus the pitman 914 normally embraces with its notched upper branch a stud 958 on the side plate 910^L above the pivot shaft 900 and said pitman is moved back and forth by the rocking of the three-armed lever 913. This rocking is accomplished in the usual way by the action of a wipe-plate or pawl 821 upon studs 961^a and 961 on the three-armed lever, said wipe-pawl being carried by an oscillating arm 813. The lower branch of the pitman is as usual hook-shaped for engagement with a stud 958^a on the plate 910^L below the pivot shaft 900. Depression of the total key 265 lowers the pitman through the medium of a link 911 so as to engage the pitman in the usual way with said stud 958^a.

Now the two left-hand pinions and their number wheels are carried in an inner frame movable about the shaft 900 independently of the main frame of which the side plate 910^L is a part. This main frame as usual comprises intermediate plates 910 besides a right-hand plate similar to the left-hand plate 910^L, and also tie-strips 910^a, and a tie rod 910^b. The wheels and pinions to the right of the split are separately mounted as usual between pairs of plates 910. The tie-strips 910^a do not extend as usual to the left-hand side of the main frame but terminate as shown in Fig. 8 at the plate 910 which supports the left-hand journal of the wheel and pinion belonging to the third row of keys from the left. Plates 920 somewhat similar to the usual plates 910 are used to the left of the split but are slotted at e where they embrace the tie-rod 910^b. These special plates

920 of which there are four make up the inner frame before mentioned, together with short tie-rods 920^a which connect the plates. The frame thus composed supports in its upper portion the two left-hand pinions and number wheels independently mounted for rotation in much the same way as the balance of the pinions and wheels. It will be noted that this inner frame may rock on the shaft 900 independently of the main frame an extent determined by the length of the slots *e*. This is sufficient to disengage the two left-hand pinions from their racks while the remaining pinions are engaged with their racks. The left-hand side plate 920 of the inner frame has a forwardly and downwardly extending arm 920^c which carries a screw stud *f* at its extremity. On this stud are loosely mounted a pair of latches *F* and *F'*, each separately drawn downward by springs *f'* and *f''*, tending to engage the latches over the rear of the stud 958 which is elongated for the purpose. When either of these latches is engaged with that stud the inner frame is locked to the main frame and will operate as though a part of it. The left-hand latch *F'* is normally disengaged from said stud by reason of the fact that the upper edge of the pitman 914 just in rear of its notch abuts the under-edge of the latch as shown in Figs. 1 and 2, but the right-hand latch *F* is normally engaged with the stud and remains so as long as the knob *C*³ is not moved to the "date" adjustment.

The strip *C*² which is slid back and forth by the said knob has at an intermediate point a cam-rise *f*⁴. When the strip is moved beyond the split adjustment, that is to say when the knob is moved to the "date" position, this cam-rise of the strip acts upon a roller *f*⁵ carried in the rear end of an arm *F*² secured to a rock-shaft 200 and extending in rear thereof. The depression of this arm by the rearward movement of the strip rocks the shaft and elevates an arm *F*³ secured to the latter and projecting forwardly. This arm *F*³ is connected by a dependent link *F*⁴ with the latch *F*, being hooked under a stud on said latch as shown at *f*⁶ in Fig. 2. A spring *F*⁵ draws downwardly upon the arm *F*³ permitting the latch *F* to maintain its engagement with the stud 958 so long as the knob *C*³ is not moved to the "date" position.

With the knob at the "date" adjustment and the inner frame unlatched from the regular accumulator frame, in an itemizing operation both frames will be swung forward in the usual way, the tie-rod 910^b carrying the inner frame along with the outer frame. However, the inner frame will not be returned with the outer frame, not being latched thereto and hence the two left-hand racks in rising will have no effect upon the pinions in this inner frame. It will thus be seen that so long as the inner frame is un-

latched there can be no accumulation of amounts on the wheels in that frame as a result of the depression of keys in the two left-hand banks. However, it is of course necessary in order to secure the extended total that these two left-hand wheels shall return to mesh with their racks in time to take transfers from the wheels to the right and from one to the other. Therefore, means are provided for rocking the inner frame just as the handle reaches the end of its return stroke and immediately after the restoring bail 613 has reached its home position. The left-hand plate 920 of the inner frame is extended downward as clearly shown in Fig. 5 and there is jointed to it a link 920^d which at its rear end is curved and slotted as shown at *g* to engage a stud *g'* on the rocking arm 813. This last-mentioned figure of the drawings illustrates the relation of parts under a "date" adjustment just as the handle is about to finish its return stroke and the stud *g'* is about to strike the right-hand end of the slot *g*. Its action against that end of the slot is sufficient to thrust the link 920^d far enough to rock the inner frame and engage its pinions with the racks. Then it will be obvious that if the adjacent wheel of the regular set has tripped its transfer pawl the carrying movement will take effect upon the right-hand one of the two wheels in the inner frame and if that movement imparted to such wheel carries it past the nine position then it will in turn trip the transfer pawl associated with it and cause a carrying movement to take place in the other wheel in the inner frame.

As the extended total wheels may be out of mesh at the time the transfer pawl is tripped by the adjacent wheel of the regular set, it is necessary to provide means for preventing the transfer or carrying movement of the rack for the right-hand one of the extended total wheels, until that wheel comes into mesh with the rack. Such means are illustrated more clearly in Fig. 7 though they also appear in Fig. 5 and that figure should be consulted as it shows the opposite adjustment to that illustrated in Fig. 7. The latter illustrates the normal position and it will be observed that there is swung from the same stud that supports the transfer pawl 413 another pawl 413^a having a finger *h* separated from its main portion a little more than the diameter of the usual stud 414 on the rack which coöperates with the regular transfer pawl. This finger *h* normally stands in rear of that stud as shown in Fig. 7 so that it does not obstruct the same. This auxiliary transfer pawl is drawn forward by a spring *i* but is normally held rearward by the inner accumulator frame, one of whose plates 920 is formed with a rearwardly and upwardly projecting arm *h'* having a forwardly-turned upper end portion with a laterally projecting

flange h^2 standing in front of the lower rounded extremity h^3 of the auxiliary transfer pawl as clearly illustrated in Fig. 7. When the inner frame rocks forward the auxiliary transfer pawl follows it by reason of the action of the spring i and the finger h is then brought to position over the stud 414 as illustrated in Fig. 5. The rocking back of the regular frame of course has no effect upon this auxiliary pawl. It continues to restrain the rack until the inner frame rocks back and its pinions are engaged with its racks. Then the restrained rack is released by the auxiliary pawl and the transfer may take place. To prevent the inner frame from accidentally returning to mesh with the racks its weight is supplemented by a spring j tending to hold the frame in its outer position, said spring being attached to a forwardly projecting arm of one of the plates 920 and to a fixture on the lower part of the regular side plate 910⁴.

In order to print the extended total it will be understood that all the hammer driver latches should be coöperatively related. Of course during the itemizing under the "date" adjustment the split is effective. This means of course that the coupler A is raised out of engagement with the second and third latches counting from the left. When an extended total is to be taken this coupler should be restored as of course the accumulator wheels to the left of the split come into play. To this end means are provided whereby the depression of the total key will result in restoring said coupler to operative position. To this end the bail B is formed with an angular forward extension B² which extends under a roll m on the rear end of a curved lever M whose upwardly extending arm has pivotally connected with it a link M' (Fig. 2) longitudinally slotted to embrace a stud m^2 upon a rearward projection of the vertical bar C. The link has an upstanding rear portion carrying a stud m^3 . A spring m^4 attached to the link M' tends to draw the same forward and therefore elevate the rearwardly-extending arm of the lever M and prevent it from affecting the bail B. The usual bell crank lever 227 on which the total key is mounted is connected by a link 226 (Fig. 4) with an arm 227^a depending from and secured to a rock-shaft 206, and the latter has secured to it another depending arm N bent over and doubled back at its lower extremity (see Fig. 6) forming a foot n adapted to operate upon this stud m^3 under certain conditions. It will be noted that the position of the link M' is determined by the adjustment of the bar C and the latter is of course determined by the manipulation of the knob C³. While the knob remains either at "normal" or at "split" adjustment the bar C is not lowered far enough to bring the said stud m^3 in line with the foot n (see Figs.

1 and 2). Consequently in the taking of a total no effect is produced upon the bail B by depression of the total key. However, when the knob C³ is moved to the "date" position the step c^6 of the irregular portion of the strip C² rides over the roll c^7 on the bar C and further depresses the latter. This brings the stud m^3 in line with the foot n . Consequently when the total key is depressed as illustrated in Fig. 4 said foot acts on the stud and draws the link M' rearwardly rocking the lever M and raising the bail B by pressure of the roll m upon the forward extension of said bail. This permits the coupler A to become engaged with the notched latches 717. Hence the tripping from right to left throughout the entire series of latches takes place.

Of course it will be understood that in order to obtain the extended total all the pinions must remain in engagement with their racks during the forward stroke of the operating handle. Now the spring j as well as the weight of the inner accumulator frame and its two pinions and wheels will tend to disengage these pinions from their racks as the arm 813 starts rearward relieving the link 920^a of the restraint imposed upon it by the stud g' . It is in this connection that the latch F' comes into play. It will be recalled that this latch is normally upheld by the pitman 914 so as not to engage the stud 958 (Figs. 1 and 2). When the pitman is lowered by depression of the total key said latch F' drops behind the said stud 958 as shown in Fig. 4 and thus prevents the disengagement of the two pinions from their racks. All of the accumulating pinions move out of mesh with their racks at the beginning of the rear or return stroke of the operating handle as usual in the taking of a grand total on a regular Burroughs machine. Of course at the conclusion of the operation the pitman 914 rises to its normal position and lifts the latch F' but the inner accumulator frame has meantime been rocked through the medium of the link 920^a so as to engage the two extended total pinions with their racks at the same time that the balance of the pinions are returned to engagement with the racks through the usual means. Depression of the sub-total key 265^a produces the same result of engaging the latch F' with the stud 958, inasmuch as said key also operates to depress the pitman though not to the same extent as the key 265 yet sufficiently to permit the latch F' to fully descend. With the inner accumulator frame and the outer or main accumulator frame thus locked together the extended total pinions as well as the balance of the pinions will remain in engagement with the racks throughout the operation when a sub-total is taken, the stud g' having arrived at the forward end of the slot in the link 920^a by the

time the latch F' is lifted as a result of release of the sub-total key and consequent rise of the pitman 914. The sub-total key like the total key surmounts a bell crank lever 227^c and the latter is connected to a link 227^d extending over a stud o on the lever 227 and formed with a lug o' to act against said stud so that in depression of the sub-total key the total key will also be depressed. Said link 227^d extends under a stud p on the link 911 and has a high portion p' just beyond a notch in its upper edge, so that when the sub-total key is depressed the rearward movement of the link 227^d will bring this high portion under said stud p to limit the downward movement of the link 911 and consequently of the pitman, thus preventing the engagement between the latter and the stud 958^a which in a grand totaling operation effects the disengagement of the pinions from the racks before the latter start to ascend.

The return of the accumulator wheels to mesh with the racks at the conclusion of a grand totaling operation is effected through the usual means employed in a Burroughs machine, the same comprising a rearwardly projecting arm 919 secured to the rock shaft 900 near its right-hand end and having a cam edge acted upon by a roller 311^a on the full stroke sector 311, all as illustrated in Fig. 1.

The usual form of locking means is employed to prevent turning of the pinions when disengaged from their racks, said locking means comprising a frame journaled on the shaft 900 and composed of side plates 926, intermediate plates 926^a with locking noses, and cross rods 926^b. Said frame co-operates with the usual locking lever such as illustrated in Burroughs Patent 504,963. It will be understood that whenever the accumulator wheels to the right of the split move out of mesh with their racks the wheels to the left of the split must necessarily be moved out of mesh with their racks also and to just the same extent, by reason of the engagement of the tie-rod 910^b against the front ends of the slots e . Consequently the extended total pinions are locked against turning just the same as though they were mounted in the ordinary way and not in a support capable of independent movement.

It will be seen that the above-described construction is well adapted to produce the results referred to at the outset of this specification and it is particularly to be noted that provision is made for the filling in of ciphers in an extended total where ciphers would be omitted in itemizing operations to be thus totalized. Of course after having printed two columns under the "date" adjustment the printing of an extended total with ciphers thus filled in might be accomplished by moving the knob C^3 back to "normal" but of

course if further itemizing was to be done with the expectation of utilizing the extended total feature, said knob would have to be re-adjusted to the "date" position. The above-described construction provides for the filling in of ciphers in the extended total without requiring any manipulation of the knob C^3 . Consequently the machine can be operated indefinitely under the "date" adjustment and as many totals or sub-totals printed as desired without requiring any special manipulation.

While the above-described construction is well calculated to serve the purposes in view yet it is to be understood as susceptible of considerable modification without departing from the spirit and scope of the invention.

What I claim is:

1. In a machine of the character described, the combination with accumulating and printing devices, the former co-operatively related for additive carrying and the latter co-operatively related for cipher-printing, and means for setting up a total by restoration of the accumulator to zero; of means for suspending co-operative action of printing devices at a predetermined location and preventing accumulation to one side of such location while permitting the additive carrying to take place beyond that location, and means for restoring co-operative action between the printing devices in the taking of a total.

2. In a machine of the character described, the combination with accumulating and printing devices, the former co-operatively related for additive carrying and the latter co-operatively related for cipher-printing, and means for setting up a total by restoration of the accumulator to zero; of means for suspending co-operative action of printing devices at a predetermined location and preventing accumulation to one side of such location while permitting the additive carrying to take place beyond that location, and means for restoring co-operative action between the printing devices by manipulation of the means for setting up a total.

3. In a machine of the character described, the combination with accumulating and printing devices, the former co-operatively related for additive carrying and the latter co-operatively related for cipher-printing, and means for setting up a total by restoration of the accumulator to zero including a manipulative key; of means for suspending co-operative action of printing devices at a predetermined location and preventing accumulation to one side of such location while permitting the additive carrying to take place beyond that location, and means for restoring co-operative action between the printing devices by manipulation of the total key.

4. In a machine of the character described, the combination of accumulator wheels, actu-

ators therefor, means determining the extent of movement of said actuators, carrying mechanism, devices for regulating the order of engagement and disengagement of wheels and actuators, type-carriers moving with the actuators, printing hammers for the type, latches or triggers for said hammers coöperatively related for cipher-printing purposes with a movable coupler between adjacent latches, means for displacing said coupler and preventing accumulative action between wheels and actuators associated with latches to one side of the coupler, while preserving coöperative relation thereof for the carrying action, and means for restoring the displaced coupler when the order of engagement and disengagement of actuators and wheels is changed for the taking of totals.

5. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a main accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of ciphers with provisions for suspending the coöperative action at a predetermined location, a support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both directions while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanism between all the pinions, and means for engaging the pinions of the independent support with their racks for carrying purposes.

6. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a main accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of ciphers with provisions for suspending the coöperative action at a predetermined location, a support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both directions while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanism be-

tween all the pinions, means for engaging the pinions of the independent support with their racks for carrying purposes, and means for varying the order of engagement and disengagement of racks and pinions to effect the taking of totals, including provisions for preventing movement of the independent pinion support relatively to the accumulator frame to disengage the pinions from their racks.

7. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of ciphers with provisions for suspending the coöperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both directions, while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanism between all the pinions, and means for engaging the pinions of the independent support with their racks for carrying purposes.

8. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of ciphers with provisions for suspending the coöperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both directions while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanisms between all the pinions, means for engaging the pinions of the independent support with their racks for carrying purposes, and means for varying the order of engagement and disengagement of racks and pinions to effect the taking of totals, including provisions for preventing movement of the independent pinion support relatively to the accumulator frame to disengage the pinions from their racks.

9. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a main accumulator frame carrying adding
 5 pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of ciphers
 10 with provisions for suspending the coöperative action at a predetermined location, a support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side of such location,
 15 said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both direc-
 20 tions while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanism between all the pinions, means for engaging the pinions of the independent sup-
 25 port with their racks for carrying purposes, means for varying the order of engagement and disengagement of racks and pinions to effect the taking of totals, including provisions for preventing movement of the inde-
 30 pendent pinion support relatively to the accumulator frame to disengage the pinions from their racks, and devices operated by said last-mentioned means for restoring co-
 35 operative action between the impression de-
 vices.

10. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carry-
 40 ing adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of
 45 ciphers with provisions for suspending the coöperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side
 50 of such location, said support being capable of movement independently of the accumulator frame, a latch for preventing movement of said support independently of the frame, manipulative means for displacing
 55 the latch as an incident to interruption of co-
 operative action between impression de-
 vices, carrying mechanism between all the pinions, and means for rocking the inde-
 60 pendent pinion support to engage its pinions with their racks for carrying purposes.

11. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carry-
 65 ing adding pinions and movable to engage

the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of
 70 ciphers with provisions for suspending the coöperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side
 75 of such location, said support being capable of movement independently of the accumulator frame, a latch pivoted on the said support and spring-drawn into engagement with the frame, manipulative means for displacing the latch as an incident to interrup-
 80 tion of coöperative action between impres-
 sion devices, carrying mechanism between all the pinions, and means for rocking the independent pinion support to engage its pinions with their racks for carrying purposes. 85

12. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carry-
 90 ing adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of
 95 ciphers with provisions for suspending the coöperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side
 100 of such location, said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the lat-
 105 ter in both directions while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanism between all the pinions, and means for engaging the pinions of the independent support with their racks for car-
 110 rying purposes, the same comprising a link connected at one end to the support and slotted at the other end, and a vibrating arm having a stud occupying the slot of the link.

13. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a main accumulator frame carrying
 115 adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of
 120 ciphers with provisions for suspending the coöperative action at a predetermined loca-
 125 tion, a support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side of such location, said support being capable of
 130 movement independently of the accumulator

frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both directions while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanism between all the pinions, means for engaging the pinions of the independent support with their racks for carrying purposes, and means for preventing carrying movement of the rack for the first of said latter pinions while the same is disengaged from the rack.

14. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and cooperatively related for the printing of ciphers with provisions for suspending the cooperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which cooperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both directions while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanism between all the pinions, means for engaging the pinions of the independent support with their racks for carrying purposes, and means for preventing carrying movement of the rack for the first of said latter pinions while the same is disengaged from the rack comprising a pawl spring-drawn to position for obstructing the rack but normally restrained by engagement with the rocking support.

15. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulating frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and cooperatively related for the printing of ciphers with provisions for suspending the cooperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which cooperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both directions while the balance of the pinions return to engagement with their

racks for the return movement thereof, carrying mechanism between all the pinions, means for engaging the pinions of the independent support with their racks for carrying purposes, and means for varying the order of engagement and disengagement of racks and pinions to effect the taking of totals, including provisions for preventing movement of the independent pinion support relatively to the accumulator frame to disengage the pinions from their racks, said provisions including a normally displaced spring-drawn latch on the rocking pinion support adapted when released to engage the rocking accumulator frame.

16. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and cooperatively related for the printing of ciphers with provisions for suspending the cooperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which cooperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, means for controlling said support to hold its pinions out of engagement with their racks during movement of the latter in both directions while the balance of the pinions return to engagement with their racks for the return movement thereof, carrying mechanism between all the pinions, means for engaging the pinions of the independent support with their racks for carrying purposes, means for varying the order of engagement and disengagement of racks and pinions to effect the taking of totals, said means including a transversely shiftable pitman, and a spring-drawn latch on the rocking pinion-support adapted to engage the rocking accumulator frame but normally restrained by said pitman.

17. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and cooperatively related for the printing of ciphers with provisions for suspending the cooperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which cooperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, a latch for preventing move-

ment of said support independently of the frame, manipulative means for displacing the latch as an incident to interruption of coöperative action between impression devices, carrying mechanism between all the pinions, means for rocking the independent pinion support to engage its pinions with their racks for carrying purposes, and means for varying the order of engagement and disengagement of racks and pinions to effect the taking of totals, including provisions for preventing movement of the independent pinion support relatively to the accumulator frame to disengage the pinions from their racks, said provisions including a normally displaced spring-drawn latch on the rocking pinion support adapted when released to engage the rocking accumulator frame.

18. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of ciphers with provisions for suspending the coöperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to one side of such location, said support being capable of movement independently of the accumulator frame, a latch for preventing movement of said support independently of the frame, manipulative means for displacing the latch as an incident to interruption of coöperative action between impression devices, carrying mechanism between all the pinions, means for rocking the independent pinion support to engage its pinions with their racks for carrying purposes, and means for varying the order of engagement and disengagement of racks and pinions to effect the taking of totals, said means including a transversely shiftable pitman, and a spring-drawn latch on the rocking pinion support adapted to engage the rocking accumulator frame but normally restrained by said pitman.

19. In a machine of the character described, the combination of reciprocating racks, keys for regulating the movements thereof, a rocking accumulator frame carrying adding pinions and movable to engage the same with and disengage them from said racks, type-carriers movable with the racks, impression devices to act upon the type and coöperatively related for the printing of ciphers with provisions for suspending the coöperative action at a predetermined location, a rocking support on the accumulator frame carrying the pinions which coöperate with the racks and type-carriers to

one side of such location, said support being capable of movement independently of the accumulator frame, a latch pivoted on the said support and spring-drawn into engagement with the frame, manipulative means for displacing the latch as an incident to interruption of coöperative action between impression devices, carrying mechanism between all the pinions, means for rocking the independent pinion support to engage its pinions with their racks for carrying purposes, means for varying the order of engagement and disengagement of racks and pinions, and a second latch pivoted on the rocking support and spring-drawn into engagement with the accumulator frame, said second latch being controlled by said last-mentioned means.

20. In a machine of the character described, the combination of impression devices coöperatively related for the automatic filling in of ciphers with provisions for discontinuing the coöperative action at a predetermined location, accumulating and type-carrying mechanism, controlling devices for causing the setting up of a total of the accumulation, and means operated by said controlling devices for restoring coöperative relation between impression devices at the aforesaid predetermined location.

21. In a machine of the character described, the combination of impression devices coöperatively related for the automatic filling in of ciphers with a movable coupler for discontinuing the coöperative action at a predetermined location, accumulating and type-carrying mechanisms, controlling devices for causing the setting up of a total of the accumulation, means for displacing the coupler, and means for restoring the same by the operation of said controlling devices.

22. In a machine of the character described, the combination of impression devices coöperatively related for the printing of ciphers with a pivotally mounted coupler for discontinuing the coöperative action at a predetermined location but spring-drawn to position for maintaining the coöperative relationship, a superiorly spring-drawn rocking member for displacing the coupler, means for restraining said member adjustable to release the same, accumulating and type-carrying mechanism, controlling devices therefor whereby the total of an accumulation may be set up, and means for moving the rocking member by said controlling devices against the stress of its spring.

23. In a machine of the character described, the combination of impression devices coöperatively related for the printing of ciphers with a pivotally mounted coupler for discontinuing the coöperative action at a predetermined location but spring-drawn to position for maintaining the coöperative relationship, a superiorly spring-drawn rocking

member for displacing the coupler, a spring-drawn slide bar engaged with said rocking member and normally restraining it, means for shifting the slide-bar to release the rocking member, a lever adapted to engage the latter for retracting it but normally spring-drawn to inoperative position, a link connected to said lever and having a slot-and-pin connection with the slide bar and having an abutment portion, a swinging arm for acting against the latter when brought into its path by the shifting of the slide-bar, a depressible key for swinging said arm, accumulating and type-carrying mechanism, and devices controlled by said key for causing the setting up of a total of the accumulation.

24. In a machine of the character described, the combination of racks and type and reciprocatory carriers therefor; pinions for engaging the racks; a rocking frame in which the pinions are mounted; an independent rocking support for certain of said pinions; a pitman for rocking the frame to move the pinions into and out of engagement with the racks and shiftable to vary the order of engagement and disengagement; a pivoted spring-drawn latch on the independent support adapted to engage the frame but restrained by the pitman; a key and connections for shifting the latter; a second latch pivotally mounted on the independent support and normally spring-drawn into engagement with the frame, a link connected to said latch; a lever connected to said link; impression devices for the type coöperatively related for the printing of ciphers with a pivotally mounted coupler for interrupting the coöperative action at one location; a rocking member for displacing the coupler; a slide bar for restraining the rocking member; a lever for retracting the latter; a link connected to said lever and engaged with the slide-bar and having an abutment portion; a swinging arm connected to the aforesaid key and adapted to strike the said abutment portion of the link when the slide-bar is at a certain position; a slide-strip having a stepped portion to act upon said bar and a cam-rise to act upon the aforesaid lever linked to the second latch; and a suitable handle and index for said strip; all substantially as described.

25. In a machine of the character described, the combination of reciprocating racks, accumulator wheels engageable therewith and disengageable therefrom, and means for timing the engagement and disengagement of one or more wheels differently from the timing of engagement and disengagement of the balance of the wheels.

26. In a machine of the character described, the combination of reciprocating racks, accumulator wheels engageable therewith and disengageable therefrom, carrying

mechanism, and means for timing the engagement and disengagement of one or more wheels differently from the timing of engagement and disengagement of the balance of the wheels whereby the last-mentioned wheels may be turned varying distances by their racks while the other wheel or wheels remain disengaged except for carrying purposes.

27. In a machine of the character described, the combination of reciprocating racks, means for determining the extent of movement thereof, a rocking frame, pinions carried thereby for actuation by certain of said racks, means for rocking the frame to move the pinions into and out of engagement with the racks, a second rocking frame mounted concentrically with the first-mentioned frame, one or more pinions carried by said second frame for engagement with the balance of the reciprocating racks, means for preventing the return of the pinions of the second frame to mesh with their racks when the balance of the pinions return to mesh with their racks, means for returning the pinions of the second frame to mesh with their racks after the same have returned home, and carrying mechanism for imparting extra movement to the racks beyond their home position.

28. In a machine of the character described, the combination of reciprocatory carriers tending to move in one direction, a reciprocating restoring frame normally restraining said carriers, racks mounted on the latter with provisions for independent movement in the restoring direction and spring-drawn in that direction, pawls normally obstructing the racks, pinions for engaging the latter having projections to trip the pawls, means for holding the pawls tripped, a rocking frame carrying certain of the pinions, means for rocking said frame to effect disengagement and reengagement of said pinions with their racks, a second rocking frame carrying the balance of the pinions and movable by the first rocking frame to disengage those pinions from their racks, a latch connecting the two rocking frames whereby all the pinions may be returned simultaneously to mesh with their respective racks, said latch being displaceable to provide for the pinions of the second frame remaining disengaged from their racks when the other pinions return to engagement with their own racks, and means for rocking the second frame to reengage its pinions with their racks after the latter have been carried home by the restoring frame.

29. In a machine of the character described, the combination of reciprocatory carriers tending to move in one direction, a reciprocating restoring frame normally restraining said carriers, racks mounted on the latter with provisions for independent movement in the restoring direction and

spring-drawn in that direction, pawls normally obstructing the racks, pinions for engaging the latter having projections to trip the pawls, means for holding the pawls
 5 tripped, a rocking frame carrying certain of the pinions, means for rocking said frame to effect disengagement and reengagement of said pinions with their racks, a second rocking frame carrying the balance of the
 10 pinions and movable by the first rocking frame to disengage those pinions from their racks, a latch connecting the two rocking frames whereby all the pinions may be returned simultaneously to mesh with their
 15 respective racks, said latch being displaceable to provide for the pinions of the second frame remaining disengaged from their racks when the other pinions return to en-

gagement with their own racks, means for rocking the second frame to reengage its
 20 pinions with their racks after the latter have been carried home by the restoring frame, and an auxiliary pawl adapted to obstruct the rack of the second frame pinion next adjacent the first frame pinions, when the
 25 second frame is unlatched from the first frame and the pinions of the latter alone engage their racks, said pawl being moved from obstructing position by the action of the second frame when operated upon by the
 30 aforesaid rocking means.

JESSE G. VINCENT.

Witnesses:

F. P. DAVIS,
 LOUIS B. ERWIN.

Correction in Letters Patent No. 908,430.

It is hereby certified that in Letters Patent No. 908,430, granted December 29, 1908, upon the application of Jesse G. Vincent, of Detroit, Michigan, for an improvement in "Adding-Machines," an error appears in the printed specification requiring correction, as follows: The columns of numbers appearing in lines 69-83, page 1, should be arranged as follows:

12	5,667.00
13	6,770.00
14	9,007.00
15	9,654.00
15	9,650.00
16	9,753.20
17	9,753.00
18	9,784.00
19	9,865.00
20	9,654.00
21	9,860.00
22	9,540.30

108,937.50*

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23d day of February, A. D., 1909.

[SEAL.]

C. C. BILLINGS,
 Acting Commissioner of Patents.