J. G. VINCENT.

ADDING AND LISTING MACHINE.

APPLICATION FILED APR. 14, 1910.

1,013,910.

Patented Jan. 9, 1912.

4 SHEETS—SHEET 1.

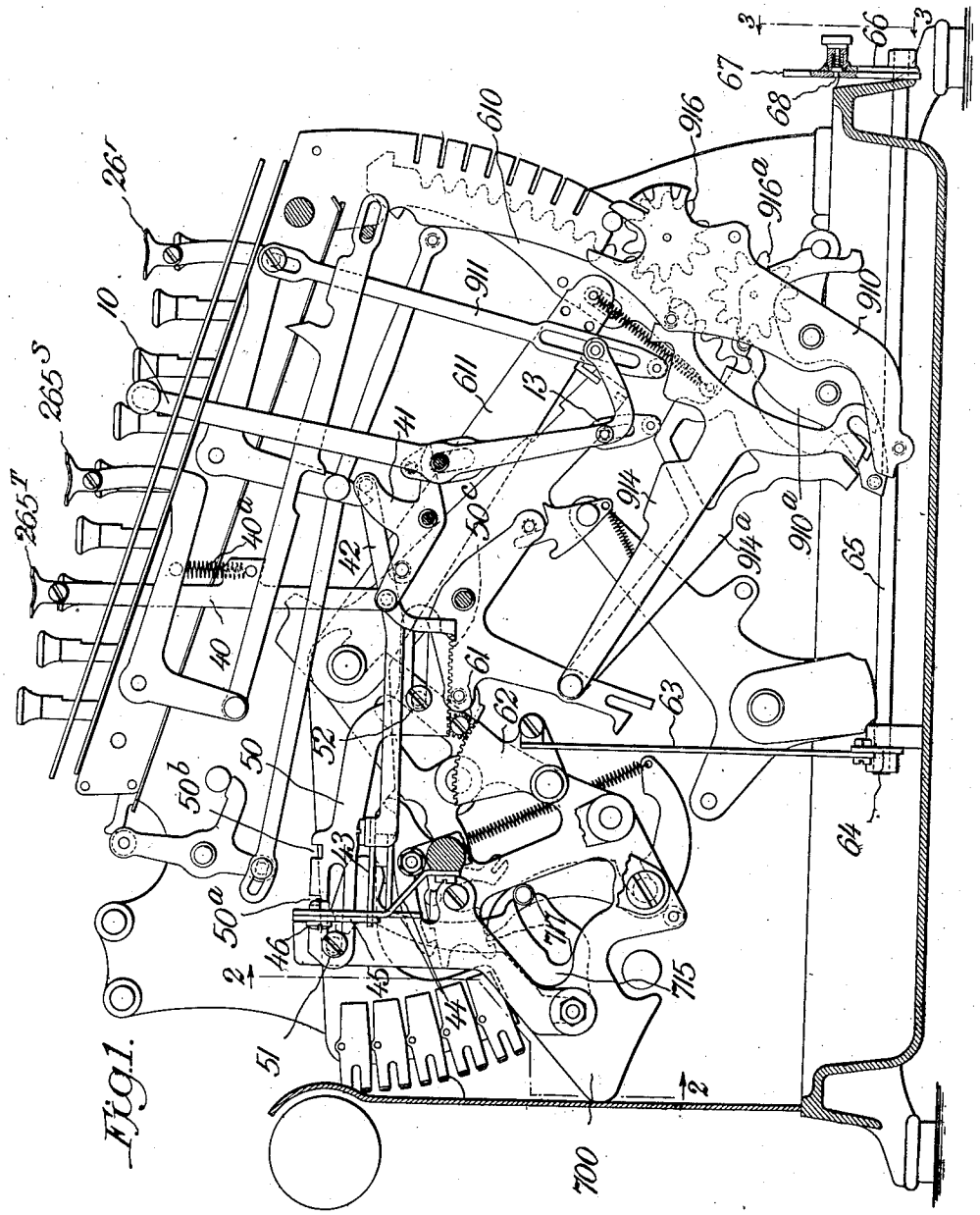

Fig. 1.

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Fig. 2.

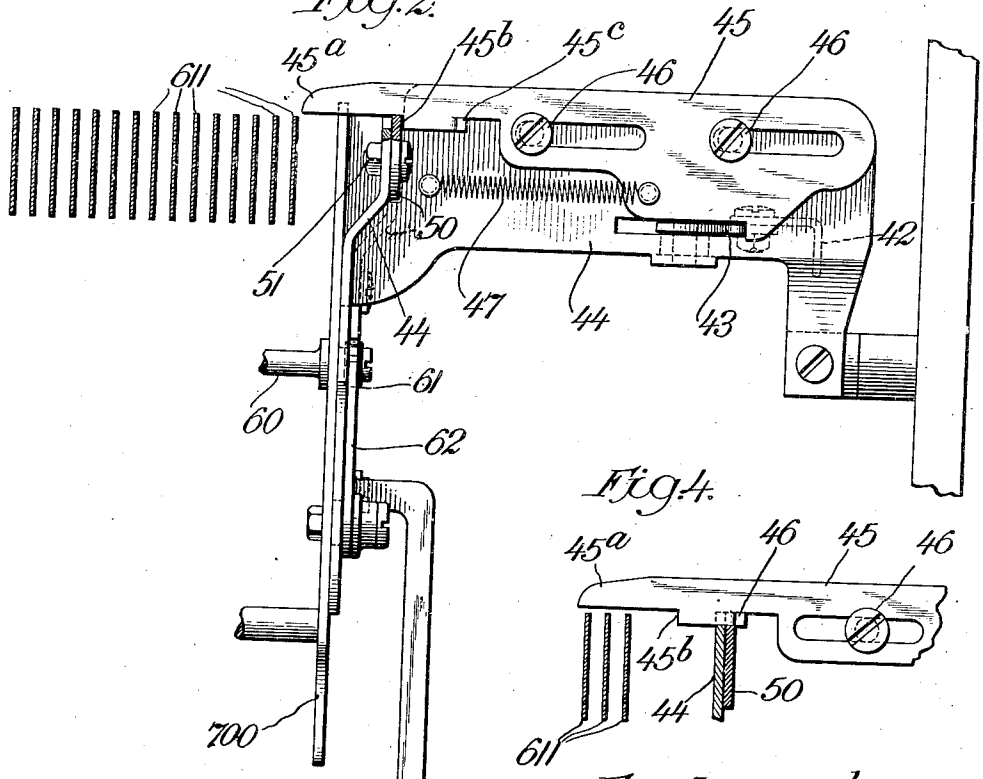


Fig. 4.

Fig. 5.

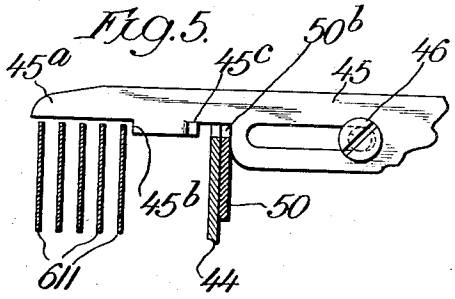
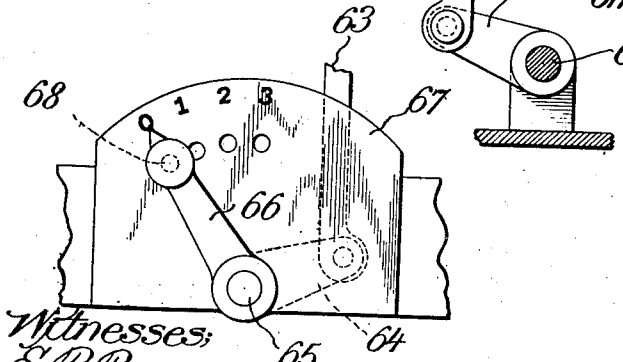


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 6.

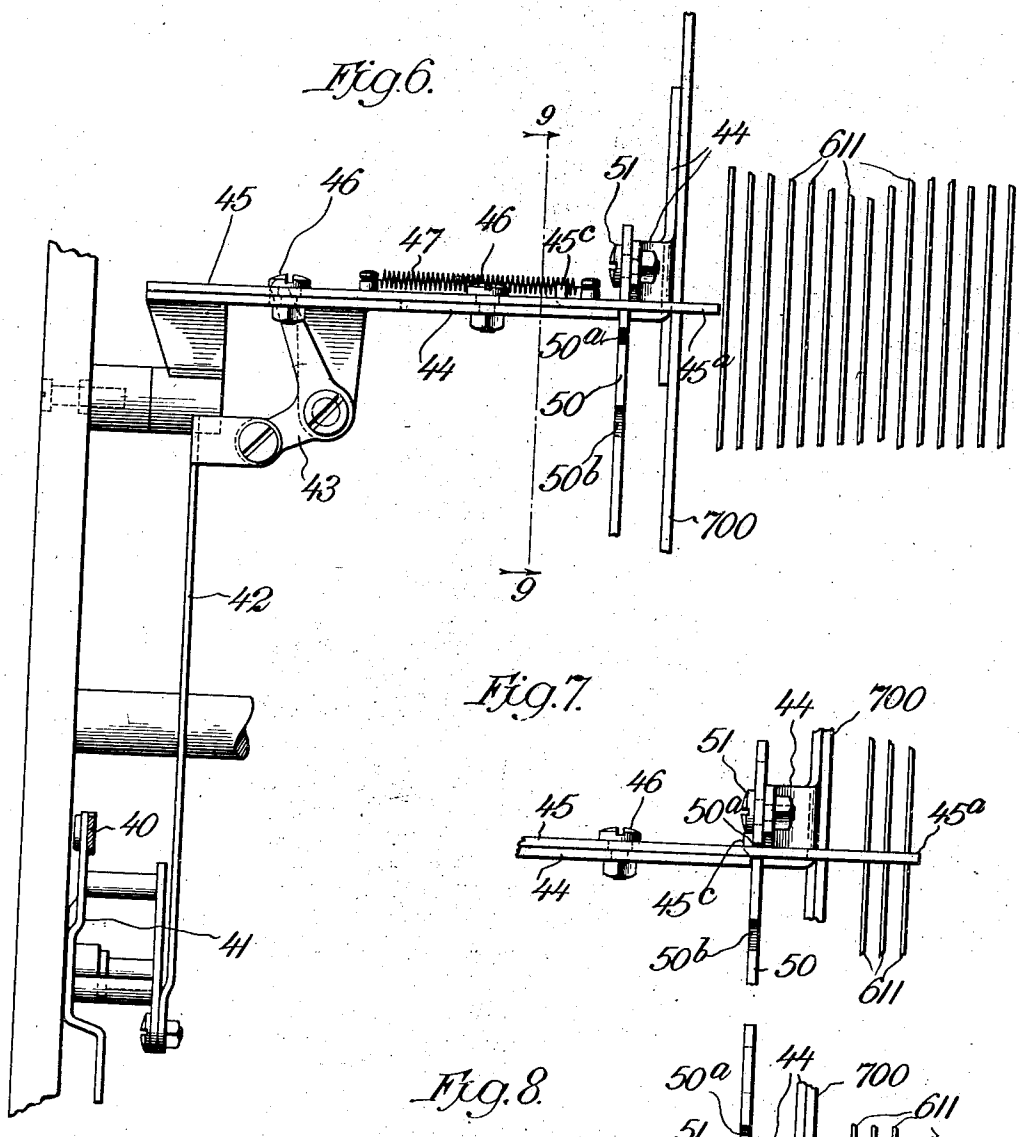
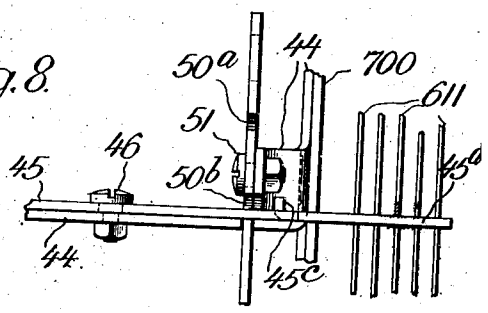


Fig. 7.

Fig. 8.



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4 SHEETS—SHEET 4.

Fig. 9.

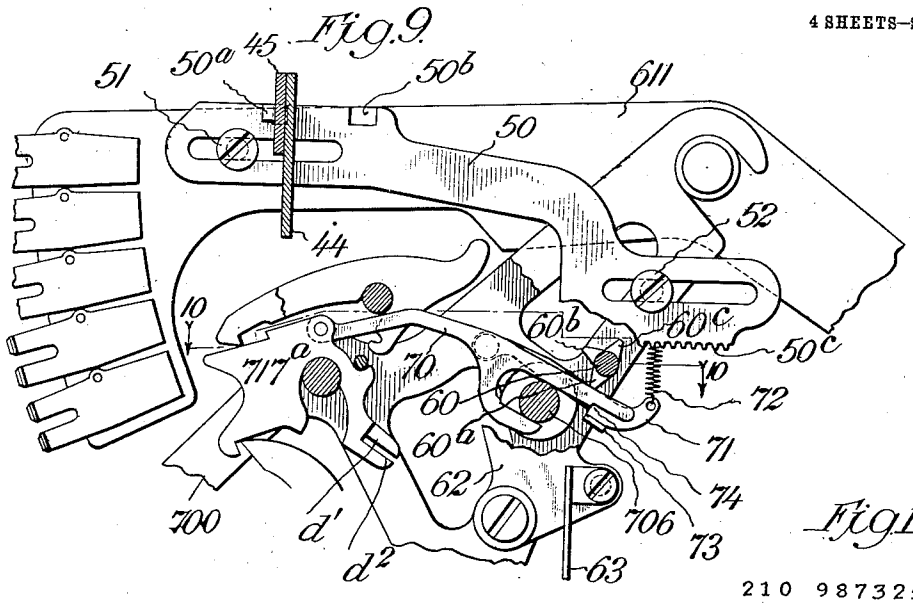


Fig. 11.

210 98732567983
132 89996754347
300 99879865784
400 87693498654

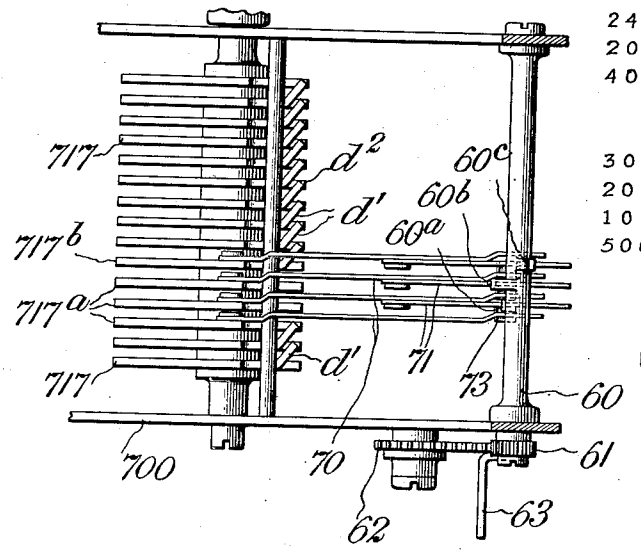
376302686768
130 98795432164
246 99867545643
200 99987658764
400 99897965843

398548602414
300 99876598943
200 99997867654
100 97898769853
500 99989658765

397862896215

117271418539

Fig. 10.



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UNITED STATES PATENT OFFICE.

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ADDING AND LISTING MACHINE.

1,013,910. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed April 14, 1910. Serial No. 555,326.

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 and Listing Machines, of which the following is a specification.

My present invention relates to that type of adding and listing machines in which two sets of adding wheels are employed and registrations of one such set of wheels may be transferred to the other when desired, as for example when the work in hand calls for listing of successive series or groups of amounts, the printing of totals of the series respectively, and the preserving of a grand total representing the sum of the separate or sub-totals. Reference may be had to Patent No. 919,656, issued April 27, 1909, on the joint invention of one Nelson White and myself, for an exemplification of such a machine and in fact the particular machine to which my present invention is shown adapted in the present instance though of course it is to be understood that this invention is not restricted to embodiment in that particular character of machine.

The object of the present invention is to provide for double column listing, as *e. g.* when dates or designating numbers are to appear opposite amounts, and yet to provide for the registering of a grand total exceeding denominationally any transferred total. Thus wheels of the grand total set which correspond in order or denomination with wheels of the set associated with type carriers employed for setting up dates or designating numbers, will have nothing transferred to them when wheels of the other or primary set are turned backward to zero for the purpose of transferring a sub-total to the grand total wheels. Such particular wheels of the latter set as above referred to will, however, serve to extend the grand total through the ordinary tens-carrying action.

In the embodiment of the invention here shown type carriers which serve to set up dates or designating numbers, when amounts are being successively accumulated upon the primary set of wheels, will be obstructed in the operation of transferring the accumulation of such amounts to the grand total wheels, so that such carriers will not move distances determined by backward turning to zero of the associated wheels of the primary set and in fact will partake of no movement at all which will set their actuating racks for operating upon wheels of the grand total set upon return of type carriers to normal. Inasmuch as carrying movement of racks can take place independently of movement of the type carrying levers, it is obvious that such obstruction of the latter will have no effect to interfere with the extending of the grand total in such manner as above mentioned.

While as above stated, the invention makes provision for extending the grand total upon wheels which correspond denominationally with wheels of the primary set associated with type carriers employed for setting up dates or designating numbers and in the form of embodiment here shown such type carriers will be obstructed in the transferring of a sub-total to grand total wheels, the arrangement may be such and is here shown and described as such that when only one set of adding wheels is to be called into play then two columns may be printed and a grand total below each, as *e. g.* when one column represents weights, measures or quantities and the other values.

In the drawings which accompany and form a part of this specification Figure 1 represents in left side elevation an adding and listing machine of the type shown in the above mentioned patent having incorporated therein a construction embodying the present invention, all parts being shown at normal; Fig. 2 is a vertical cross section of part of the machine taken substantially on the line 2—2 of Fig. 1 looking from the rear as indicated by the arrows associated with the section line; Fig. 3 is a fragmentary front elevation, see line 3—3 of Fig. 1; Figs. 4 and 5 are views similar to Fig. 2 though not so extensive and further differing in showing changed relative positions of parts, the two views differing from each other in this regard; Figs. 6, 7 and 8 are top plan views respectively of parts appearing in Figs. 2, 4 and 5; Fig. 9 is a vertical section taken substantially on the line 9—9 of Fig. 6 and embracing parts of the machine not appearing therein; Fig. 10 is a horizontal section taken on the line 10—10 of Fig. 9 and Fig. 11 illustrates an example

of recording of which the machine is capable.

Referring first to Fig. 1 the numeral 916 designates adding pinions of the upper one of two sets, the numeral 916ª designating the pinions of the lower set and 910 and 910ª the rocking frames which support said sets of pinions respectively. The numeral 914 designates the pitman for the upper set of pinions and the numeral 914ª designates the pitman for the lower set of pinions. The construction and mode of operation of the above designated parts is the same as disclosed in the before mentioned patent and they are controlled by the same sort of devices comprising total key 265, link 911, subtotal key 265ˢ, accumulator selecting lever 10 and transfer key 265ᵀ. The stem 40 of the latter, as in the construction disclosed in said patent, is coupled at its lower end to a bell crank lever 41 for lifting the slide bar 13 and depressing the total key 265. For the purposes of the present invention said bell crank lever 41 has an additional function, to wit, that of blocking or obstructing certain of the type carrying levers 611 provided coöperative relation between hammer latches has been suspended at one or another point for the purpose of double column listing as an accompaniment to registering on the upper set of pinions 916 with a view to transfer of accumulations from the latter to the lower set of pinions 916ª and an extension of the grand total on the latter. To this end the upwardly projecting branch of said bell crank lever 41 is coupled by an irregular shaped link 42 to one arm of a horizontal bell crank lever 43, Fig. 6, the other arm of which bell crank lever extends through a slot in a supporting plate 44 and engages a shoulder of a slide piece 45 mounted upon said plate as shown in Fig. 2. Said supporting plate is secured between the left side frame of the machine and the fixed hammer frame 700 and the bell crank lever 43 is pivoted upon an ear of the plate, and screws 46 entered in the plate occupy slots in the slide piece 45 as illustrated in Fig. 2. A spring 47 connects the slide piece to the plate tending to move the former toward the levers 611. However, the spring 40ª (Fig. 1) which normally upholds the transfer key 265ᵀ is superior to said spring 47 so that the bell crank lever 43 normally retracts the slide piece as illustrated in Fig. 2.

The inner end portion 45ª of the above specified slide piece is in the form of a finger with a straight under-edge adapted to be projected over a number of the levers 611 upon depression of the transfer key provided other restraint upon the slide piece is removed. Such other restraint is normally had by reason of an unbroken portion of a slide plate 50 confronting a shoulder 45ᵇ of the slide piece 45 as illustrated in Fig. 2. Said slide plate 50 has in its upper edge and normally spaced a distance forward from said shoulder of the slide piece 45, a square notch 50ª and spaced still farther forward a second wider notch 50ᵇ, Fig. 1, and when the slide plate is moved rearward so that either one of these notches comes in line with the shoulder 45ᵇ of the slide piece 45 the latter may move inward upon depression of the transfer key though registry of the wider notch 50ᵇ permits a greater extent of movement than does registry of the narrower notch 50ª with said shoulder. This is provided for by the formation of a laterally projecting lug 45ᶜ on said slide piece back of the shoulder, which lug can pass through the wider notch but not through the narrower one. In case of registry of the narrower notch with the shoulder, said lug will abut the plate 50 as illustrated in Fig. 4 and limit movement of the slide piece 45 so that its finger 45ª will obstruct but three of the levers 611. On the other hand, if the wider notch is brought into registry with the shoulder of the slide piece the latter may move farther so that its said finger will obstruct five of said levers, as illustrated in Fig. 5, the movement being then limited by abutment of another shoulder of the slide piece against a portion of the plate 50 below the wide notch. The plate 50 is longitudinally slotted in its rear portion to embrace a screw 51 entered in a portion of the supporting plate 44 (Fig. 1) and is similarly slotted in its forward portion to embrace a screw 52 entered in the hammer frame 700. The plate is irregular in shape to bring its forward portion to such lowered position that a rack 50ᶜ formed in its lower edge may coöperate with mechanism for controlling the subdivision or "split" of the printing section or department of the machine. Such mechanism comprises a shaft 60 journaled in the sides of the hammer frame and carrying a pinion 61 with which said rack is in mesh on the upper side. A toothed segment 62 is in mesh with the pinion on its underside and is connected by a link 63 with a crank arm 64 secured to a rock shaft 65 journaled in the base of the machines and extending to the front thereof. There is secured to the front end of this shaft an index arm 66 arranged to move over an index plate 67 secured to the base of the machine and inscribed with a zero and the numerals 1, 2, 3 in the arc of the circle, and also perforated to correspond, the index arm being equipped with a spring-actuated retaining pin 68 to engage one or another of the perforations. It will be obvious that the swinging of said index arm will shift the plate 50 through the connections above described, and the arrangement here shown is such that when said index arm is moved to register with the numeral 1 the

narrow notch 50^a is brought in registry with the shoulder of the slide piece 45, whereas when such index arm is moved to register with the numeral 3, then the wide notch 50^b is brought into registry with said shoulder.

The devices for effecting subdivisions or splitting of the printing section or department of the machine, are of the following description, reference being had particularly to Figs. 9 and 10. The machine here shown is a "15-bank" machine, that is to say, it has fifteen rows of keys and as many printing hammers 715 and type-carrying levers 611, and correspondingly there are fifteen latches for normally restraining the printing hammers, certain of these latches being of the ordinary construction and designated 717, while others are specially formed. Thus referring to Fig. 10 the latches 717 have the usual laterally turned tails d' to overlap shoulders d^2 of adjacent latches to the right. Counting from the left of the machine as viewed from the front the third, fourth and fifth latches specially designated 717^a, are without the overlapping tails and the sixth latch 717^b, while having the overlapping tail is specially equipped as are the third, fourth and fifth latches to provide for suspending coöperative action between either the third and fourth, fourth and fifth or fifth and sixth latches. Each of these special latches has pivoted to it a pitman 70 bifurcated to slide upon a cross rod 706. Each of the pitmen of the fourth and fifth latches 717^a and of the sixth latch 717^b carries a pivoted coupler piece 71 upheld by a spring 72 and having a laterally bent lug 73 to engage a shoulder 74 on the adjacent pitman to the left. The before mentioned shaft 60 extends above the pitmen and coupler pieces and has a spirally arranged series of fingers 60^a, 60^b and 60^c to act respectively upon the three coupler pieces 71. Normally the position of said shaft is such that no one of these coupler pieces is affected and cooperative relationship exists between the latches throughout the entire series. With the index arm 66 moved to register with the numeral 1 the coupler piece farthest to the left is displaced by the finger 60^a thereby suspending coöperative relationship between the third and fourth latches. This obviously provides for use of the three left-hand hammers for printing a column separate from that for which the balance of the hammers may be employed, see Fig. 11, or in other words effecting what is commonly known as a "split" between the third and fourth orders of numerals. It will be remembered that this same adjustment of the index arm provides for the obstruction of the three type-carrying levers 611 (Fig. 4) which belong to the trains of printing and registering devices including the three left hammer latches. When the index arm 66 registers with the numeral 2 the finger 60^a which before held the first coupler 71 displaced has passed beyond effective position and the next finger, 60^b, has become effective upon the second coupler piece counting from the left, thereby suspending the coöperative action between the fourth and fifth latches 717^a. This particular adjustment of the index arm has no corresponding effect to provide for blocking of type-carrying levers for the reason that the resultant movement of the slide plate 50 positions an unbroken portion of the same opposite the shoulder 45^b of the slide piece 45. The intention here is simply to provide for a split adjustment without an extended total adjustment but merely for the purpose of doing double column work accompanying registration on either set of adding pinions. Under this adjustment there may be sub-totals or clearing totals of amounts in the left-hand column as well as of amounts in the right-hand column, and grand totals of sub-totals of both columns. With the index arm 66 in position of registry with the numeral 3 the rock shaft 60 will be further turned to carry the finger 60^b past effective position and cause the third finger 60^c to displace the coupler piece in line with it, thereby suspending coöperative action between the fifth latch 717^a and the sixth latch 717^b, and here again the extended total adjustment is provided for since the resultant further movement of the slide plate 50 brings its wide notch 50^b into line with the shoulder 45^b and lug 45^c of the slide piece 45 so that the effect produced is as illustrated in Fig. 5, when the transfer key is depressed.

Fig. 11 represents an example of work of which the machine is capable when embodying my present invention. It will be noted that two columns first appear comprising designating numbers at the left and amounts at the right, the split being between the third and fourth orders. Then, after a line space, the total of the amounts appears specially indicated as a transferred total. Thereafter another series of designating numbers and another series of amounts appear and then after a line space the total of this second series of amounts, also designated as a transferred total. Then a third series of designating numbers and amounts appear and the total of the amounts. Finally the grand total appears representing the sum of the three transferred totals and it will be noted that said grand total extends one order beyond the point of split, indicating that when the last sub-total was transferred a carry took place on the grand total wheels causing the wheel third from the left to register 1. The absence of totals below the several series of designating numbers will be noted and is to be accounted for from the fact that, as hereinbefore pointed out,

type-carrying levers of the three orders concerned are blocked or obstructed in operation of the machine with the transfer key depressed. Consequently no transfer is made of any total carried by the corresponding wheels of the primary set and the corresponding wheels of the grand total set are reserved for the extension of the grand total by tens-carrying. Of course it will be understood in this connection that the actuating racks 610 have the usual slot pin and spring connection with the levers 611 and are controlled in the matter of carrying just as set forth in the above mentioned patent.

What I claim is:

1. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels with provisions whereby one set of wheels is engaged with the actuators during their advance and the other set of wheels during their return, and means under control of such provisions for preventing advance of certain actuators.

2. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels with provisions whereby one set of wheels is engaged with the actuators during their advance and the other set of wheels during their return, means under control of such provisions for preventing advance of certain actuators, and impression devices coöperatively related for cipher printing with provisions for suspending coöperative relationship at a point corresponding with that to which prevention of advance of actuators extends.

3. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels; controlling devices for causing one set of wheels to engage the actuators during their advance and the other sets of wheels during their return; and an obstructing member controlled by said devices, said member adapted to prevent advance of certain actuators.

4. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels; controlling devices for causing one set of wheels to engage the actuators during their advance and the other sets of wheels during their return; an obstructing member controlled by said devices, said member adapted to prevent advance of certain actuators; impression devices coöperatively related for cipher printing with provisions for suspending coöperative relationship at a point corresponding with that to which prevention of advance of actuators extends; and manipulative means for effecting such suspension and permitting control of the obstructing member by the aforesaid controlling devices.

5. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels; controlling devices for causing one set of wheels to engage the actuators during their advance and the other sets of wheels during their return; an obstructing member controlled by said devices, said member adapted to prevent advance of certain actuators in varying number; impression devices coöperatively related for cipher printing with provisions for suspending coöperative relationship at a point corresponding with that to which prevention of advance of actuators extends; and manipulative means for effecting such suspension at one point or another and correspondingly controlling the number of actuators to be obstructed.

6. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels; controlling devices for causing one set of wheels to engage the actuators during their advance and the other sets of wheels during their return; a spring-drawn slide piece for obstructing certain actuators; and means connected to said controlling devices for normally retracting said slide piece.

7. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels; controlling devices for causing one set of wheels to engage the actuators during their advance and the other sets of wheels during their return; a spring-drawn slide piece for obstructing certain actuators; means connected to said controlling devices for normally retracting said slide piece; impression devices coöperatively related for cipher printing with provisions for suspending coöperative relationship at a point corresponding with that to which prevention of advance of actuators extends; and manipulative means for effecting such suspension at one point or another and correspondingly limiting movement of the slide piece.

8. In a machine of the character described,

the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels; controlling devices for causing one set of wheels to engage the actuators during their advance and the other set of wheels during their return; a spring-drawn slide piece for obstructing certain actuators; means connected to said controlling devices for normally retracting said slide piece; a movable stop member for said slide piece having provisions for permitting varying extent of movement thereof; impression devices coöperatively related for cipher printing with provisions for suspending cooperative relationship at a point corresponding with that to which prevention of advance of actuators extends; and manipulative means for effecting such suspension at one point or another and correspondingly positioning the aforesaid stop member.

9. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels; controlling devices for causing one set of wheels to engage the actuators during their advance and the other sets of wheels during their return; a spring-drawn slide piece for obstructing certain actuators; means connected to said controlling devices for normally retracting said slide piece; a stop slide with graded notches for the passage of said slide piece the latter having a projecting portion to limit movement thereof through one of the notches; impression devices coöperatively related for cipher printing with provisions for suspending coöperative relationship at a point corresponding with that to which prevention of advance of actuators extends; and manipulative means for effecting such suspension at one point or another and connected to the said stop slide; substantially as and for the purpose described.

10. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels with provisions whereby one set of wheels is engaged with the actuators during their advance and the other set of wheels during their return, and means under control of such provisions for preventing registration on certain of the wheels of said other set.

11. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels with provisions whereby one set of wheels is engaged with the actuators during their advance and the other sets of wheels during their return, means under control of such provisions for preventing registration on certain of the wheels of said other set, and impression devices coöperatively related for cipher printing with provisions for suspending coöperative relationship at a point corresponding with that to which prevention of registration extends.

12. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels with provisions whereby one set of wheels is engaged with the actuators during their advance and the other set of wheels during their return, and means under control of such provisions for preventing registration on certain of the wheels of said other set, and varying the number of wheels so affected.

13. In a machine of the character described, the combination of two sets of adding wheels, reciprocatory combined type carriers and wheel actuators, means for effecting engagement and disengagement of the actuators and the wheels with provisions whereby one set of wheels is engaged with the actuators during their advance and the other set of wheels during their return, means under control of such provisions for preventing registration on certain of the wheels of said other set and varying the number of wheels so affected, and impression devices coöperatively related for cipher printing, with provisions for suspending cooperative relationship at one or another point corresponding with that to which prevention of registration extends.

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