

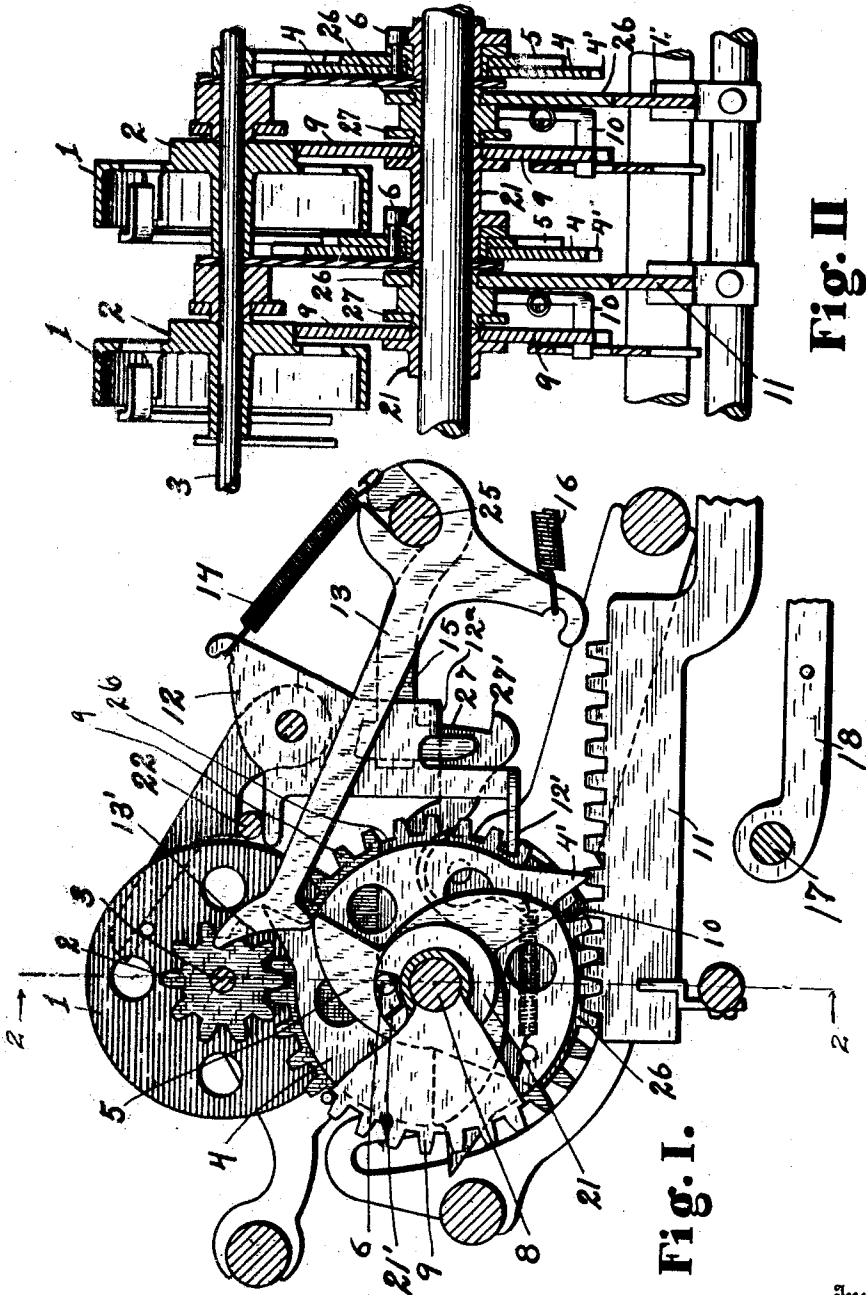
G. J. BARRETT.
TRANSFER MECHANISM FOR ADDING MACHINES.

APPLICATION FILED JUNE 7, 1910.

Patented June 6, 1911.

3 SHEETS—SHEET 1.

994,238.



Witnessed
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3 SHEETS—SHEET 2.

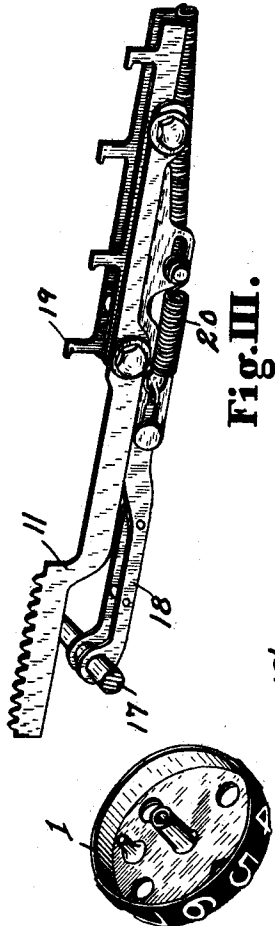


Fig. III.

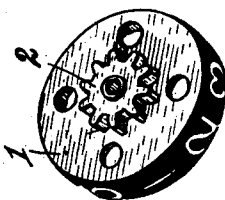


Fig. IV.

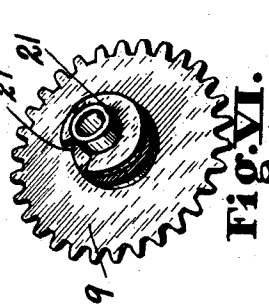


Fig. VI.

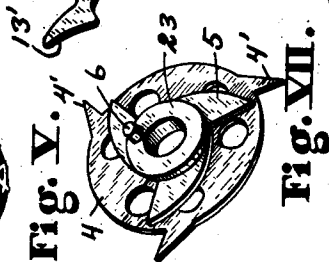


Fig. V.



Fig. VII.

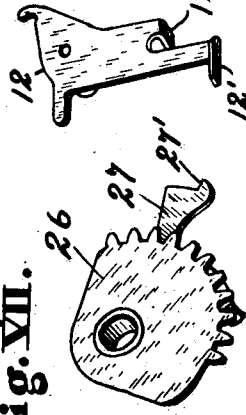


Fig. XI.

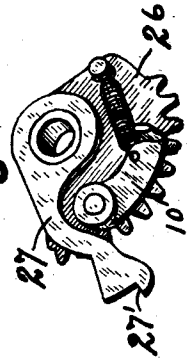


Fig. IX.

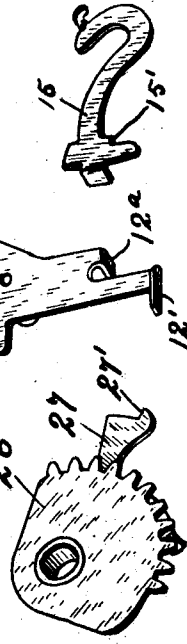


Fig. XII.

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334

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3 SHEETS—SHEET 3.

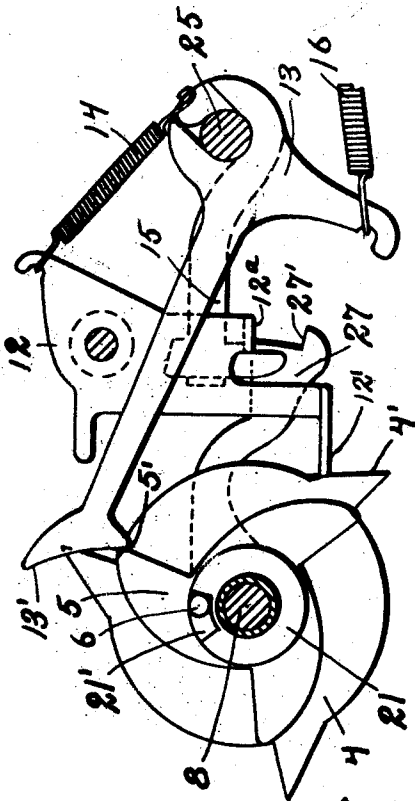


Fig. XIII.

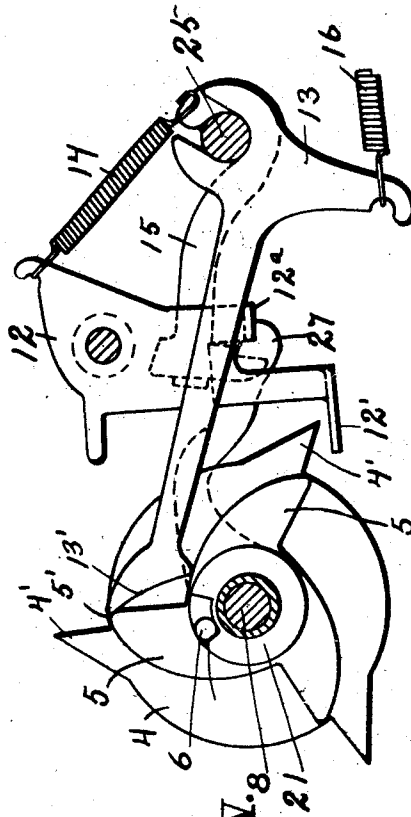


Fig. XIV.

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384

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UNITED STATES PATENT OFFICE.

GLENN J. BARRETT, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO BARRETT ADDING MACHINE CO., OF GRAND RAPIDS, MICHIGAN, A CORPORATION.

TRANSFER MECHANISM FOR ADDING-MACHINES.

994,238.

Specification of Letters Patent.

Patented June 6, 1911.

Application filed June 7, 1910. Serial No. 565,563.

To all whom it may concern:

Be it known that I, GLENN J. BARRETT, a citizen of the United States, residing at Grand Rapids, Kent county, Michigan, have invented certain new and useful Improvements in Transfer Mechanisms for Adding-Machines, of which the following is a specification.

My invention relates to improvements in transfer mechanisms for adding machines, and its objects are: to provide a carrying mechanism which will not prematurely allow the carrying operation to take place when the dials are rotated at a great speed; and to provide a carrying mechanism wherein the power for tripping the carrying step devices is accumulated during the revolution of the dial of the lower denomination, and not during the movement of the dial for one space, between the "9" and "0" point, as is usually the case.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The structure described constitutes one effective embodiment of my invention.

Other embodiments would be readily devised by those skilled in the art.

The invention is clearly defined and pointed out in the claims.

A structure constituting an effective and preferred embodiment of the features of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure 1 is a detail sectional side elevation of the transfer mechanism of an adding machine embodying my invention, showing bearing shafts, and stay rods of the adding machine to which it is applied corresponding to an elevation view taken from the right hand of the parts illustrated in Fig. 2. Fig. 2 is a sectional view of the parts shown in Fig. 1, on line 2—2, said sectional view being taken from the front of the machine. Fig. 3 is a perspective view of the dial actuators which I have shown in conjunction with my invention. Fig. 4 is a perspective view of one of my dials taken from the right. Fig. 5 is a perspective view of the dial taken from the left. Fig. 6 is a perspec-

tive view of the dial actuating gear showing the hub thereon, said view being taken from the left. Fig. 7 is a perspective view, taken from the right of the carrying trigger and carrying cam mounted on a common hub. Fig. 8 is a perspective view of the carrying wedge. Fig. 9 is a perspective view taken from the left of the actuating sector, showing the stopping member 27 and the pawl which is adapted to engage the teeth of the gear shown in Fig. 6. Fig. 10 is a perspective view of Fig. 9, taken from the right. Fig. 11 is a perspective view taken from the right of the carrying trip. Fig. 12 is a perspective view of the carrying trip catch also taken from the right. Fig. 13 is a side elevation of a portion of my invention, showing the parts in position just before the dial reaches the "0" point in its adding rotation; in passing from "9" to "0", the driving gear 9 being removed from the hub 21. Fig. 14 is a side elevation of the parts shown in Fig. 13, showing the carrying parts in position, just after the carrying operation has taken place, or just as the dial finally reaches the "0" point.

In the drawing, similar numerals of reference refer to similar parts throughout the several views.

As it is immaterial to what form of adding machine my invention shall be applied, I have only shown such parts as bear upon my invention for the purpose of giving thereof a clear understanding. However, it may be assumed that the type of machine to which my invention is applied is known as a key-setting handle-operated machine, wherein the depression of suitable finger keys interposes stops which limit the movement of suitable dial-actuating members, there being one actuator for each dial, and that these actuating members are operated by the movement of the operating handle, all of which are features well known in connection with machines of this class.

It may be further assumed that the machine to which my invention is applied has what is known as a reciprocating pick-up bail, the function of which is to restore the actuators to normal positions, during which operation the dials are engaged with said actuators, and are rotated in the process of addition. It will be further understood that, in the machine to which I have

shown my invention applied, the real power for accomplishing the carrying movement is stored somewhere between the dial actuators and the operating handle, during the
 5 final movement of said handle; in other words, suitable stops limit the backward movement of said actuators when no carrying operation is desired, and by the removal of these stops at the point of carrying, the
 10 desired actuator is allowed to proceed one extra space under the tension of a suitable spring or other means, somewhere between said actuators and said operating handle, as will be thoroughly understood by anyone
 15 familiar with the ordinary key-set, handle-driven type of adding machine.

In Fig. 1, 1 is the dial, one of a series, upon which is read the accumulations; 2 is a pinion rigidly attached to said dials and
 20 rotating upon the pivotal shaft 3; 9 is the driving gear always in mesh with said dials; 4 is the carrying tripping trigger; and 5 the carrying cam for storing power to trip the carrying stop mechanism. 23 is the hub
 25 upon which are rigidly mounted both the carrying tripping fingers 4 and the cam 5. 6 is a pin extending from said hub 23, toward the right. 21 is a hub secured to the gear 9, and 21' is an opening in this hub
 30 21 to receive the pin 6 when the parts are assembled in operative position upon the shaft 8. Now it will be readily seen that the rotation of the gear 9 in one direction will cause one edge of the opening 21' to
 35 abut the pin 6 and force a rotation of the carrying tripping fingers 4 and the cam 5 in the same direction. It will be also understood that the carrying tripping fingers 4 and the cam 5, by reason of the slot 21', can
 40 rotate a little in advance of the movement of said gear 9, when power is applied to them greater than the force of the normal rotation of the gear 9. 12 is the carrying trip having thereon the tripping portion 12' and
 45 the stopping portion 12^a, against which the carrying stop 27 is adapted to normally abut, as shown in Fig. 1.

It will be readily understood, as stated, that, when the parts are in normal position,
 50 as shown in Fig. 1, the actuator 11 is exerting a tension upon said actuator rearwardly. Fig. 3 shows one form of actuator, the style of which, however, is immaterial to my invention.

55 17 is the pick-up bail, which has a reciprocatory movement driven by the operating handle. In this particular case, when the stop 27 abuts the stopping portion 12^a of the carrying trip 12, the further movement
 60 of the pick-bail 17 to normal position causes what is known as carrying power to be stored in the spring 20. In this connection, 19 are a series of stops suitably arranged to cooperate with stops governed by the de-
 65 pression of digit finger keys, as will be

understood to be a common feature of adding machines of the class to which my invention is applied.

When the trip 12 is forced backwardly during the passing of its cooperating dial 70 beyond the "9" point, the stop 27 of the dial of next higher denomination is freed from its cooperating member 12 and said stop 27 is allowed to move until the point 27' contacts with said stopping portion 12^a. 75 During the rearward movement of the dial actuators 11, it will be understood that the pawl 10 is in operative engagement with the teeth of the gear 9. This pawl 10, is pivotally mounted upon the actuating sector 26, 80 which is always in mesh with the actuator 11. It will be further understood that, when said sector 26 swings forwardly, impelled by said actuator 11, the pawl is not in engaging relation to the gear 9, but passes 85 freely over the teeth thereof. Thus, during the rearward movement of the stop 27 just described, having been freed from the normal stopping position shown in Fig. 1, by the actuation of the next lower dial mechanism and driven by the carrying power, which in this case is shown to be the spring 20, said stop 27 passes a distance equal to that required to move its cooperating dial 90 one space, or until the point 27' abuts 12^a, 95 or position shown in Fig. 14. This method in general of tripping a stop and allowing the movement of an extra space for the actuating parts of next higher denomination is an old feature in adding machines of this 100 class and the general method will be well understood by those familiar with the art. However, my invention relates more particularly to the devices and means for accomplishing this tripping operation just de- 105 scribed.

Ordinarily, during the passage of the dial from the "9" point to the "0" point, a cam, moving in synchrony with the dial, 110 forces a stopping member out of the path of travel of some sort of a stop portion having a synchronous movement with the actuators, thus allowing the actuator to move an extra carrying space. Serious difficulties 115 are always encountered in devices for this purpose, for two reasons: First, during the rapid rotation of the dials, especially if there be a slightest lost motion, no matter what the stop or "overthrow" preventing means may be, the slightest over rotation 120 of said dials produces a blow upon the tripping mechanism, which is sufficient in rapid operation to trip such mechanism as is ordinarily employed, thus producing a carrying movement when not desired. This is particularly noticeable when a series of dials 125 rotate from "0" to "9". This difficulty is usually overcome by a nicety of construction, and governing features compelling a slow movement of the parts to insure ac- 130

curacy. Second: The second difficulty is in the fact that it takes considerable power to trip the parts, when in position shown in Fig. 1, the carrying tension of the carrying spring 20, whatever the same may be, causing considerable friction between parts corresponding to 27 and 12^a, and this requires a much stronger spring than would be otherwise necessary. In this regard, my invention relates to means for storing power for this tripping operation during the considerable portion of the rotation of the dial and not during its passage simply from the "9" point to the "0".

15 Figs. 1 and 7 show a rotary cam, having three elevating portions because, in the structure shown, I have provided a driving gear with three times the number of teeth as upon the dial pinion 2, and the same may be said of the trip 4. 13 is a lever with inclined edge 13', actuated by the spring 16. The forward portion of this edge is adapted to cooperate with the elevating portions of the cam 5. Thus, during the rotation of the dial from the "0" to the "9" position, the latter of which is shown in Fig. 1, this wedge is raised against the tension of said spring 16 to the position shown in Fig. 1. Now, it will be readily seen that the point 4' of the trip 4 is not in contact with the contact portion 12' of the trigger 12, and that no ordinary or possible overthrow by rapid operation will even cause such a contact. However, as the dial passes from the "9" toward the "0" point and just before the dial reaches the "0" point, the parts will assume the position shown in Fig. 13. At this point, the tension of the spring 16 is such that the inclined surface 13' comes behind the point 5' of the cam and forces the cam and its cooperating part 4 suddenly ahead of the gear 9. This movement will be understood by noting Figs. 13 and 14, and particularly the position of the pin 6 in Fig. 13, and then its position in Fig. 14, with reference to the slot 21'. In other words, the regular movement of the actuator, whatever it may be, in passing from "9" to "0", indicated on the dials, merely positions the parts as shown in Fig. 13, and then the spring 16 exerting its tension upon the lever 13, through the inclined edge 13' drives the parts 4 and 5 farther than the actuator could do during the movement of one space on the dials, and the point 4' of trigger 4, contacting with the contact portion 12', of trigger 12, throws the finger 12^a well back out of the normal engaging portion of the stop arm 27 or to positions shown in Fig. 14. The function of the catch 15, with the engaging portion 15', is merely for the purpose of retaining the portion 12' in position, shown in Fig. 14, if this tripping operation should happen while the

higher denomination be down away from 12', which would be the case, for instance, when adding to a "6" and "9". A member having a similar function to the catch 15 is usually provided in machines of this class, so further explanation is not deemed necessary.

Fig. 2 shows how my dials, driving gears, trigger 4 and cam 5, etc., are mounted. Especial attention is directed to the manner of mounting the trigger 4 and cam 5 upon the hub 21, attached to the gear 9. The hub 23 is adapted to rotate freely on the hub 21, but is limited in movement by the pin 6, rigidly attached to the trip 4 and cam 5, in the slot 21'. In an ordinary carrying device well known in the art, as applied to such general form of adding machine, as has been stated is shown herewith in conjunction with my invention, this tripping operation between the equivalents of the trip point 4' and trigger 12 would have to take place during the movement of 12 degrees of the gear 9, but, in my invention, the trip 4' is given a movement of over 30 degrees by reason of the lever 13, and its inclined edge 13', which is entirely independent of the movement of the dial or driver. The latter, being the gear 9, merely positions the parts so that the spring 16 may become operative. The lever 13 is fulcrumed at 25. A stop 22 is provided for the trigger 12, and a spring 14 holds the trigger 12 and stop 15 in normal position.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an adding machine of the class described, the combination of a series of dials; pinions carried by said dials; driving gears to mesh with said pinions; vibrating sectors axially mounted with said driving gears; dogs carried by said sectors adapted to engage said driving gears respectively when said sectors move in one direction; a transfer mechanism comprising a stopping arm carried by said sectors respectively, a swinging stop adapted to normally arrest said arm and limit the movement of the same, and means for swinging said swinging stop out of the normal path of travel of said stopping arms to allow said sectors and cooperating parts to move one more numeral space than normal, comprising a tripping trigger and cam rotatably mounted axially of said driving gears, means for compelling a synchronous movement of said tripping and cam members with said dials during the rotation of said dials from approximately the "0" point to the "9" point thereon, and a movement thereof from the "9" point to the "0" point thereon comprising a pin and slot connection between said tripping and cam members and said driving gears; spring means adapted to be raised by each of

said cams away from the axial point thereof; an inclined edge on each of said spring pressed arms adapted to contact with its corresponding cam after said cam has moved
 5 said spring pressed arm to the limit of said movement, and force a further movement of said tripping and cam members; projections from each of said swinging stops; contact connections between said projections of each
 10 swinging stop and the tripping and cam member of the next lower denomination; and secondary stops to limit the movement of said stopping arms after said swinging stops have been moved out of the normal
 5 path of travel of the respective stopping arms, substantially as described.

2. In an adding machine of the class described, the combination of a series of dials; a transfer mechanism comprising a reciprocating actuating member for each dial, stop-
 20 ping arms actuated by said reciprocating members, swinging stops normally adapted to arrest said arms and limit the movement of the same, means for swinging said swing-
 25 ing stops out of the path of travel of said stopping arms to allow said reciprocating members and cooperating parts to move one more numeral space than normal when the
 30 "9" point on any dial of lower denomination is passed, comprising a trip device and cam rotatably mounted, means for compelling a synchronous movement of said trip device
 35 and cam member with their cooperating dials respectively, during the rotation of said dials from approximately the "0" point thereon to the "9" point, comprising a lost
 40 motion connection with said dials; a spring pressed arm corresponding to each dial of lower denomination adapted to be moved
 45 by each of said cams away from the axial point thereof, and an inclined edge upon each of said spring pressed arms adapted to contact with each of said cams after said
 50 cams have reached the transfer point to react upon the same and advance the same, projections from each of said swinging stops, contact connections between said projections from each swinging stop and said tripping
 55 member of next lower denomination, and secondary stops to limit the movement of said stopping arms after said swinging stops have been moved out of the normal path of travel of the respective stopping arms, substantially as described.

3. In an adding machine of the class described, the combination of a series of dials, and transfer mechanism comprising a plu-
 60 rality of movable stops for normally arresting and limiting the movement of said dials, means for moving said movable stops from normal limiting engagement with said dials when the dial of next lower denomination passes the "9" point thereon compris-
 65 ing a rotatable cam for each operative denomination section, adapted to rotate in syn-

chrony with its cooperating dial from approximately the "0" point thereon to the
 "9" point, spring pressed members adapted to be moved by said cams away from the
 70 pivotal points of the latter, means carried by said spring pressed members for forcing a movement of each of said cams in excess of the movement of its cooperating dial at the transfer point; tripping members mov-
 75 ing in synchrony with said cams and adapted to contact with said movable stops of next higher denomination and render said stops inoperative during said excess movement of
 80 said cams, and suitable secondary stops for said dials when said normal stops have been rendered inoperative, substantially as de-
 85 scribed.

4. In an adding machine of the class described, the combination of a series of dials, and transfer mechanism comprising a plu-
 85 rality of movable stops for normally limiting the movement of said dials; means for moving said stops from normal limiting engagement with said dials when the dial of
 90 next lower denomination passes the "9" point thereon comprising a rotatable trip-
 95 ping member adapted to rotate in synchrony with each of said dials during the passage of said dials from approximately the "0" point thereon to the "9" point, suitable engaging
 100 portions from each of said movable stops adapted to normally lie in the path of travel of said tripping member of next lower denomination, means for imparting to said rotary tripping members an additional move-
 105 ment to that of its cooperating dial when said dial passes from the "9" point thereon to the "0" point and during the contact between said tripping rotary member and
 110 said projection from said movable stop of next higher denomination, and means for storing power for imparting such additional movement to said tripping members during
 115 approximately the movement of said cooperating dials from the "0" point thereon to the "9" point, substantially as described.

5. In a transfer mechanism for an adding machine, the combination of accumulating
 120 dials, a reciprocating driving means therefor, a plurality of movable stops for normally arresting and limiting the movement of said reciprocating members, and means for moving said movable stops from normal
 125 engaging relation with any of said reciprocating members when the dial of the next lower denomination passes the "9" point thereon comprising a tripping member
 130 adapted to rotate in synchrony with its cooperating dial during the passing of said dial from the "0" point to the "9" point thereon, and to move in excess of the movement of its cooperating dial during the passage of the latter from the "9" point to the
 "0" point thereon, means for storing power for said excess movement of said tripping

means during the movement of the cooperating dial from approximately the "0" point to the "9" point thereon, and suitable contact connections between said tripping members and the reciprocatory driving member of the next higher denomination, substantially as described.

6. In a transfer mechanism for an adding machine, the combination of accumulating dials, stopping means for limiting the movement thereof in one direction, and means for displacing the said stopping means and granting to any of said dials a further movement than normal when the dial of next lower denomination passes the "9" point thereon, comprising a rotary tripping member adapted to rotate in synchrony with each of said dials during a movement thereof from approximately the "0" point to the "9" point thereon, and to rotate in excess of the movement of its cooperating dial during the movement of said dial from the "9" point to the "0" point thereon, means for producing said excess movement of said tripping members actuated by power stored during the said rotation of said dial from approximately said "0" point to the said "9" point, and suitable connections between said tripping members and the stopping means for the dials of next higher denomination respectively during said excess movement of said tripping means, substantially as described.

7. In a transfer mechanism for an adding machine, the combination of accumulating dials, stopping means for limiting the movement thereof in one direction, and means for displacing the said stopping means and permitting any of said dials a movement in excess of normal, when the dial of next lower denomination passes the transfer point thereon, comprising a rotary tripping member, suitable connections between each of said tripping members and said stopping means cooperating with the dial of next higher denomination, means for storing power to actuate said tripping means of one denomination in said altering of said stopping means of the next higher denomination and during the rotation of the dial of the lower denomination from approximately the "0" point to the "9" point

thereon, and means for rendering said stored power operative during the movement of said dial of lower denomination from the "9" point to the "0" point thereon, substantially as described.

8. In a transfer mechanism for an adding machine, the combination of accumulating dials, stopping means for each of said dials for limiting the movement thereof in one direction, and means for displacing said stopping means and granting to any of said dials a movement in excess of normal when the dial of next lower denomination passes the "0" point thereon, comprising a rotary tripping member adapted to contact with each of said stopping means for the dial of next higher denomination, and means for forcing the rotary movement of said tripping member during the passage of its cooperating dial from the "9" point thereon to the "0" point actuated by power stored during the rotation of said dials from approximately the "0" point thereon to the "9" point, substantially as described.

9. In a transfer mechanism for an adding machine, in combination with accumulating dials, normal stopping means therefor, and a rotary means cooperating with each of said dials for rendering said normal stopping means inoperative, and means for storing power for operating said rotary means during the rotation of said dials from approximately the "0" point thereon to the transfer point.

10. In a transfer mechanism for an adding machine, in combination with accumulating dials, normal stopping means therefor, and a rotary means cooperating with each of said dials for rendering said normal stopping means inoperative, and means for storing power for operating said rotary means, during the rotation of said dials before the transfer point thereon is reached, from approximately the "0" point thereon to the transfer point.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

GLENN J. BARRETT. [L. s.]

Witnesses:

CLORA E. BRADEN
L. G. GREENFIELD.