A. J. POSTANS.

ZEROISING MECHANISM.

APPLICATION FILED AUG. 27, 1907.

967,829.

Patented Aug. 16, 1910.

2 SHEETS—SHEET 1.

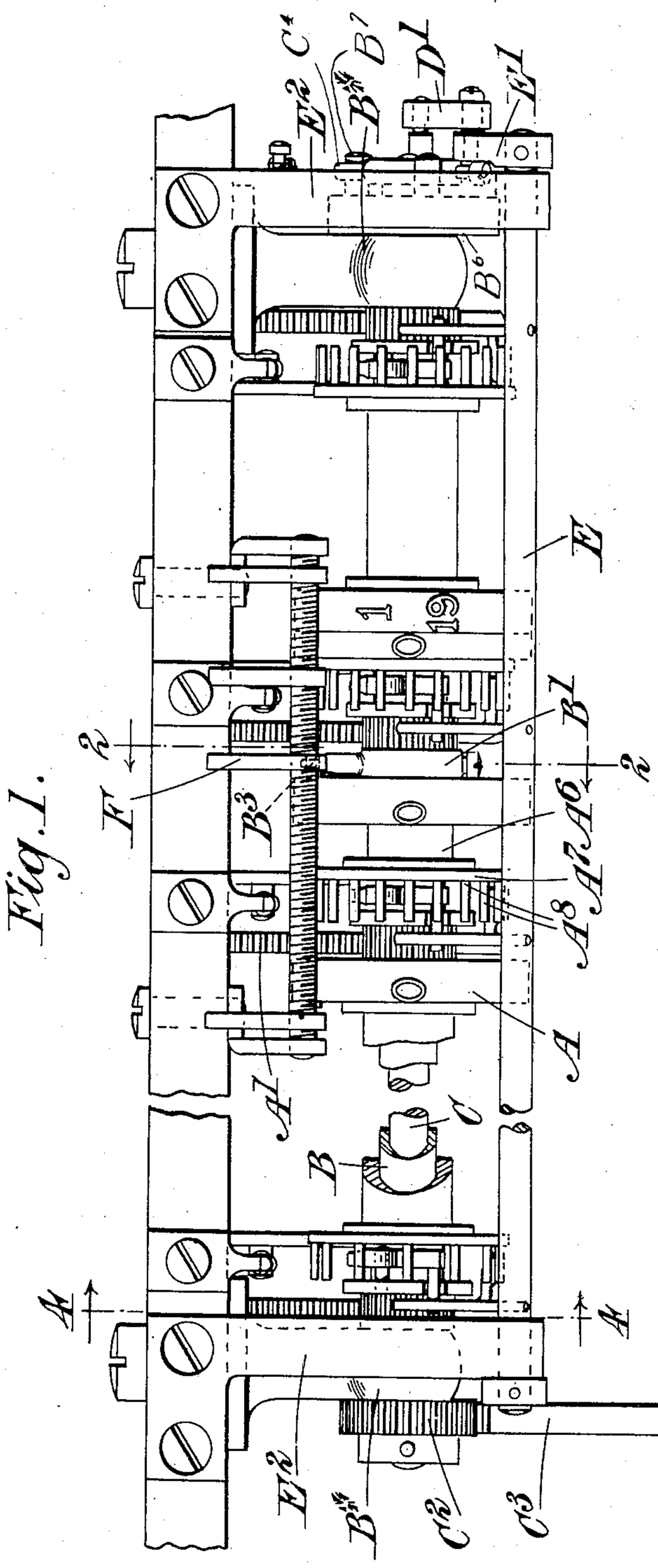

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 4.

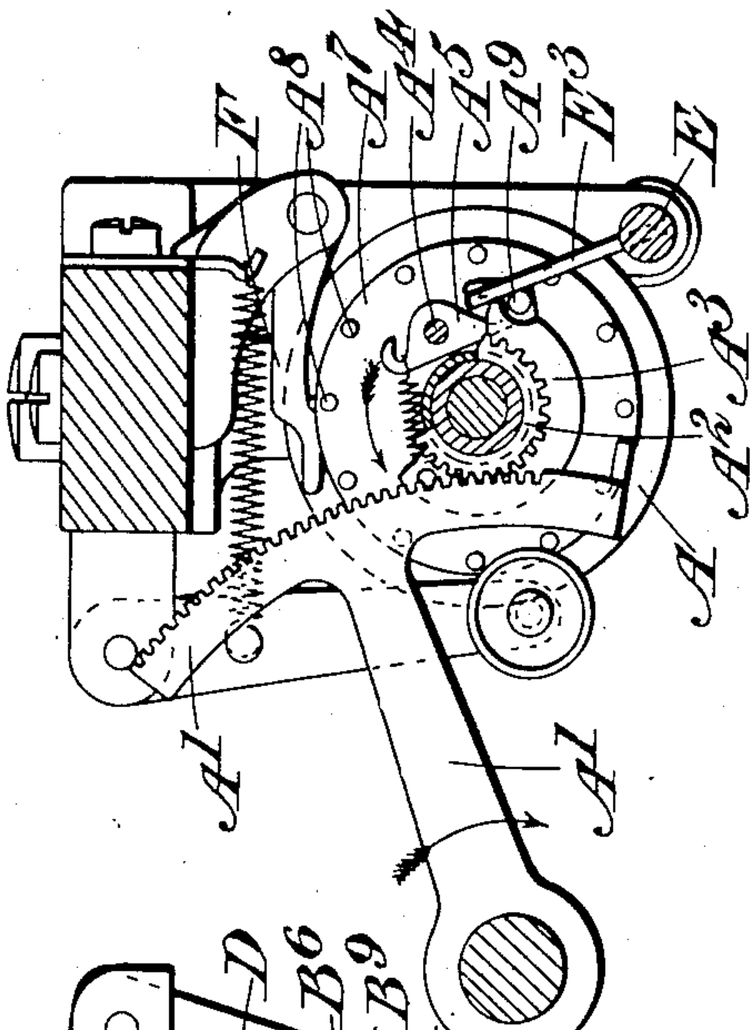


Fig. 3.

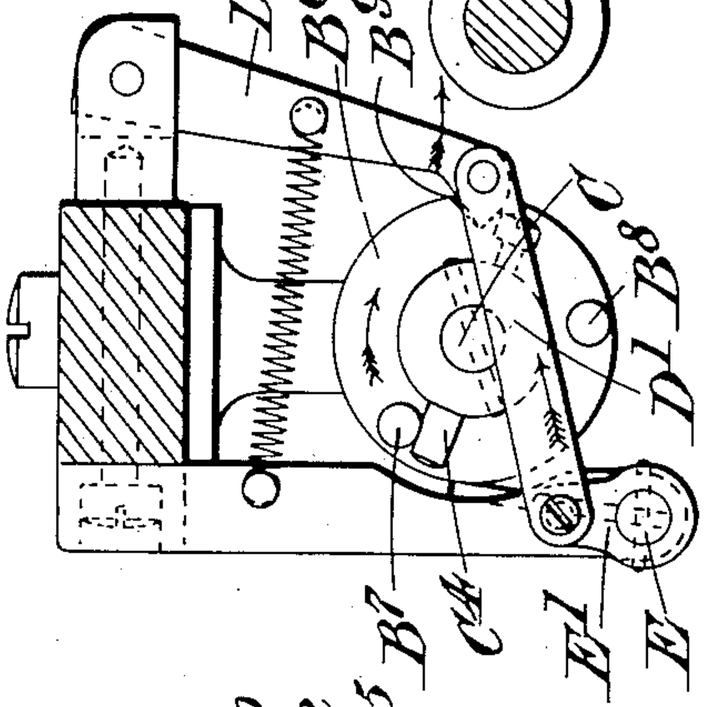
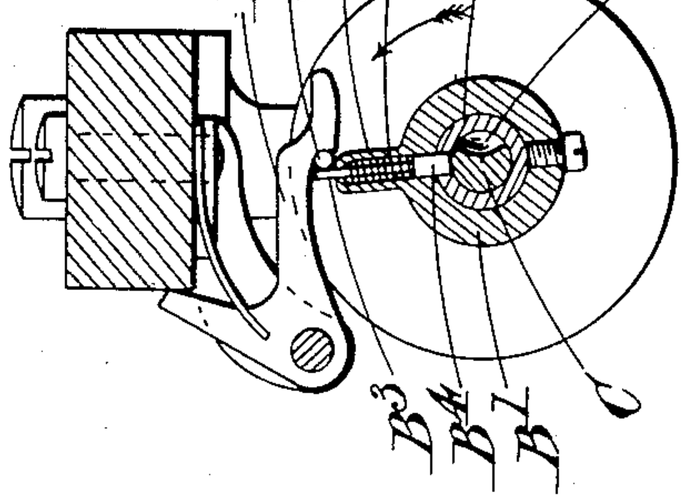


Fig. 2.



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UNITED STATES PATENT OFFICE.

ARTHUR JAMES POSTANS, OF LONDON, ENGLAND, ASSIGNOR TO ADDER CASH REGISTER SYNDICATE LIMITED, OF LONDON, ENGLAND.

ZEROISING MECHANISM.

967,829. Specification of Letters Patent. Patented Aug. 16, 1910.

Application filed August 27, 1907. Serial No. 390,334.

To all whom it may concern:

Be it known that I, ARTHUR JAMES POSTANS, a subject of the King of England, and residing in London, England, have invented certain new and useful Improvements in Zeroising Mechanism, of which the following is a specification.

This invention is for improvements in or relating to zeroising mechanism and is applicable to any number of rotatable recording or indicating units or drums such as are used in calculating machines or cash registers.

In zeroising mechanism as at present constructed for these machines a shaft has been used carrying setting pins and arranged to move endwise as well as to rotate. To zeroise with this arrangement it is necessary to first move the shaft endwise for the purpose of bringing the setting pins into position for engagement with their respective units or drums and then to rotate the shaft to bring the drums around to the zero position.

According to this invention a rotatable shaft is employed in combination with setting fingers so connected with the shaft that as the latter rotates the setting fingers are first brought into position to engage the drums and then advanced by the continued rotation of the shaft to the zeroising position.

Preferably the setting-fingers take the form of spring-controlled pins carried by a rotatable sleeve and made to bear by means of their springs against a cam shaft mounted within the sleeve. Normally the shaft within the sleeve is so situated that the pins are retained in their nearest position to the center of the shaft but when zeroising is to be effected the shaft is rotated so that the cams move the pins radially outward, whereby they are brought into the requisite position for engaging the drums.

The sleeve carrying the zeroising fingers receives its movement from the cam shaft referred to, but the means of connection is such that the cam shaft has a certain amount of free movement relatively to the sleeve in order that the fingers may be brought into position as stated before the sleeve is rotated. To hold the sleeve stationary while the cam shaft performs the first portion of its movement a retarding device is employed. This preferably takes the form of a cam or notched disk having a spring-controlled follower which rises out of the notch when the sleeve is engaged and rotated by the cam shaft. This outward movement of the follower is utilized through the medium of other mechanism to release the pawls which otherwise prevent the movement of the drums in the direction for zeroising.

In the accompanying drawings—Figure 1 is an elevation of a series of drums provided for zeroising mechanism constructed according to this invention. Fig. 2 is a section on the line 2—2 of Fig. 1, Fig. 3 is an end elevation of the apparatus shown in Fig. 1 viewed from the right. Fig. 4 is a section on the line 4—4 of Fig. 1.

Like letters indicate like parts throughout the drawings.

The recording units or drums A are mounted free on a rotatable sleeve B carried in brackets B*. These drums may have on their peripheries a series of numbers; a cipher only is shown in the drawings. The numbers may be raised to serve as type whereby the amount recorded by the drums can be printed when brought into contact with suitable apparatus or the numbers may be arranged to appear before an inspection orifice in the machine wherein the zeroising mechanism is employed, so that the amount can be read therefrom at sight. The normal driving mechanism for the drum is of known construction and comprises a toothed quadrant A^1 which engages a pinion A^2 also mounted free upon the sleeve B. The pinion carries a disk A^3 whereon is pivoted at A^4 a spring-controlled pawl A^5. Each drum has secured to it either directly or through the medium of a sleeve A^6 a disk A^7 having a series of pins A^8 which serve as teeth wherewith the pawl A^5 coöperates.

In the operation of the machine the drums are actuated by movement of the quadrants A^1. When a quadrant is moved in the direction of the arrow Fig. 4, it draws the pawl A^5 back over the pins A^8 but on the return movement the pawl engages with the last pin over which it was withdrawn and carries the drum A around with it until it again arrives at the position of rest. It will thus be seen that each of the drums is brought around to varying positions according to the number of keys operated and the object of the present invention is to provide means for zeroising them, that is to bring

them all back when required so that they each register 0, as shown in Fig. 1.

To effect the zeroising a series of collars or casings B^1 is secured on the hollow shaft or sleeve B, one collar being allotted to each drum A. The collar has a radial lug B^2 and mounted in this portion is a setting-finger or pin B^3. The pin B^3 has an enlarged head B^4 and is surrounded by a spring B^5 which bears at one end against the head B^4 and at the other end against the interior of the lug so that it always tends to advance the pin toward the center of the sleeve B and the sleeve is perforated to allow the passage of the head therethrough. Within the sleeve B is a cam shaft C. This shaft is recessed as at C^1 opposite each pin B^3, and when the cam shaft is in its normal position relatively to the sleeve the recesses C^1 lie directly beneath the pins so that the latter are advanced into them; the outer end of each pin then lies within the lug B^2 of its casing B^1.

At one end the cam shaft C carries a pinion C^2 which meshes with a toothed quadrant C^3 and at the other end the shaft carries a radial pin C^4 which is situated adjacent to a disk B^6 carried fast on the sleeve B. On the disk are two pins B^7 B^8 which lie in the path of the pin C^4 so that while the shaft C is allowed a certain amount of free movement relatively to the sleeve B it finally engages the sleeve B by means of its pin C^4 and one of the pins of the disk B^6. The object of permitting this free movement is to enable the shaft B to be turned so that the recesses C^1 therein may be carried away from the pins B^3 as shown in Fig. 2 before the sleeve B commences to rotate and in order that the sleeve may be held stationary while this operation is effected the disk B^6 has in it a notch B^9 and coöperating therewith is a spring-controlled detent D. The disk B^6 thus serves as a cam and the detent or follower D drops into the notch B^9 when this is brought into such position that it registers therewith, but the engaging portion of the detent is so shaped that when the disk is forcibly turned the detent will be made to rise out of the notch against the action of its spring.

With the mechanism arranged as shown in the drawings zeroising is effected by turning the drums A in a direction opposite to that of their normal travel and as the pawls A^5 prevent movement in this direction it is necessary to disengage them before zeroising can be effected. Obviously the mechanism might be arranged to zeroise by movement in the same direction as that in which they normally travel, but as it is always necessary in these machines to provide some locking device whereby over-running may be prevented, there would still be some pawl or equivalent device to release before zeroising could be effected. To release any such locking mechanism (in this case the pawl A^5) the movement of the retarding detent D is taken advantage of. For this purpose it is connected by a link D^1 to an arm E^1 fast on a rocking shaft E carried in brackets E^2. On the rocking shaft is a series of arms E^3, one of which is allotted to each pawl A^5. When the parts are at rest, that is when the keys of the machine are all released so that they assume their normal positions, the pawls A^5 are all brought around by means of the quadrants A^1 and pinions A^2 to the position shown in Fig. 4 and each pawl carries a pin A^9. The arms E^3 on the rocking shaft E are so alined relatively to these pins that when the shaft is in its inoperative position, that is when the detent D lies in the notch B^9 of the disk B^6 the arms lie clear of the pawls A^5 as shown in Fig. 3, but when the detent is forced out of the notch the shaft E is rocked so that the arms advance and engage the pins A^9 on the pawls whereby the latter are pushed back out of engagement with the pin teeth A^8 of the drums (Fig. 4).

The operation of this mechanism is as follows:—The quadrant C^3 is advanced by any suitable mechanism which may be connected to its rocking shaft C^5. Such mechanism may comprise a key which when depressed rocks the quadrant forward toward the observer so that the pinion C^2 and consequently the shaft C is rotated in the direction of the arrow, Fig. 3. When the shaft C is in its normal position the pin C^4 lies against the pin B^8 and consequently during the first quarter of a revolution the shaft advances without imparting movement to the sleeve B, this being held as already described by the detent D. After the first quarter of a revolution the pin C^4 is brought against the pin B^7 on the disk B^6, but before it reaches the same the recesses C^1 on the shaft have been carried away from the pins B^3, see Fig. 2, so that these have been moved outwardly against the action of their springs B^5. Further movement of the shaft C now causes the sleeve B to rotate by means of the engagement of the pins C^4 B^7, and the pins B^3 are carried around with the sleeve. Each drum A has on it a pin A^{10} which is in such position that it clears the lug B^2 of the collar B^1 allotted to that drum, but lies in the path of the pin B^3 when this is in the advanced position. The quadrant C^3 is moved a sufficient distance to rotate the sleeve B through a complete revolution so that whatever position each drum is in the pin B^3 allotted thereto will strike the pin A^2 on the drum and carry it around until movement of the shaft is arrested. To insure that the drum shall be properly brought to zero a spring-controlled pawl F is allotted to each drum and coöperates with the pin A^{10}. This pawl allows the pin to pass freely beneath it when

the drum is moving in the normal direction, see the arrow Fig. 2, but when the drum is moved in the reverse direction as for zeroising it engages the pin A^{10} when the drum has been brought around to the zero position. In Fig. 2 the parts are shown in the position they occupy when the shaft C has just completed its movement and it will be seen that the pin A^{10} is locked between the pin B^3 and the detent F, the drum A being in the zero position.

The quadrant C^3 is preferably spring-controlled so that when the key whereby it was advanced is released it automatically returns carrying with it the shaft C. During the first quarter of a revolution in the return movement of the shaft C the sleeve B may or may not move with it, that is to say if the friction between the sleeve and shaft is greater than that between the sleeve and its bearings B* the sleeve will follow the shaft, but if the reverse is the case the sleeve will be held by the bearing until the pin C^4 comes into contact with the pin B^8, when the sleeve will be carried around until the shaft comes to rest at its normal position. When the shaft has come to rest, the sleeve B will have been returned to the position shown in Fig. 3 so that the detent D once again engages the notch B^9 of the disk B^6. It will be seen that if the sleeve is not held by the bearing, the sleeve B will travel around with the shaft until the detent D enters the notch B^9 when the sleeve will be arrested and the shaft C will continue its movement independently until the pin C^4 once again lies against the pin B^8. As the detent D drops into the notch B^9 it rocks the shaft E back to its release position so that the pawls A^5 of the drums are again operative.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In zeroising mechanism for a recording machine, the combination of a shaft (C) having in it a transversely disposed recess (C^1), a sleeve rotatably mounted thereon, means for engaging the shaft and sleeve by rotating the former, such means however permitting a limited amount of independent movement, a rotatable recording unit mounted co-axially with the sleeve, an approximately radially disposed pocket or guide in the sleeve, a pin carried in the pocket of the sleeve and free to slide therein, the inner end of the pin lying normally in the recess (C^1) of the shaft (C) and a spring also mounted within the pocket to maintain the pin in such position that its inner end always bears against the shaft (C) the arrangement of the parts being such that when the shaft is rotated so that the recessed portion of the shaft is turned from the pin and the full portion is brought beneath it, the pin is first moved radially outward to engage the recording unit and is then moved in a circular path to carry the unit to the zero position, substantially as set forth.

2. In zeroising mechanism for a recording machine the combination of, a rotatable shaft (C) having in it a recess (C^1), a sleeve rotatably mounted thereon, a rotatable recording unit mounted co-axially with the sleeve, a setting-finger carried by the sleeve and having a part that extends through the sleeve and normally lies in the recess (C^1) in the shaft (C), yielding means for maintaining such part of the setting-finger in contact with the shaft (C), means for engaging the shaft with the sleeve, said means permitting a given amount of independent movement of these two parts, and means to retard the shaft until it is positively engaged by the sleeve, substantially as and for the purpose set forth.

3. In zeroising mechanism for a recording machine the combination of, a rotatable shaft (C) having in it a recess (C^1), a sleeve rotatably mounted thereon, a rotatable recording unit mounted co-axially with the sleeve and having a propelling pawl, a setting-finger carried by the sleeve and having a part that extends through the sleeve and normally lies in the recess (C^1) in the shaft (C), yielding means for maintaining such part of the setting finger in contact with the shaft (C), means for engaging the shaft (C) with the sleeve such means permitting a given amount of independent movement of these two parts, a cam-member on the shaft, a yieldingly controlled detent-follower engaged with the cam-member and a releasing member operatively connected with the follower in such manner that when the shaft is turned from its normal position by the rotation of the sleeve the consequent displacement of the follower causes the arm to strike the driving pawl of the recording unit and thereby disengage it therefrom, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR JAMES POSTANS.

Witnesses:
A. M. HAYWARD,
HARRY B. BRIDGE.