June 12, 1923.

1,458,689

C. S. ELLIS

ELAPSED TIME RECORDER

Filed April 9, 1920

3 Sheets-Sheet 1

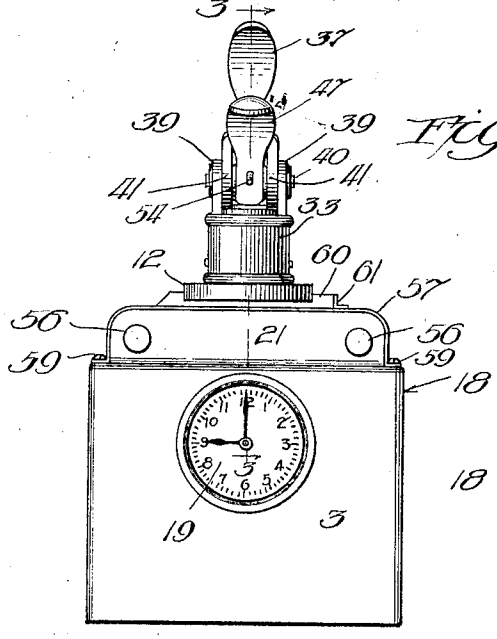
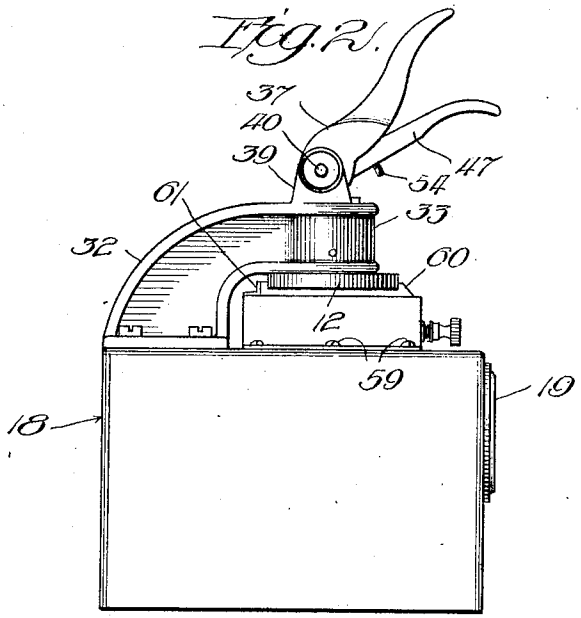


Fig. 1.

Fig. 2.



Inventor:
Charles S. Ellis
by William K. Hall
Atty

June 12, 1923.

1,458,689

C. S. ELLIS

ELAPSED TIME RECORDER

Filed April 9, 1920

3 Sheets-Sheet 2

Fig. 3.

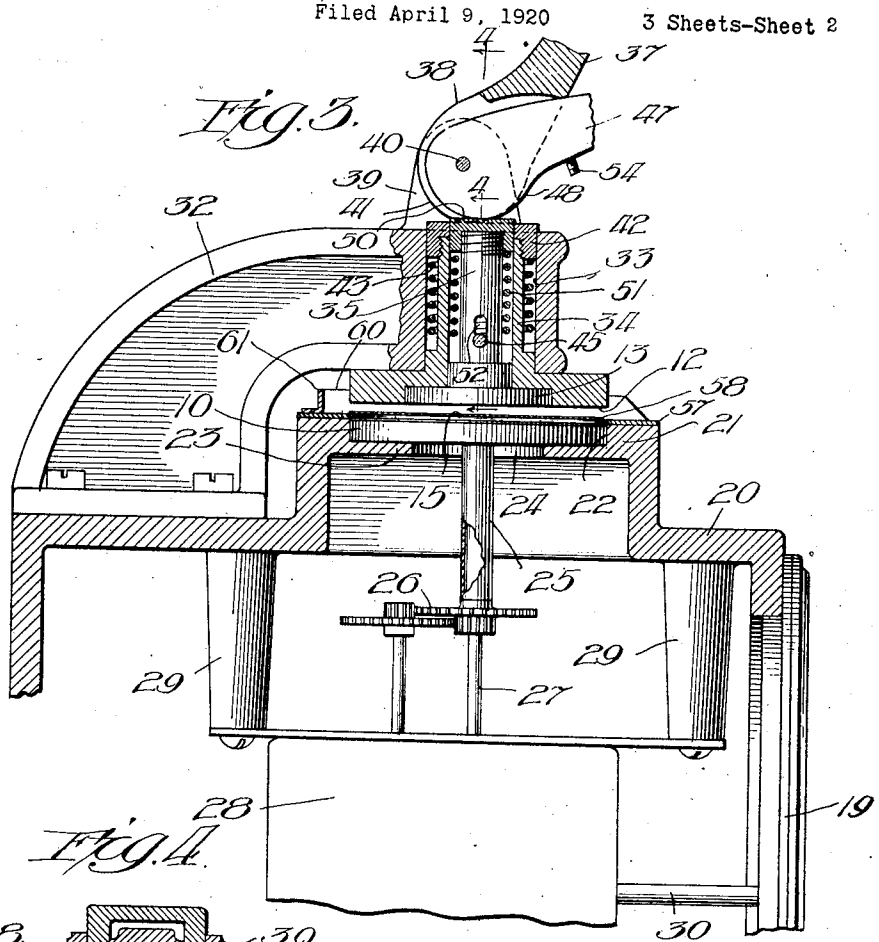


Fig. 4.

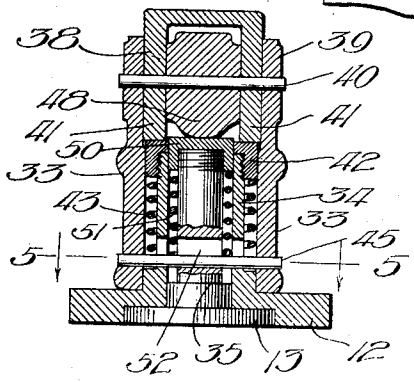
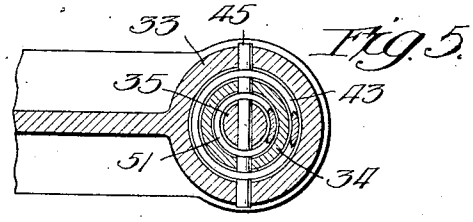


Fig. 5.



Inventor:
Charles S. Ellis
by William A. Hall
Atty's

June 12, 1923. 1,458,689

C. S. ELLIS

ELAPSED TIME RECORDER

Filed April 9, 1920 3 Sheets-Sheet 3

Fig. 6.

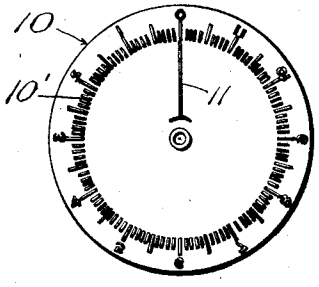


Fig. 8.

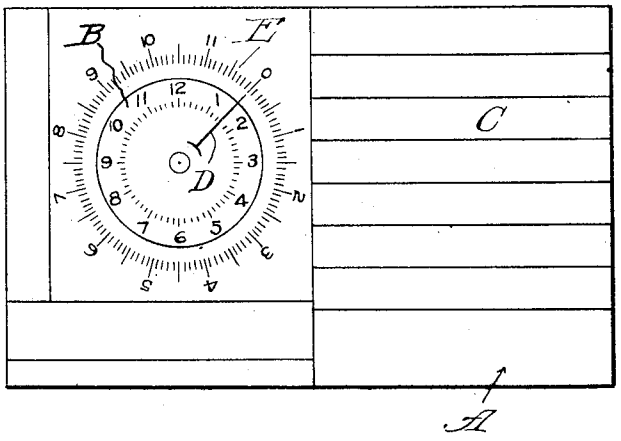


Fig. 7.

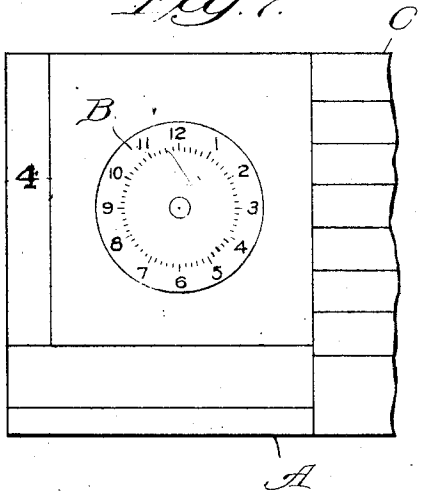
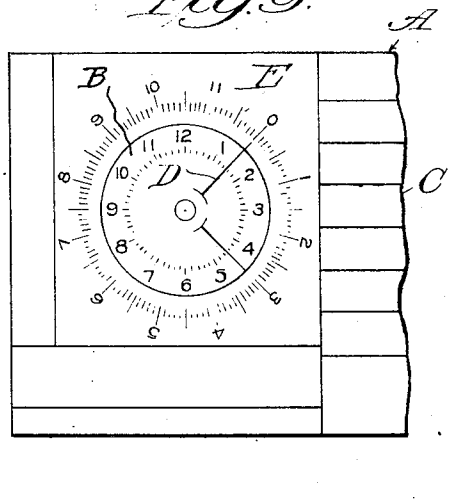


Fig. 9.



Inventor
Charles S. Ellis
by William W. Hall
Atty.

Patented June 12, 1923. 1,458,689

UNITED STATES PATENT OFFICE.

CHARLES S. ELLIS, OF CHICAGO, ILLINOIS.

ELAPSED-TIME RECORDER.

Application filed April 9, 1920. Serial No. 372,409.

To all whom it may concern:

Be it known that I, CHARLES S. ELLIS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Elapsed-Time Recorders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in elapsed time recorders or recording devices which are constructed and arranged to produce a record on a time card or other card where increments of time or other units of value are to be calculated. For instance, when used in connection with a time card, the card may bear a permanent circular record corresponding to the hours and minutes of a clock dial in association with which may be imprinted, by printing members of the recorder, hand and other time indicating marks that will indicate the beginning and end of the period to be computed; the card having spaces for other data relative to the job in connection with which the elapsed time is computed.

A recording device embodying my invention is adapted for use in shops where the employees are paid by the hour or fractional parts thereof, and when so used, the employee is furnished with a card bearing on its face a permanent concentric row of numbers corresponding to the hour and minute graduations of a clock dial, and bearing also lines on which may be entered data with respect to a particular job of work and the name of the workman, as indicated in Figures 7 and 8, and the recorder is provided with a die concentric to which the permanent dial marking on the card is adapted to be adjusted in the machine when a record is to be made, the die bearing a circular row of markings corresponding to the hour and minute markings of a dial, which are adapted to be imprinted on the card, with the latter series or row of such diameter as to appear radially outside or inside the permanent dial record on the card. Said die is also provided with a radial upstanding rib or what may be termed a printing hand indicator which is of a radial length to extend to the annular series of markings on the die; and the die is adapted, when impressed on the card through the medium of an interposed ink ribbon, to mark on the card permanent dial area and across the annular hour and minute graduations thereof a radial mark which simulates the hand of a clock and which cooperates with both the permanent card dial record and the concentric imprinted dial record from the printing die. The said die is operatively connected to a clock mechanism so that it is turned in clockwise direction, and thereby angularly advances the clock hand die element; and after an elapsed time, if the card be again placed in the machine with the permanent dial record thereon faced downwardly and concentric to the axis of the die, and a second impression of the die be made to imprint the clock hand die element on the card at its newly clock advanced position, a second marking or imprint will be made, and the angular distance between the two markings of the clock hand die element, when read with respect to the figures or graduations of the inner and outer circles, indicates the time which has intervened or elapsed between the time when the marking hand impression was first marked on the card and when it was last marked thereon, as will be clear, by reference to Figures 6 to 9, inclusive.

In accordance with my invention two impressing platens or plungers co-operate with the die element, one a solid inner platen and the other a rim like surrounding platen, both concentric to the axis of the die element, the outer platen being annularly opposed to and acting against the annular series of hour and minute graduations on the die element, and the other or inner platen being opposed to and acting against the central part of the die element. The actuating devices for the platens are so constructed that both platens can be depressed simultaneously through the operation of one of the actuating devices, and the inner platen can be independently depressed through the operation of the other actuating device. The depression of both platens serves to press a card against the die element, preferably through the medium of an inked ribbon, to print on the card the outer circular series of hour and minute graduations, and the hand printing element or marker, and

the independent depression of the inner or central platen serves to print on the card, and within the permanently printed circular series of hour and minute graduations the impression of the hand printing element (or marker alone). The angular distance between the hand element impression produced by the simultaneous depression of both plungers or platens and that produced by the central platen indicates on the graduations the elapsed time.

The purpose of the invention is to provide improvements in elapsed time recording devices of the general character described which is rugged in its construction and the operative parts of which are so constructed and arranged as to avoid shocks or jars on the mechanism which are operative to print the records on the cards and to rotate the die element.

Another object of the invention is to provide a novel form of printing mechanism constructed with two platens which are so constructed and arranged with respect to each other and to the means for supporting them on the machine that both platens can be depressed to print on a card inserted in the machine, a circular record on the card concentrically to a permanent record thereon, and to also at the same time initially imprint on the card the full length of the marking hand, and constructed to permit the inner platen to be separately depressed so as to imprint on the record formed or produced by the permanent card record and the printed record thereon an imprint of the marking hand without reprinting on the card the circular series of die characters.

Another object of the invention is to provide in combination with co-operative twin, coaxial platens of this character means to actuate the plungers by a movement or movements which exerts a minimum stress or shock on the mechanism.

Other objects of the invention are to improve and simplify elapsed recording mechanisms of this general character, and the invention consists of the combination and arrangements of the parts shown in the drawings and described in the specification, and is pointed out in the appended claims.

As shown in the drawings,

Figure 1 is a front elevation of a time elapsed recorder embodying my invention.

Figure 2 is a side elevation thereof.

Figure 3 is an enlarged vertical section, partially in elevation, on the line 3—3 of Figure 1.

Figures 4 and 5 are detail sections on the respective lines 4—4 of Figure 3 and 5—5 of Figure 4.

Figure 6 is a plan view of the rotative printing die of the recorder.

Figure 7 is a partial plan view of a time card having a permanent dial record thereon adapted for use with the recording mechanism shown.

Figure 8 is a plan view of the card after the exterior dial record has been printed thereon, and also an imprint of the marking hand has been made on the card, such as shown at the beginning of the job.

Figure 9 is a fragmentary view of the card showing the record at the end of the job.

In said drawings, A designates a card having on one end a permanently printed dial record B, shown as marked with the hour and minute graduations of a clock dial. This permanent dial record is located at one end of the card, the other end C being provided with parallel lines to receive suitable data with respect to a job of work. This card, when fully printed in the recorder, is a complete record of a given job, and is used to compute the cost of the work on the job.

As shown in Figure 6, 10 designates a plan view of the die that is rotated by a clock mechanism in the machine. It is shown as of larger diameter than the permanent or printed dial record B on the card, and is marked near its margin with the hour and minute graduations of the usual twelve hour dial. As before stated, the permanent record dial of the card, when placed and gauged in the record, is adapted to be axially disposed with respect to the dial 10, and the dial 10 is provided with a raised radial rib 11 that constitutes the printing element to produce on the card a printed mark D to simulate one hand of a clock on the permanent dial record of the card. Said rib prints a mark D that extends radially across said permanent card dial record to points on the graduations of the larger circular series of hour and minute graduations E stamped or printed on the card, as shown in Figure 8 when both platens are depressed. The printed hand impression D extends only to the inner permanent series of graduations when the central platen is independently depressed as shown in Figure 9.

The machine is provided with two platens indicated in Figures 3 and 4 by 12 and 13, respectively, which are disposed in the machine coaxially with respect to each other and to the die 10. The diameter of the outer plunger 12 and its rim like contour is of such relative width as to co-operate with that portion of the die which bears the annular series of hour and minute graduations 10^1 of the die (Figure 6), and the inner plunger 13 is of a diameter to approximately correspond to that of the permanent printed dial record on the card. The said larger platen is recessed or inset and the smaller platen fits and is closely guided in said recess and is normally flush

at its lower face with the lower face of the larger or other platen.

The said platens 12 and 13 are so constructed that they both can be depressed together against a card which is inverted and interposed between the platens and a printing ribbon 15 that overlies the die 10, to produce the initial record shown in Figure 8, the outer imprint E surrounding the permanent dial record B of the card; and the depression of both platens also imprints on the card an impression of the full length of the rib or die hand 11 as shown in Figure 8. After an elapsed time and during the time when the die is rotated in clockwise direction by the clock mechanism, the inner platen 13 can be depressed on the card when inserted again into the machine so as to imprint on the permanent record of the card from that portion of the hand element 11 which is coradial with the inner platen 13. After the card is so printed the record appears as in Figure 9.

A simple form of machine and mechanism support is herein shown. It comprises in general terms a box-like frame 18 at the upper side of which is mounted the parts which have before been described. The front wall of said frame carries a dial 19 over which sweep the usual minute and hour hands of a clock. The top wall 20 of the frame is provided with a central raised portion or platform 21 that is cut away at 22 to form a seat for the rotating die; the annular walls of the seat or recess constitute confining or constraining means to hold the die in place on the platform. Said platform portion of the frame is provided with an opening 24 downwardly through which extends an operating sleeve 25 that is connected by the gears 26 and a shaft 27 to any suitable form of clock mechanism enclosed in a casing 28. The said clock mechanism casing is fastened to the lower ends of studs or posts 29 that depend from the top wall 20 of the frame. Said clock mechanism is also operatively connected by a second shaft 30 in the usual or known manner with the hour and minute hands associated with the clock dial 19 at the front of the case.

Referring now to the mechanism for operating the platens 12 and 13, the same are made as follows:

32 designates a relatively heavy arm or bracket that is bolted or otherwise secured to the lower portion of the top wall 20 at one side of the platform 21. The free end of said bracket extends over said platform and terminates in a vertical sleeve or bearing 33. 34 designates a tubular stem which is fixed to or made integral with the outer platen 12 and it has sliding bearing in the sleeve 33. 35 is a second stem that is disposed axially within and slides endwise of the hollow stem 34 and is made integral with or fixed to the inner platen 13.

37 designates a lever which is formed at its free end to constitute a hand piece. The heel end 38 of the lever, which is made hollow for a purpose hereinafter to be described, is disposed between upstanding arms 39 of the bearing sleeve 33 and is fitted to said arms through the medium of a pivot or fulcrum pin 40. The lateral sides of said heel end 41 of the lever 37 in front of the pivot 40 are shaped to provide eccentric portions which rest on the upper side of a ring 42 that is threaded to and constitutes the upper end of the platen stem 34, whereby upon swinging the lever 37 downwardly, said eccentric portions of the divided heel part of the lever act on said ring to depress said stem 34 and its platen 12. The said stem and platen are thus depressed against the action of a spiral restoring spring 43 which surrounds the stem 34 between it and the sleeve 33, and said spring bears at one end against the lower end of the ring 42 and at its other end against a cross bar 45 that is seated transversely across the lower end of the sleeve 33.

The inner platen stem 35 is depressed by a second lever 47, the eccentric heel end portion 48 of which is located between the arms of the heel end of the lever 37 and is also pivotally mounted on the pin 40 for the lever 37. Said eccentric heel end of the lever 47 bears against a cap or nut 50 that is threaded to the upper end of the inner platen stem 35. The inner platen stem is depressed against the action of a spiral restoring spring 51 that surrounds the latter stem between it and the hollow stem 34; and one end of the spring 51 bears against the lower edge of the cap 50 and the other end bears against the pin 45 before mentioned. The said inner platen stem is slotted at 52 so as to permit the inner plunger stem to reciprocate relatively to the outer plunger stem.

A stop pin 54 is fixed to and extends downwardly and forwardly from the lever 47 and is adapted to strike against the upper end of the sleeve 33 to limit the movement of both of the levers 47 and 37; it being understood that the lever 47 may be swung downwardly independently of and without moving the lever 37, and that when the latter lever is swung downwardly it also swings the lever 47 herewith.

The inking ribbon 15 before referred to is attached to and wound about rollers 56, 56 that are rotatively supported within a casing 57 that partially encloses the platform 21, and said casing is provided with a central large opening 58 to receive the platens 12 and 13 when the latter are depressed. The ribbon rollers are mounted in bearings at the ends of the platform 21 and are enclosed therebetween and the downturned

ends of the casing 57 which latter may be fixed in any suitable manner to the frame, as by the screws 59 (shown in Figures 1 and 2).

Gauge flanges or strips 60, 61 are supported on said ribbon casing at two adjacent sides thereof to locate the time card A with its permanently printed dial record concentric with the die 10 and the platens 12 and 13.

In the operation of the recorder device the clock mechanism is wound and the time card A having thereon the permanently printed dial record, as shown in Figure 7, is inserted between the ribbon 15 over the dial 10 and the platens 12 and 13 thereabove. It is located relatively to the printing elements by the gauge flanges 60 and 61. Thereafter the main lever 37 is swung downwardly to depress both of the platens 12 and 13 against the actions of both of their restoring springs 43 and 51, respectively, and to print on the card A the outer record dial E and the record of the marking hand D. Thereafter the card is removed and after an interval of time has elapsed or when a job is finished, or the workman leaves the machine, the card is again inserted between the platens and the ribbon over the die and the smaller, inner platen is depressed through the action of the lever 47 to imprint on and in proper relation to the permanent dial record B and the imprint dial record E the short marking hand impression D. The initially printed marking hand record has a fixed relation to the permanent dial record B and the imprinted record E, as shown in Figure 8. After the first portion of the record is made, the printing hand 11 moves away from the hand printed record D before referred to, due to the rotation of the die element 10, and when the record is completed by inserting the card a second time in the machine after an elapsed time, the angular distance between the hands in the dial will show the elapsed time, or the time during which a particular job or a portion of a job is being completed. By reason of the fact that the platen 13 is of shorter radius than the platen 12, and of the fact that but a single rib 11 is used to produce both of the imprinted hand markings D, it is possible and practicable to use but a single hand printing member to produce long and short hand imprints, as shown in Figure 9. Thus the mechanism is simplified and the reading of the record is facilitated because it is compact and contained within a single cylindric outline.

The clock mechanism contained in the enclosure 28 serves to operate the die in timed relation, and also serves to operate the hands of the clock dial 19 at the front side of the casing so that the workmen may always have a clock at hand.

I claim as my invention:

1. An elapsed time recorder for printing over a permanent dial of a card time elapsed indicating markings of a rotating member, comprising a single rotative clock-driven die having a printing face composed of an annular series of time graduations and a single relatively fixed radial marker, relatively movable platens coaxial with each other and the die, one within and of smaller diameter than the other, and means to move said platens simultaneously towards the die, and one of them separately towards said die, whereby the imprint of said marker from the latter platen is shorter than the imprint produced by the coaction with said marker from both platens.

2. An elapsed time recorder comprising a rotative clock-driven die having a printing face composed of an annular series of time graduations and a single relatively fixed radial marker extending from the center of said die to said series, a pair of relatively movable platens coaxial with each other and the die, the inner platen being inset in and guided by the outer platen, means to depress both platens simultaneously towards the die, and other means to separately depress the central platen towards the central part of the die.

3. An elapsed time recorder comprising a rotative clock-driven die having a printing face composed of an annular series of time graduations and a single relatively fixed radial marker extending centrally from said die to said series, relatively movable platens coaxial with each other and the die, and both cooperating with said marker the inner platen being smaller than the diameter of said series, and the outer platen having an annular printing face of a diameter to be presented against said series, and means to move said platens simultaneously and, one of them, separately, towards said die to printing positions.

4. An elapsed time recorder comprising a rotative clock-driven die and separately movable platens coaxial with each other and with the die and movable axially relatively to each other and towards and from said die, with the printing faces of the platens normally flush with each other at the die side thereof and eccentric actuating means for said platens, one adapted to move both platens to printing position and the other to separately move one of the platens to printing position.

5. An elapsed time recorder comprising a rotative clock-driven die and separately movable platens coaxial with each other and with the die and movable axially relatively to each other and towards and from said die, and flush on their printing faces, with the active printing face of the outer platen formed as an annulus, a lever having an eccentric portion to move both platens to printing positions, and a second lever having an eccentric portion to separately move the

central platen to printing position and itself operated by the first lever to move the central platen to printing position.

6. An elapsed time recorder comprising a rotative clock-driven die and separately movable non-rotative platens coaxial with each other and with the die and movable axially relatively to each other and towards and from said die, a lever pivoted to the recorder frame and having a portion provided with spaced eccentric bearings operative to move both platens to printing positions, and a second lever pivoted to the frame by the same means as the first lever and having an eccentric bearing portion between the bearings of the first lever to separately move the central platen to printing position.

7. An elapsed time recorder comprising a rotative clock-driven die, and printing platens coaxial with each other and the die, the outer platen having on its lower side a recess to receive the inner platen, with the printing faces thereof flush, said die having an annular series of time graduations opposed to the annular face of the outer platen, and an inner area of a diameter equal to and opposing the inner platen, and provided also with a single radial marking element fixed relatively to said graduations and extending across the circular line dividing said platens, and means to operate said platens.

8. An elapsed time recorder comprising a rotative clock-driven die, and printing platens coaxial with each other and the die, the outer platen having on its lower side a recess to receive the inner platen with the printing faces thereof normally flush, spring means to normally hold the platens way from the die, eccentric means acting on the outer platen to depress both platens to printing position and separate eccentric means acting on the inner platen to separately press it to printing position.

9. An elapsed time recorder comprising a rotative clock-driven die, and printing platens coaxial with each other and the die, the outer platen having on its lower side a recess to receive the inner platen with the printing faces thereof flush, stems for said platens, one of which is hollow to receive and be guided by the other, a guide for the hollow stem, restoring springs for said platens enclosed respectively by said guide and hollow stem, a pivoted lever having a hollow eccentric heel portion to bear on the stem of the outer platen, and a second pivoted eccentric lever within the hollow eccentric heel of the first lever to act on the stem of the inner platen.

10. An elapsed time recorder comprising a rotative clock-driven die, and printing platens coaxial with each other and the die, the outer platen having on its lower side a recess to receive the inner platen with the printing faces thereof flush, an overhanging fixed arm having a bearing coaxial with said die and said platens, a hollow stem for the outer platen reciprocably in said bearing, a second stem for the inner platen reciprocable in the said hollow stem, a lever having spaced eccentric parts pivoted on extensions of said bearing sleeve and bearing on the stem of the outer platen, and a second eccentric lever pivoted between said eccentric parts of the first lever and bearing on the stem of the inner platen.

11. An elapsed time recorder comprising a rotative clock-driven die, and printing platens coaxial with each other and the die, the outer platen having on its lower side a recess to receive the inner platen, with the printing faces thereof flush, an overhanging fixed arm having a bearing coaxial with said die and said platens, a hollow stem for the outer platen reciprocable in said bearing, a second stem for the inner platen reciprocable in the said hollow stem, a lever having separated eccentric parts pivoted on extensions of said bearing sleeve and bearing on the stem of the outer platen, a second eccentric lever pivoted between said eccentric parts of the first lever and bearing on the stem of the inner platen, and a separate stop for limiting the printing movements of both said levers.

12. An elapsed time recorder adapted to record elapsed time on a card bearing on its face a permanent annular series of time graduations, embracing a die bearing an annular series of time graduations of a diameter greater than the series on the card, and two platens movable towards and from said die and coaxial with respect to each other and the die, one having an annular printing face opposed to said die series of graduations and the other opposing the face of the die within the latter series, and the die having additionally a radial hand printing marker, fixed relatively to said graduations and extending from the center of the die to its annular series of graduations.

In witness whereof I claim the foregoing as my invention, I hereunto append my signature this 7th day of April, 1920.

CHARLES S. ELLIS.