C. E. LARRABEE.

COUNTER.

APPLICATION FILED JUNE 20, 1918.

Patented Apr. 1, 1919.

11 SHEETS—SHEET 1.

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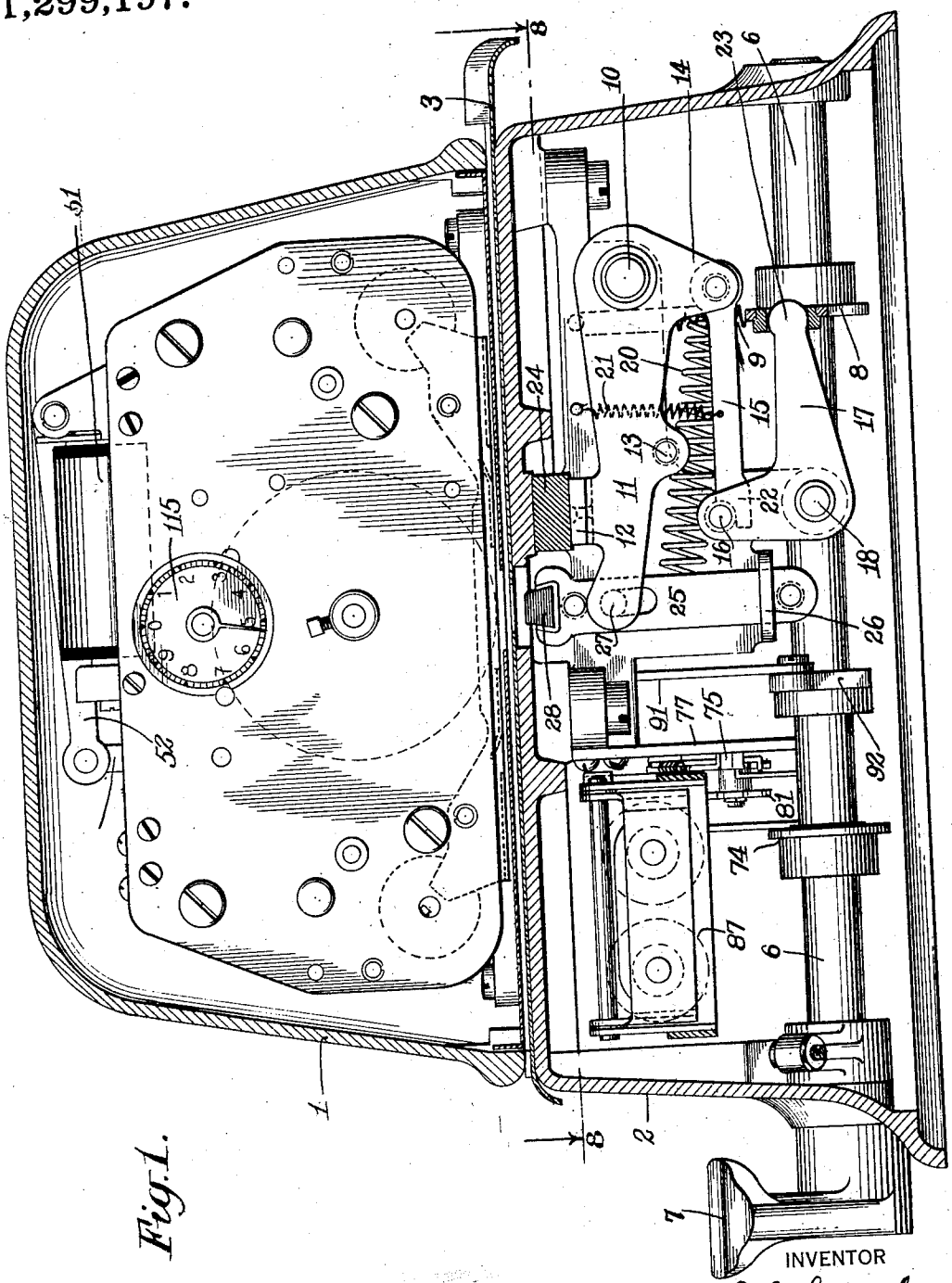

Fig. 1.

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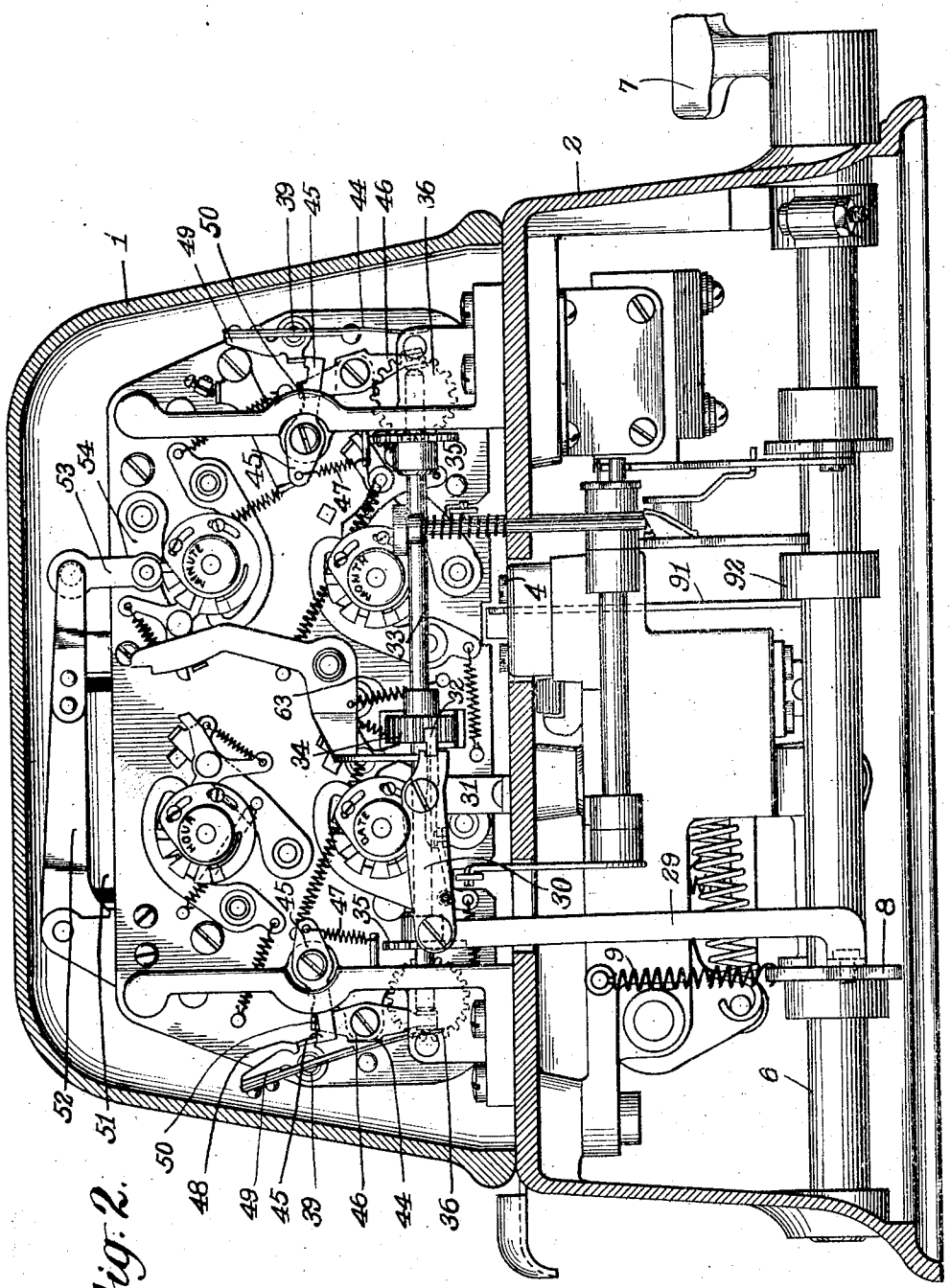

Fig. 2.

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Fig. 3.

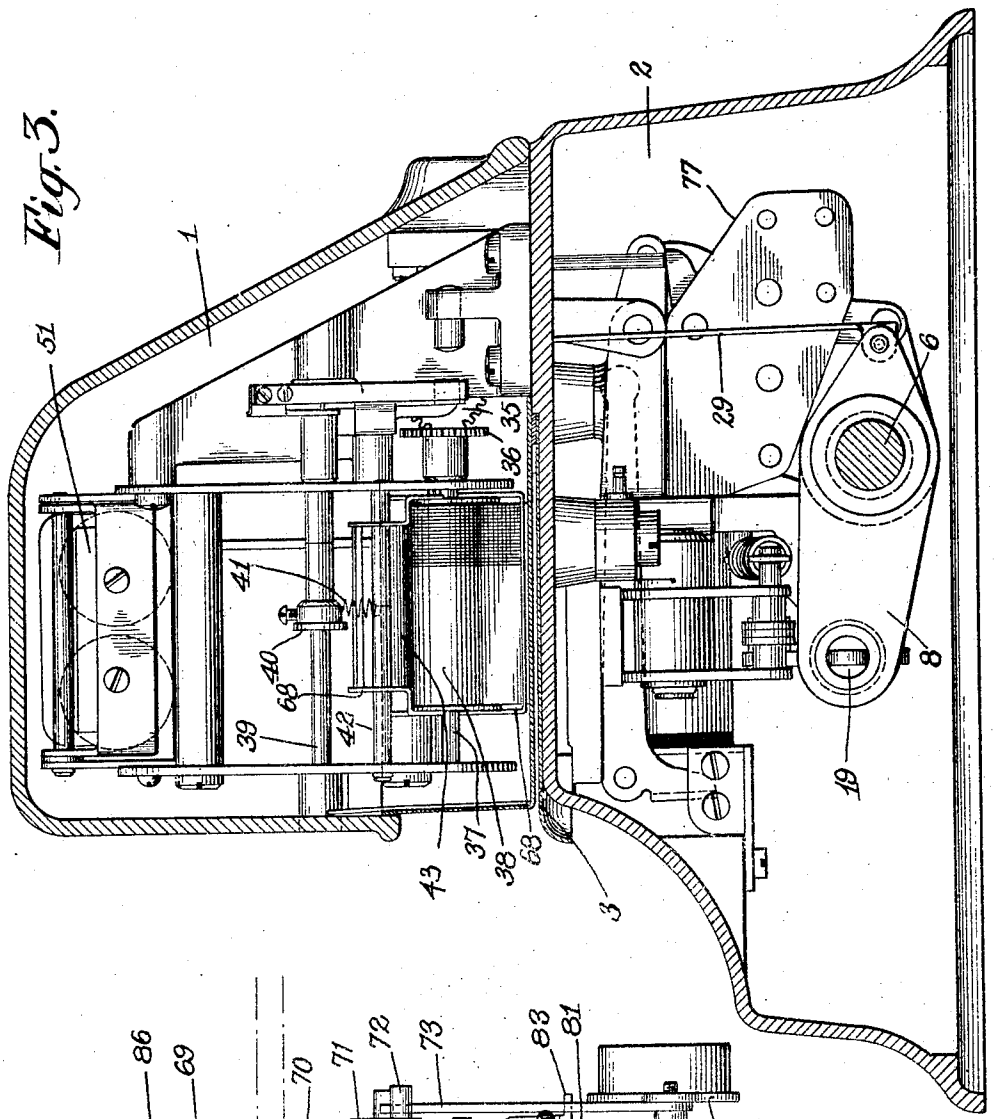

Fig. 5.

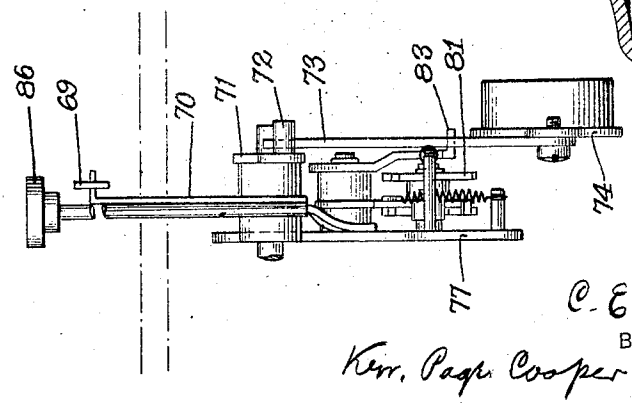

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Fig. 4.

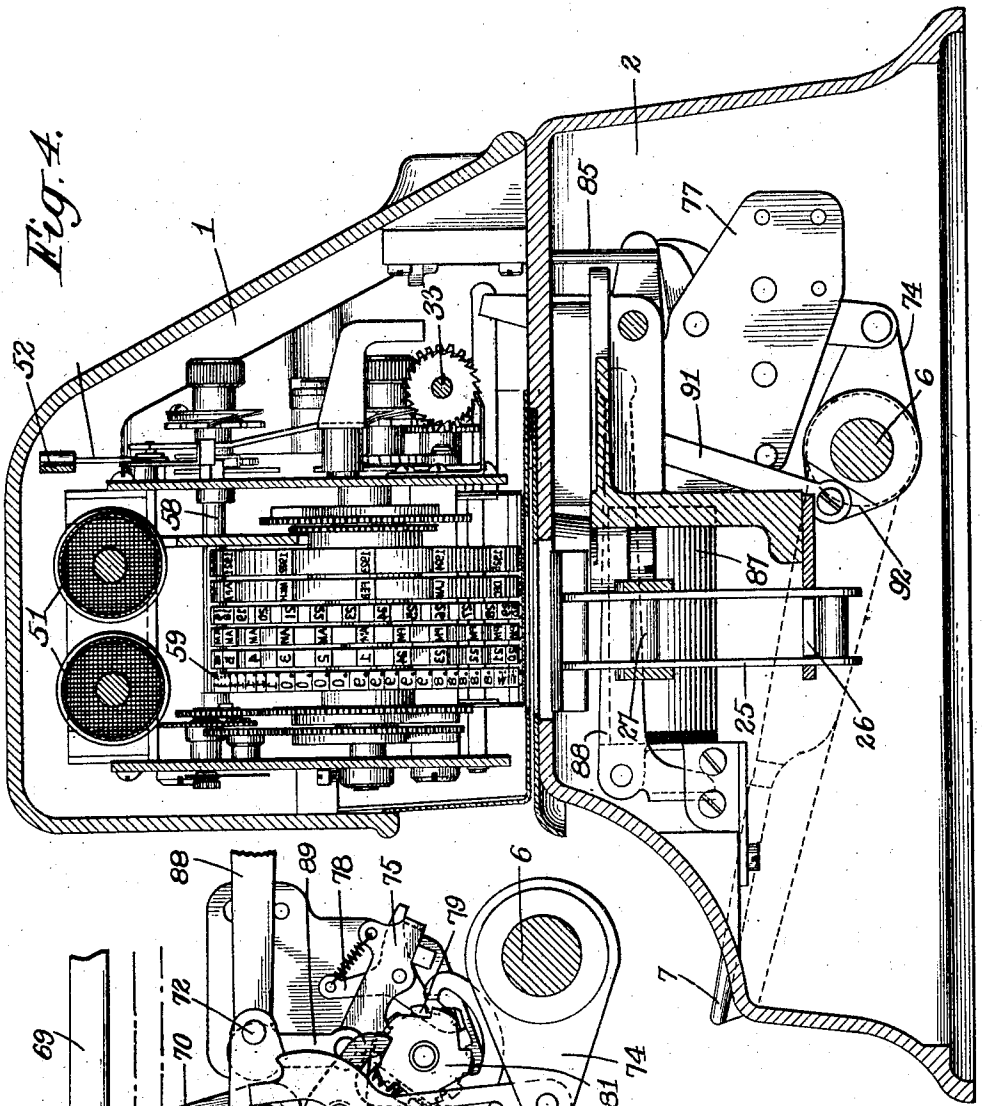
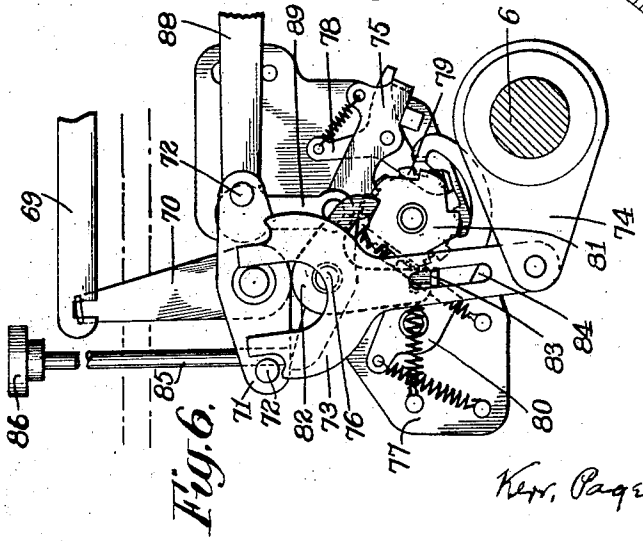


Fig. 6.



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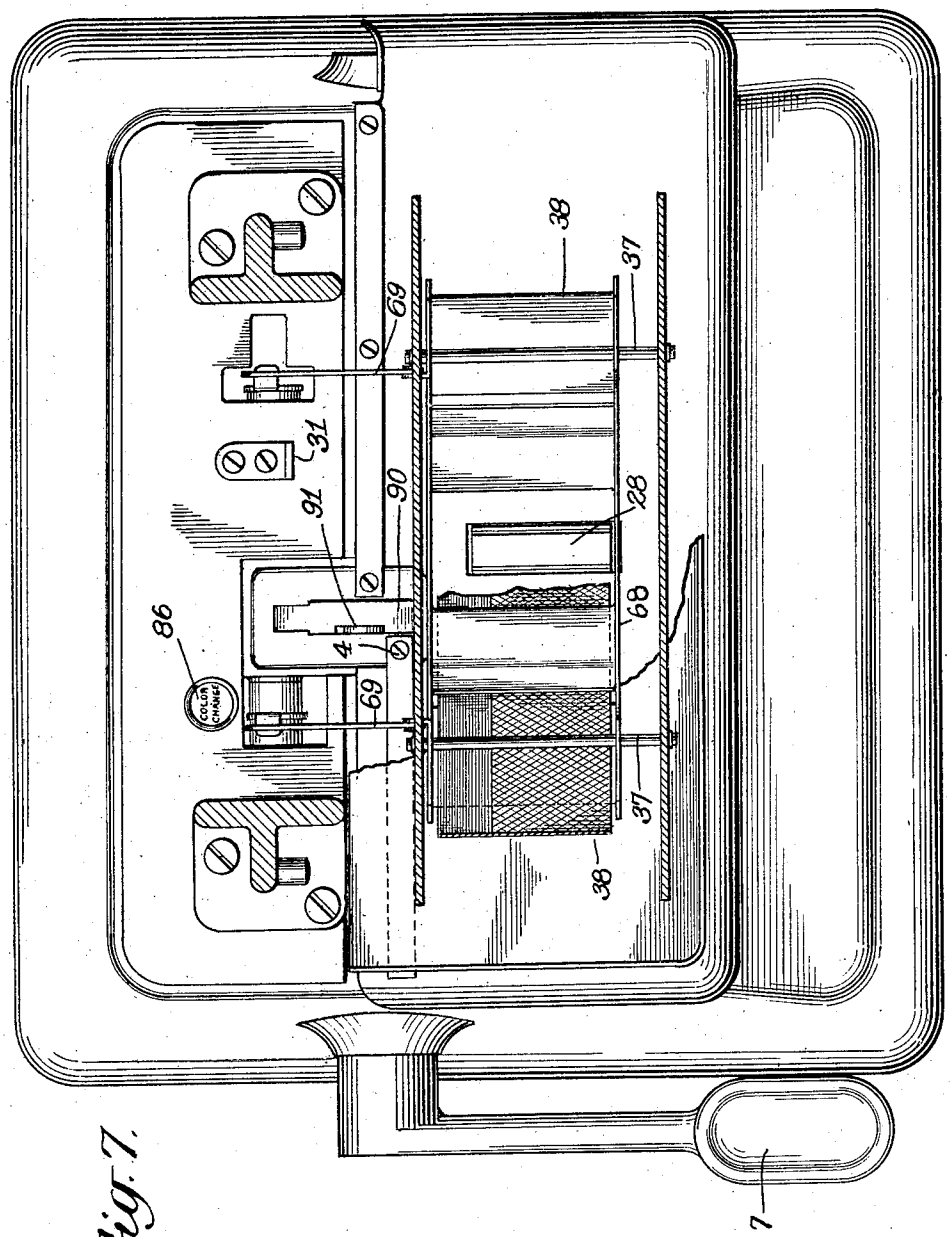

Fig. 7.

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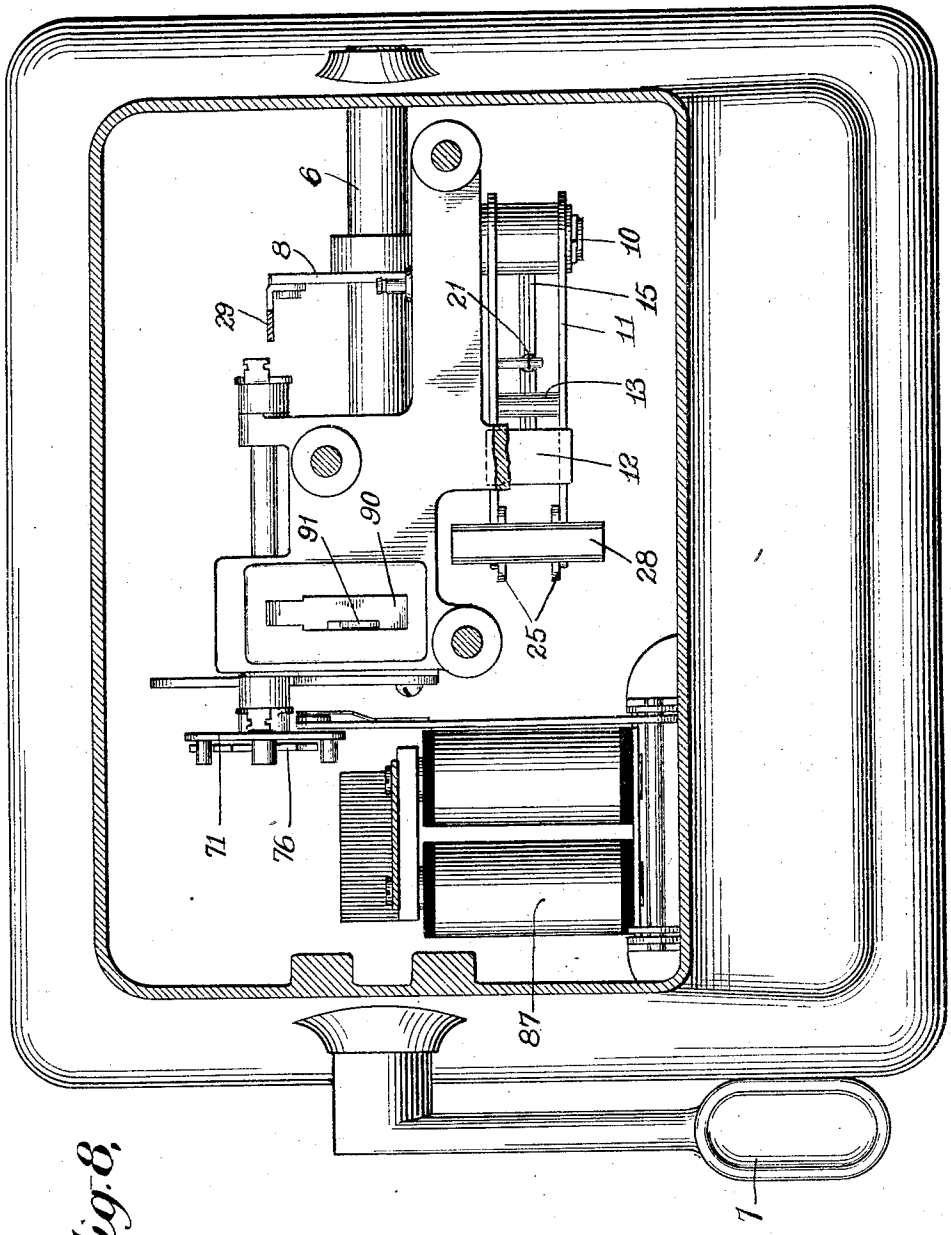

Fig. 8.

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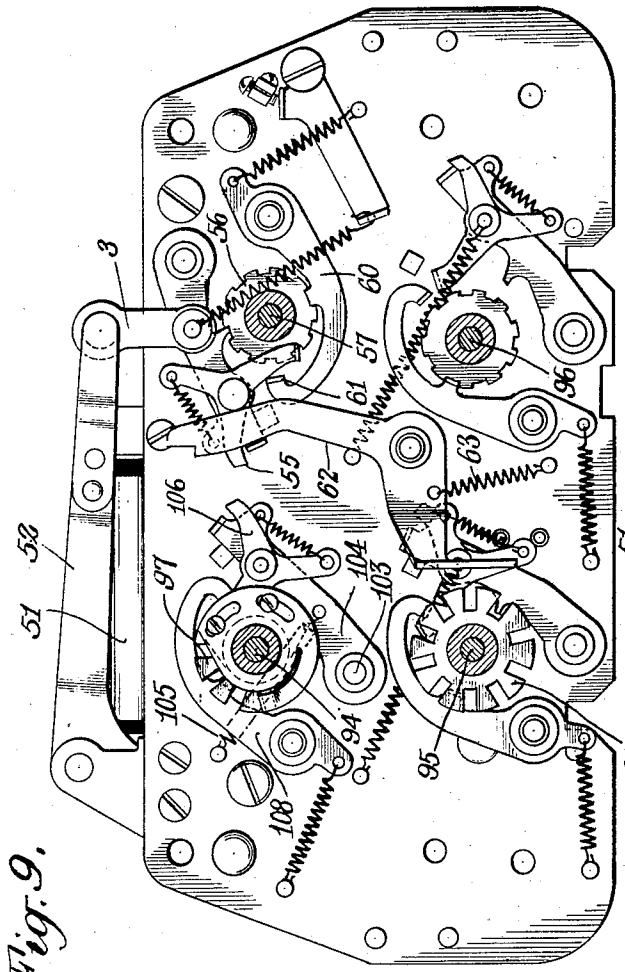

Fig. 9.

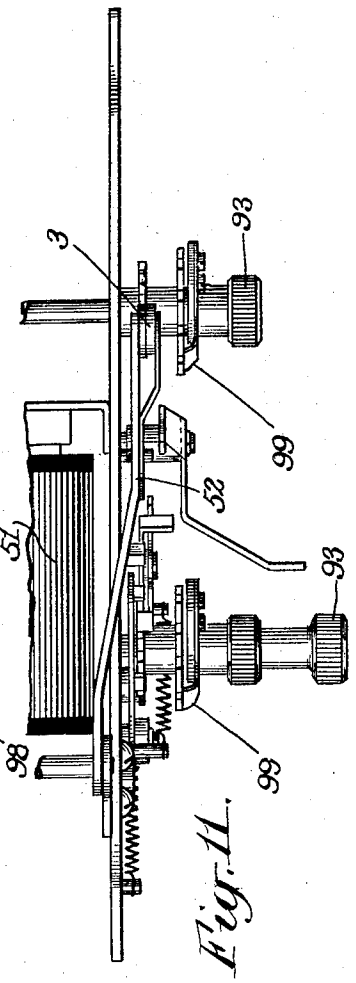

Fig. 11.

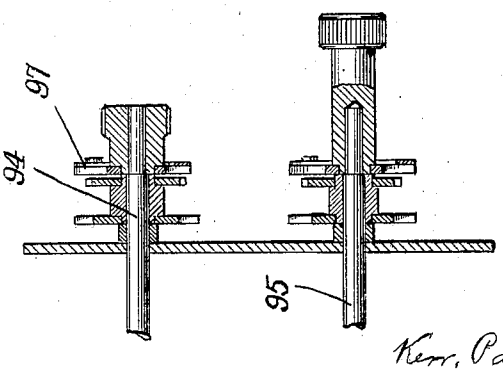

Fig. 10.

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Fig. 13.

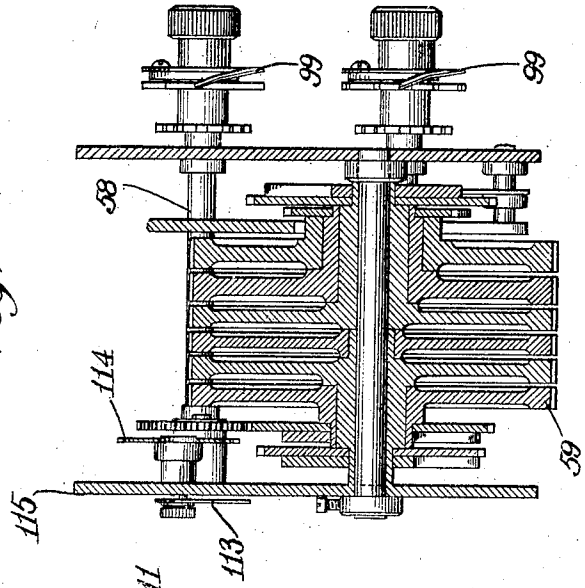
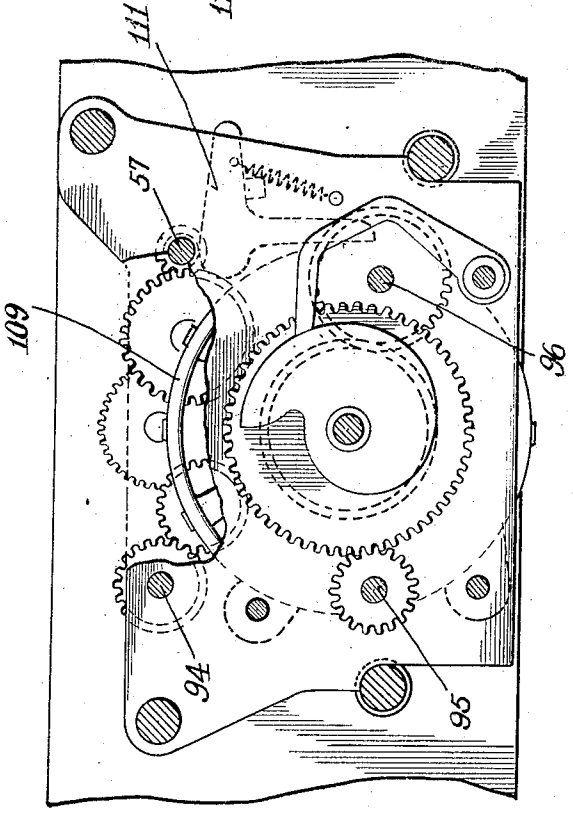


Fig. 12.



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11 SHEETS—SHEET 9.

Fig. 15.

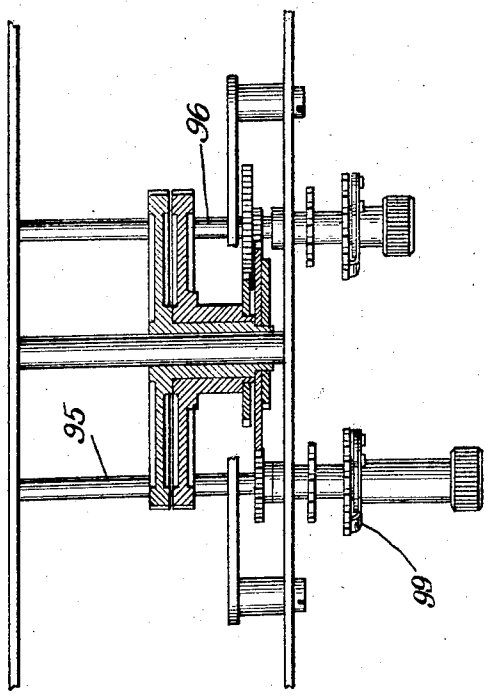


Fig. 16.

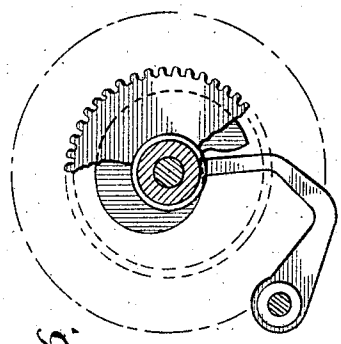


Fig. 14.

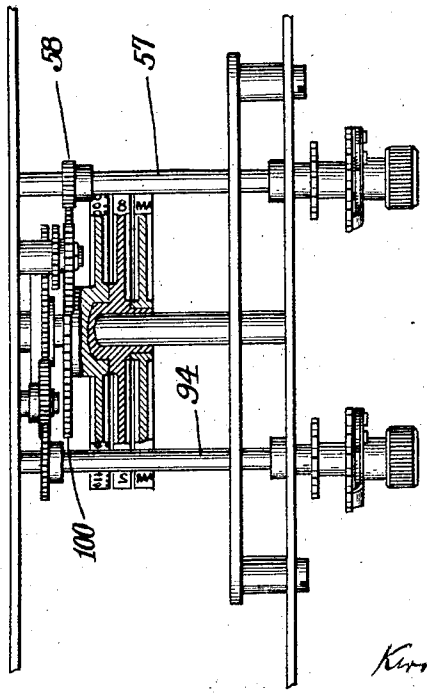
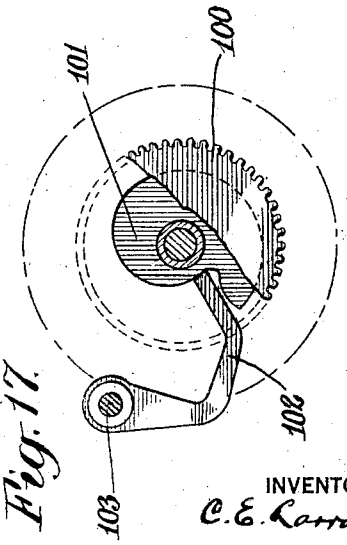


Fig. 17.



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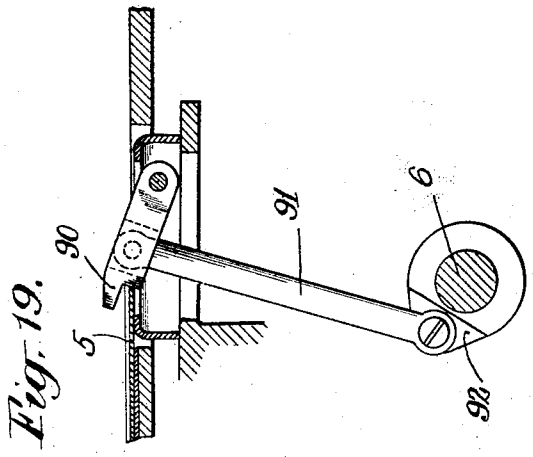

Fig. 19.

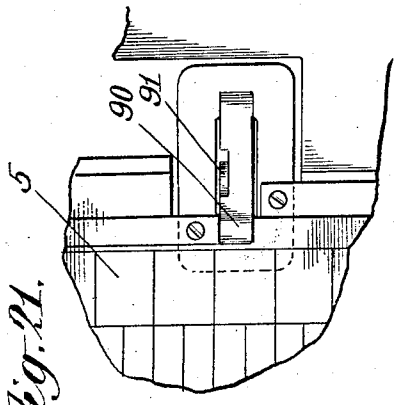

Fig. 21.

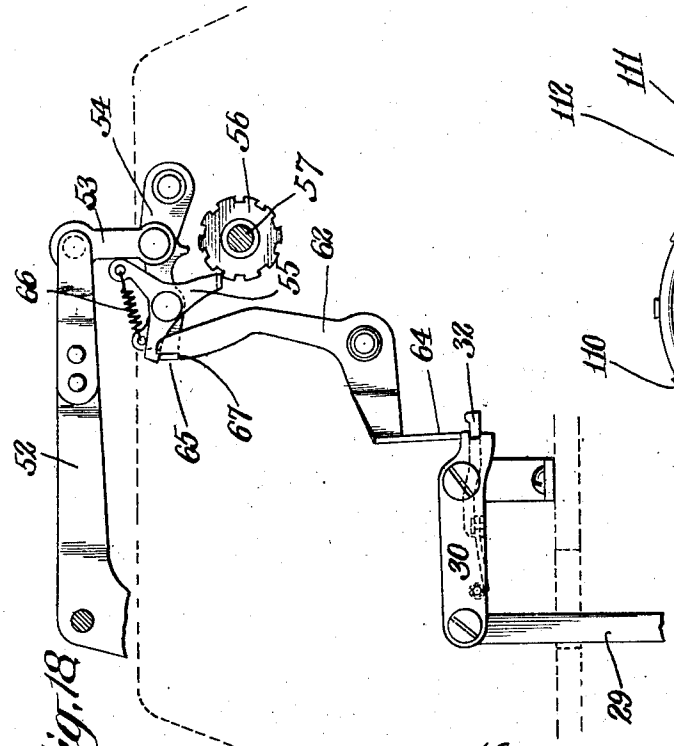

Fig. 18.

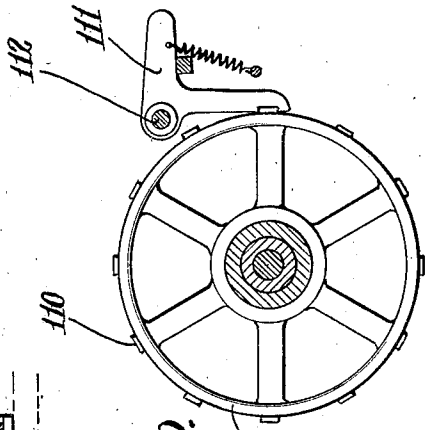

Fig. 20.

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11 SHEETS—SHEET 11.

Fig. 22.

No. _____

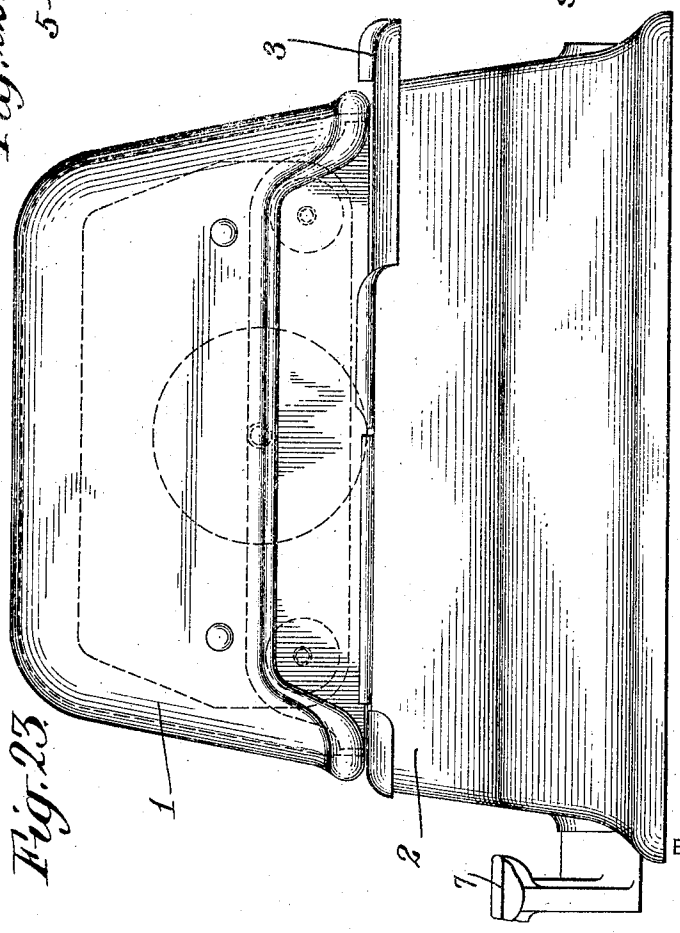
Name _____

Job No.	Clock Record		Elapsed Time	Rate	Cost
		Stop			
		Start			
		Stop			
		Start			
		Stop			
		Start			
	1917 JAN 25 11.5	Stop			
	1917 JAN 25 9.0	Start			
	1917 JAN 25 9.0	Stop			
	1917 JAN 25 5.7	Start			
	1917 JAN 25 5.7	Stop			
	1917 JAN 25 2.6	Start			
	1917 JAN 25 2.6	Stop			
	1917 JAN 25 1.4	Start			
	1917 JAN 25 1.4	Stop			
	1917 JAN 25 0.0	Start			
	Totals				

5

93

Fig. 23.



INVENTOR
C. E. Larrabee
BY Kerr, Page, Cooper & Hayward
ATTORNEYS

UNITED STATES PATENT OFFICE.

CLINTON EUGENE LARRABEE, OF BINGHAMTON, NEW YORK, ASSIGNOR TO INTERNATIONAL TIME RECORDING COMPANY OF NEW YORK, OF ENDICOTT, NEW YORK, A CORPORATION OF NEW YORK.

COUNTER.

1,299,197. Specification of Letters Patent. Patented Apr. 1, 1919.

Application filed June 20, 1918. Serial No. 240,928.

To all whom it may concern:

Be it known that I, CLINTON E. LARRABEE, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Counters, of which the following is a full, clear, and exact description.

This invention is an improvement in apparatus for recording on a suitably prepared card a workman's starting and stopping time on a given piece of work. Such machines are not new, but there is no device for the purpose that exhibits the result of careful study and engineering skill to more than a limited extent or that is so designed and organized as to constitute an efficient and thoroughly desirable machine. My object has been to design a more perfect and effective recorder of this character, and to improve the construction of the details which enter into its construction.

The nature of the invention may be most easily gathered from a general statement of its function, and that it resides in a mechanism comprising a series of time printed dials with means for operating them by a master or controlling clock so that the correct characters representing time units will be brought to the printing position, an operative lever, a means for holding a card in proper position, and a means for printing or impressing on the card in their appropriate locations the time when such impressions are made. This, in general, is a statement of the nature and purpose of the machine, but in order that overtime may be recorded in a distinctive color, that the card may be properly notched so as to afford a means of inserting it to the correct amount for each record in the machine, for manually setting the month and year dials and for accomplishing other purposes necessary or desirable in its use, I have devised special mechanism which may best be understood from the detailed description in the specification which follows:

In the drawings Figure 1 is a view in side elevation of the complete machine with the casing removed to exhibit the interior mechanism.

Fig. 2 is a similar view but from the opposite side.

Fig. 3 is an end view in elevation of the operative parts of the device with the casing shown in cross-section, the view being from the right.

Fig. 4 is a cross-sectional view of the apparatus looking to the right.

Figs. 5 and 6 are detail views taken at right angles to each other of a means for changing the position of the ribbon so as to print in different colors.

Fig. 7 is a horizontal section to show the inking ribbon and its supports.

Fig. 8 is another horizontal section on the line 8—8 of Fig. 1.

Fig. 9 is a rear view in elevation of the time disk operating parts.

Fig. 10 is a sectional detail of a portion of the same.

Fig. 11 is a plan view of a part of the same mechanism.

Fig. 12 is view in elevation with part of a retaining plate cut away of the time indicating mechanism.

Fig. 13 is a section of the same along the axial line of the main shaft.

Figs. 14, 15, 16 and 17 are details mainly in section of parts of the same mechanism.

Fig. 18 is a detailed view of a mechanism for arresting or holding the time disks against movement during printing.

Fig. 19 is a view in detail of a device for cutting away portions of the corner of a card.

Fig. 20 is a view of the year disk with means for setting the same.

Fig. 21 is a top plan view of the device of Fig. 19.

Fig. 22 is a plan view of a card with impressions thereon.

Fig. 23 is a side elevation of the casing containing the instrument.

The invention as above intimated resides mainly in the novel construction of parts which perform well understood functions, and as the device, while simple as regards action, is not free from apparent complications in detail, it will be described both as to construction and function by taking up its several parts in succession.

The instrument is contained in a metal casing composed of a cover 1 and a base portion 2, Figs. 3, 4 and 23, the former being detachably secured to the base portion. A horizontal platform 3 is provided under a proper passage to receive a card 5, which, in its entirety, is introduced for the first impression at the right until its corner meets a suitable abutment 4, Figs. 2 and 7, when it is impressed by the characters on the time disks at the printing position at that instant.

The impression mechanism.

Figs. 1 and 2 illustrate most clearly this mechanism. Transversely across the casing is mounted a stout shaft 6, carrying a hand lever 7, Fig. 8, by the depression of which a partial rotation is imparted to the shaft. The shaft carries a fixed arm or plate 8, Fig. 3, extending front and back, at right angles, and to the longer arm of which a spiral spring 9, secured to the casing is attached, serving as one means to maintain the lever 8 in an elevated position.

Mounted on a fixed stud 10, carried by a suitable casting secured to the casing is a frame 11, the two sides of which are united by a plate 12 on one side and by a bar 13 underneath, these parts being shown in plan view in Fig. 8. A short arm 14, extending downward from the pivotal end of the lever frame 11, has pivoted to it a rigid bar 15, the free end of which has a rounded step 22 that is normally engaged by a pin 16, in the end of a bell crank lever 17, pivoted on a fixed stud 18, and having its other end 23 rounded and fitting in a socket or circular perforation 19 in the end of the bar 8. A stout spiral spring 20 has one end connected to the casing or a projection thereon and the other to an extension of the pivotal axis of the bar 15. Finally a spiral spring 21 connects the bar 15 with the upper wall of the casing.

If the lever handle 7 be depressed, the arm 8 on shaft 6 is turned and this lowers the end 23 of the lever 17. The latter engages with a seat in the end of lever 15 by means of the part 16, and such movement of lever 17 thus forces lever 15 to the right and slightly downward.

This forces the short arm 14 over to the right and lowers the lever or frame 11. The long arm of this lever moves downward more rapidly than lever 15, and hence the bar 13 is brought into engagement with lever 15 and forces it downward out of engagement with the stud 16.

As soon as this is done the short arm of frame 11, under the action of spring 20, is snapped to the left and carries with it the bar 15, which passes under the stud 16 and is held down thereby until the handle 7 is released and the long arm of lever 17 is raised, when the end of bar 15 again engages the stud 16. As soon as bar 15 and the frame 11 are released the printing is done. When the lever 7 is released, and the parts come to rest, the engagement of the stud 16 with the stepped end of the bar 15 is reestablished through the instrumentality of the spring 21.

This cycle of operation is taken advantage of to effect the printing or impression of the time on the card. For this purpose a frame 25 is mounted to slide in a guide 26, while its upper portion has elongated perforations through which passes a bar 27, connecting the end portion of the plates of the lever frame 11. At its upper end the frame 25 carries a rubber platen or printing pad 28, which when the lever frame 11 is released and the frame 25 thrown upward strikes the card and forces it against the inking ribbon and the typed characters on the time disks.

Ink ribbon feed mechanism.

To the shorter arm of the plate 8 is connected a flat bar 29, that extends up through an opening in the top 2 of the base portion of the casing where it is connected, see Fig. 2, with a bar or plate 30, pivoted to a stud 31 secured to the top of the casing. The end of the plate or bar 30 is bifurcated and engages a lever 32 pivoted on a vertical axis carried on the inner side of the plate 30. A spring between this lever and the plate 30 tends to keep its free end in engagement with the teeth of a ratchet wheel 34, on the shaft 33, which advances the inking ribbon. Each downward movement of the operating lever 7 thereon results in raising the short bifurcated end of lever 30 and advances the inking ribbon one step through the engagement of lever 32 with the ratchet 34.

The shaft 33 has at each end a gear wheel 35, which engages with gears 36 on the spindles carrying and imparting rotary feed movements to the ribbon reels 38. The shaft is movable longitudinally in its bearings to bring the gears 35 respectively into engagement with one or the other gears 36, so that the ribbon will be wound up on that reel which is at the moment in gear with the shaft 33.

Ribbon reversing mechanism.

In order that the direction of travel of the ribbon may be reversed when it has been drawn off one reel and wound on the other, the following devices are employed. Horizontal spindles 39 are mounted in the frame of the instrument at each end, Figs. 2 and 3, and these carry arms 40 connected by spiral springs 41, to cross-bars 42 mounted in the frame, which springs hold the roller bearing ends of said arms down in contact with the top bars of frames 68, pivoted on said bars

42. The frames 68 carry rollers 43 which by the tension of springs 41 are held against the rolls of ribbon on the reels, and as these latter increase in diameter the frames are raised and lift the ends of the arms 40 and thereby turn the shafts 39.

At their projecting ends the shafts 39 carry vertical spring blades 44, which extend downward in the plane of the shaft 33. Pivoted to the frame are horizontal levers 45, acted upon by springs 47 connected therewith and to the frame, and pivoted also to the frame are levers 46, the free ends of which lie between the springs 44 and the ends of the shaft 33. The levers 45 have notches in their upper edges near their ends, upon the same edges of which beyond the notches projections 48 fixed to the plates 49 carrying springs 44 bear. Finally the ends of levers 46 have right angled ends 50 which are adapted to be engaged by the notches in levers 45. The operation of these devices is as follows:

As the ribbon by the step-by-step movement of the ratchet 34 is wound, say, upon the left hand spool the frame 68 of the latter is raised. At the same time, the diameter of the other ribbon roll is correspondingly reduced and its frame is lowered. This results in raising the stop 48 of the plate 49 on the right and lowering the corresponding stop at the other side and thereby depresses the lever 45 on the right out of engagement with the lever 46, but raises the corresponding lever on the opposite side engaging its lever 46. By this means, when the ribbon roll has increased to a predetermined extent, the pressure of the spring 44 carried thereby forces the lever 46 on the side of the growing ribbon roll over into engagement with the end of shaft 33 and throws the gear 35 into engagement with the sprocket 36 on the other side, as the lever 46 on the latter side is then free to swing, and the direction of the ribbon is immediately reversed and wound up on the reduced spool and off from the other. The shaft 33 has sufficient longitudinal play in its bearings to permit of this.

The time disk operating mechanism.

In the upper part of the instrument frame is an electromagnet 51 which has an armature carrying an arm 52 to which is pivoted a link 53 connecting said arm with a lever 54 pivoted to the side plate of the instrument. The lever 54 carries a spring actuated pawl 55, Fig. 18, which engages with the teeth of a ratchet wheel 56 on a shaft 57, engaging by a pinion 58, Fig. 14, with the gearing that imparts motion to the minute disk 59.

The magnet 51 receives an impulse of current once every minute, and hence imparts sixty movements or steps to the minute disk each hour. At all times other than during such movements of the minute wheel the ratchet wheel 56 is locked by a projection on a spring actuated lever 60, but this lever has an inclined end surface 61 with which the end of pawl 55, see Fig. 9, engages as it descends and is momentarily thrown out of engagement thereby with the ratchet 56.

Time disk locking mechanism.

It is moreover important that the time disks should be absolutely stationary at the instants when the printing is effected and for this purpose the locking mechanism shown in Figs. 2, 9 and 18 is employed. This comprises a right angle lever 62, pivoted to the side plate of the instrument and having a light spiral spring 63 connected therewith. Normally the lower end 64 of this lever rests upon the end of the lever 30, which, as has been shown, is moved by the operation of the printing lever to advance the ribbon. The pawl 55 which operates the time mechanism has an extension which normally rests upon a right angled end 65 of the lever 54, being held thereon by its spring 66. In the normal condition of the parts the lever 54 plays up and down without hindrance, but should the lever 54 be raised by the magnet while the printing lever is being operated, the end 64 of the lever 62 by the movement of the lever 30 will be freed, and hence it will swing over until a notch 67 thereon comes under the bent end 65 of lever 54 and locks the latter in a raised position so that it can not drop and turn the ratchet wheel 56 until the printing lever and lever 30 have been released and restored to normal position.

Ribbon color changing mechanism.

When cards are printed to show starting and stopping times of a workman the impressions are made by a black ink ribbon, but to facilitate computations based on overtime, the mechanism should be so arranged that all overtime may or will be printed in a different color, generally red. The means employed for accomplishing this is shown in Figs. 3 to 8.

The ribbons reels or spools are carried by a frame 68, which is capable of movement to and fro on the spindles 37. Connected to this frame are two bars 69, the free ends of which are pivotally connected with levers 70 pivoted to the frame. The shaft of these levers has two rigid arms or a bar 71, secured at right angles thereto, and each arm or end has a stud 72 projecting therefrom which are adapted to be engaged by suitably stepped ends of a swinging lever 73 pivoted to a rigid arm 74 on the main operating lever shaft 6. When the lever 7, therefore, is depressed the lever 73 will be raised and one end or the other of the lever 71 will

be raised according to whether the lever 73 is swung to the left or to the right. By this means the inking ribbon is shifted by bars 69 to present over the printing platen a black portion or a red portion.

The position of the lever 73 is determined by the following devices: A lever 75 is pivoted at 76 to a plate 77 secured in the casing 2, and carries a pivoted spring actuated pawl lever 78, which engages with the teeth of a ratchet wheel 79, and whenever the free end of said lever is depressed and released this pawl moves the ratchet 79 one tooth. The ratchet is normally locked by a lever 80, but when the pawl 78 rises it slips over the end of said locking lever and as it descends it forces downward this end and releases the lever from engagement with the ratchet.

Secured rigidly to the ratchet 79 is a toothed wheel 81, and bearing on the periphery of said wheel is a pivoted bell crank lever 82 with a rounded end in contact with the teeth of wheel 81 and a bent end 83 that engages with an elongated slot 84 in the swinging lever 73 and that operates to swing said lever to the left or to the right according as the rounded end is on a raised tooth or in a depression between teeth.

The lever 75 may be operated either manually or automatically to turn the ratchet 79. For example a spring seated rod 85, having a key head 86, may be forced down by hand at the desired time to engage and depress the said lever 75, or an electromagnet 87 energized at the proper time in any suitable manner may, by the movement of its armature, shift a bar 88 which is pivoted to a link 89 connected with lever 75, and thereby raise the lever 75.

The controlling mechanism.

A card may and usually does receive a number of impressions indicating starting and stopping time and other data, and it is obviously necessary that these impressions be received in their proper place. When the card is put into the machine for the first time its corner comes into engagement with an abutment that determines its exact position, but in order that on its second insertion it may move beyond this point to a distance equal to the space for receiving an impression, a cutter 90, Figs. 19 and 21, is pivoted beneath the platform on which the cards lie, and connected by a rod 91 with a projection 92 on the shaft 6, so that each time the shaft is partially rotated the cutter, which is arranged adjacent to the card abutment, will be operated and will cut out a rectangular section of the card at the corner. The next time the card is inserted, it may be pushed in until the cut away corner comes against the abutment and thus the impression will be properly spaced with reference to the first or preceding impression. A card with a number of sections thus cut away is shown in Fig. 22, the cut away corner being marked 93.

Time disk setting mechanism.

It will be understood from what precedes that the apparatus is provided with a series of disks carrying raised characters indicating units of time, and that these are set by electrical impulses operating through electromagnet 51 to bring directly over the printing pad or platen those units which indicate the exact time of day, month, year, etc. The details of the mechanism employed for this purpose are not of the essence of the invention and may be of any proper character. In that used in this machine, however, certain improvements in detail have been incorporated, and it will, therefore, be described so far as necessary to its understanding.

The minute wheel arbor is designated by 57, that for the hour by 94, for the day by 95, and the month by 96. Other disks to indicate A. M. and P. M., the year or other data may be used, if so desired.

The operation of the ratchet wheel 56 by means of the pawl 55 has been explained. The gearing connected with the arbor 57 is so proportioned that for every sixty steps of the ratchet 56 the ratchet 97 of the hour wheel is moved one step. Similarly twenty four steps of this ratchet produces a movement of one step of the ratchet 98, and so, on, as may be determined by the special provisions made. Each of the arbors 57, 94, etc., carries a milled head 93, which is used to turn them by hand for purpose of properly setting the disks controlled thereby when so desired. The heads 93 have rigidly attached to them pawls 99 that engage with the teeth of the ratchet wheel 56 and the corresponding ratchets on the other spindles 94 and 95, so that the heads may not be turned backward, but by which the disks carried by the spindles may be adjusted to any desired position by hand.

To transfer motion from one rotary disk to another substantially, the same means are used with the record disk. For example, in Fig. 17, a gear wheel 100 moving with the minute disk and making one complete revolution in an hour has a cam 101 secured thereto, in connection with which is a pivoted lever pawl 102 the end of which bears on the periphery of the cam. Once during each revolution of the gear wheel 100, this pawl drops from the high point of the cam and imparts a partial rotation to a spindle 103, which at its end and in the plane of the hour ratchet carries a lever 104, Fig. 9, to which is attached a retractable spring 105.

Pivoted to lever 104 is a spring actuated pawl 106, the end of which engages with

the hour ratchet 97, which, as the pawl 102 travels up the cam 101, is retracted and on the dropping of the pawl is released and moves the hour ratchet one tooth. Normally this ratchet is locked against movement by the engagement therewith of a pivoted locking lever 108, but in its movement the pawl 106 forces up this lever and unlocks the ratchet. This mechanism is used whenever movement is to be transmitted from one disk to another.

In the case of the month or year disks, this motion transmitting mechanism is not required, as these may be more conveniently adjusted when necessary by hand. For this purpose there is connected with the disk rigidly a wheel 109, Figs. 12 and 20, with projections 110 on its periphery, which are normally engaged by a spring actuated lever 111 on a spindle 112 which is designed to be turned by a key or other means from the outside of the case when necessary to release the wheel, which may then be turned by its milled head 93.

In order that the position of the minute wheel may be at all times visible, one of the train of gears 114, Fig. 13, is on a spindle that carries a pointer 113 over a dial 115, visible from without the instrument and which is marked off in tenths of an hour each having six divisions corresponding to minutes.

This machine is compact, is composed of easily and cheaply constructed parts, and is adapted to perform all of the operations required of such mechanisms in a thoroughly practicable, efficient satisfactory manner.

What I claim as new and desire to cover by Letters Patent is:

1. In a time recording apparatus of the kind described, the combination with a main shaft and hand lever for rocking the same, of a movable printing bar or platen, a spring actuated lever connected therewith with provision for lost motion, means connected with the shaft for moving said lever against the force of its spring, and a connection between the lever and the said means which is broken by the movement and engagement therewith of the lever to thereby release the lever and permit it to throw the printing pad and cause it to operate, as set forth.

2. In a time recording apparatus of the kind described, the combination with a main shaft and a hand lever for rocking the same, of a pivoted bell crank lever adapted to be turned by the rocking of the shaft, a movable printing pad or platen, a pivoted spring actuated printing lever connected therewith, a connecting bar pivotally connected to said lever and having one end in the path of the bell crank lever whereby the movement of the latter will impart movement to the said printing lever, the said connecting bar being also in the path of movement of the printing lever and adapted by the engagement of said lever with it to be thrown out of engagement with the bell crank lever and to thereby release the printing lever while the latter is under tension.

3. In a time recording apparatus, the combination with a horizontally mounted rock shaft and hand lever connected therewith, of a bell crank lever adapted to be rocked by the movement of the shaft, a vertically movable printing pad or platen, a pivoted printing lever connected therewith, a bar in the path of a moving part of the bell crank lever and connected with the printing lever and adapted when the main shaft is turned to move it against the force of a spring, and to be forced out of engagement with the bell crank lever by the engagement therewith of the moving printing lever to thereby release the printing lever and permit it to throw the printing pad and cause it to operate.

4. In a time recording machine, the combination with a series of timing disks, an electro-magnet or means for imparting movement to the same, and a pawl for moving the first of the series of disks step by step, of a card printing mechanism, a lever normally locked out of operative position thereby, but adapted to be released and to lock the said pawl and prevent it from completing its cycle of movement while the said printing mechanism is being operated whereby no movement can be imparted to the timing disks during the operation of the printing mechanism.

5. In a time recording machine, the combination with a series of timing disks and means for operating the first of the series step by step, of a printing mechanism, an inking ribbon feed lever operated thereby, and a locking lever normally held out of operative condition by said feed lever, but adapted to be released therefrom while the printing mechanism is operating and to engage with and lock the means for moving the first of the timing disks, whereby the said disks cannot be moved while the printing mechanism is operating.

6. In a time recording machine, the combination with a printing mechanism and an inking ribbon and its supporting means capable of longitudinal movement on the axes of its spools, of a toothed wheel and means for moving the same step by step, a controlling lever bearing on the teeth and adapted to be maintained in either of two positions according to whether it is on or off a tooth, means for shifting the ribbon supports longitudinally in their axes, and means for operating the same controlled by the printing mechanism and adjusted by the controlling lever to move the ribbon to a position determined by whether the said lever is on or off a tooth.

7. In a time recording mechanism, a rib-

bon shifting means for interposing portions of an inking ribbon of different colors between the type and printing pad, in combination with a toothed wheel, a controlling lever bearing thereon and determining by its position or or off a tooth the position of the ribbon and of the means for controlling the same, a pawl carrying lever for rotating the toothed wheel step by step and means for oscillating said lever and thus determining the position of the ribbon and the color of the impression made thereby.

8. In a time recording machine for cards by which the successive impressions on the same card are made at different predetermined points, of a main operating shaft, an abutment with which the corner of the card engages when it is in position for an impression, a pivoted cutter lying normally over this engaged corner of the card and a lever eccentrically connected with the main shaft for operating the cutter at each recording operation to cut out a section of the card adjacent said abutment whereby the card on its next insertion into the machine must be advanced further in order to reach the abutment.

In testimony whereof I hereunto affix my signature.

CLINTON EUGENE LARRABEE.