

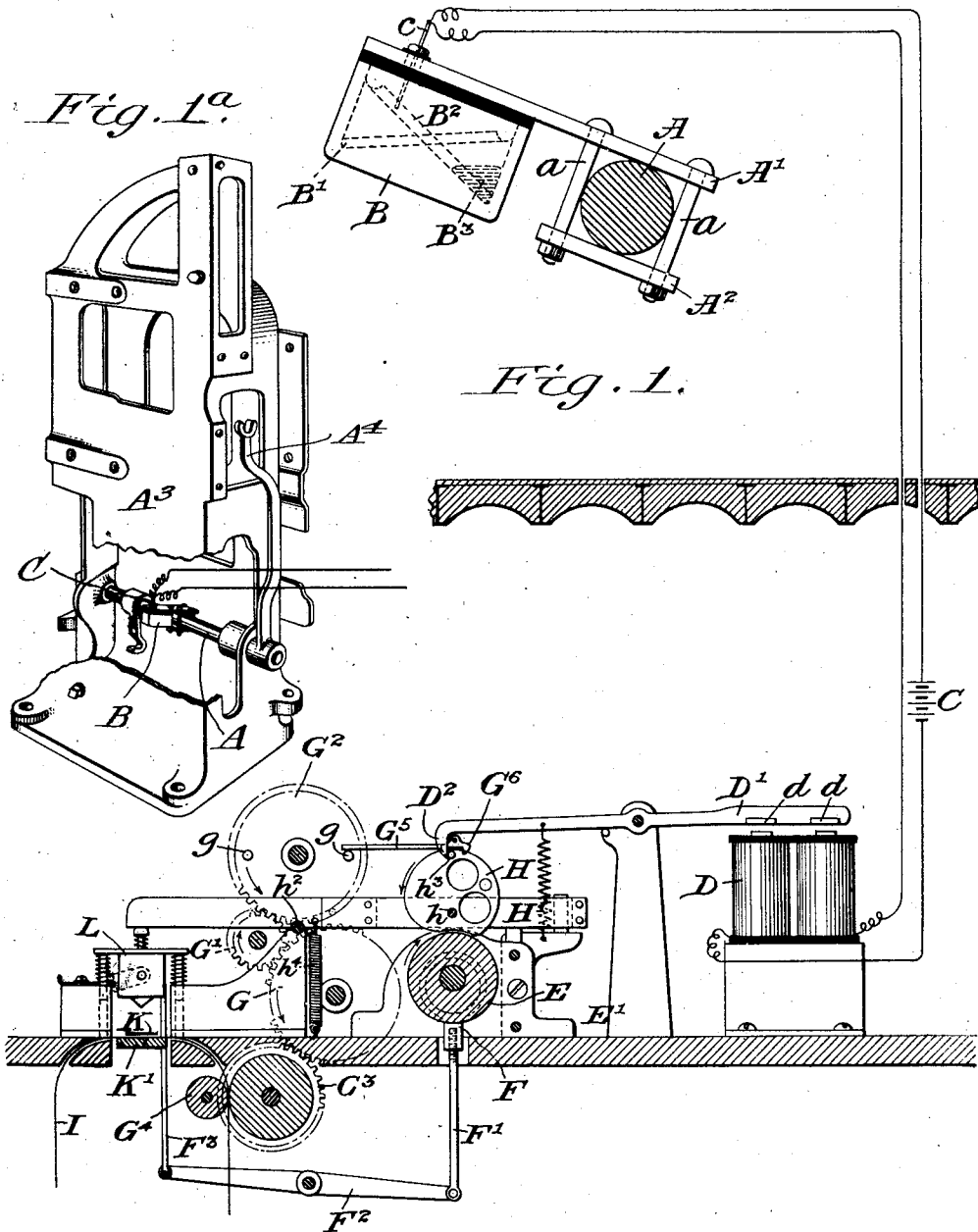
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APPLICATION FILED NOV. 12, 1910.

1,083,580.

Patented Jan. 6, 1914.

5 SHEETS—SHEET 1.



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5 SHEETS—SHEET 2.

Fig. 2

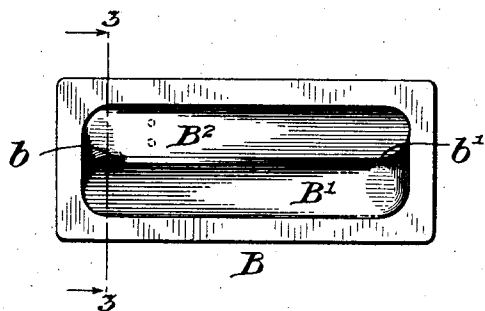


Fig. 3

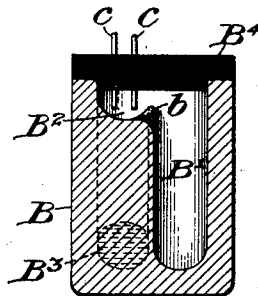
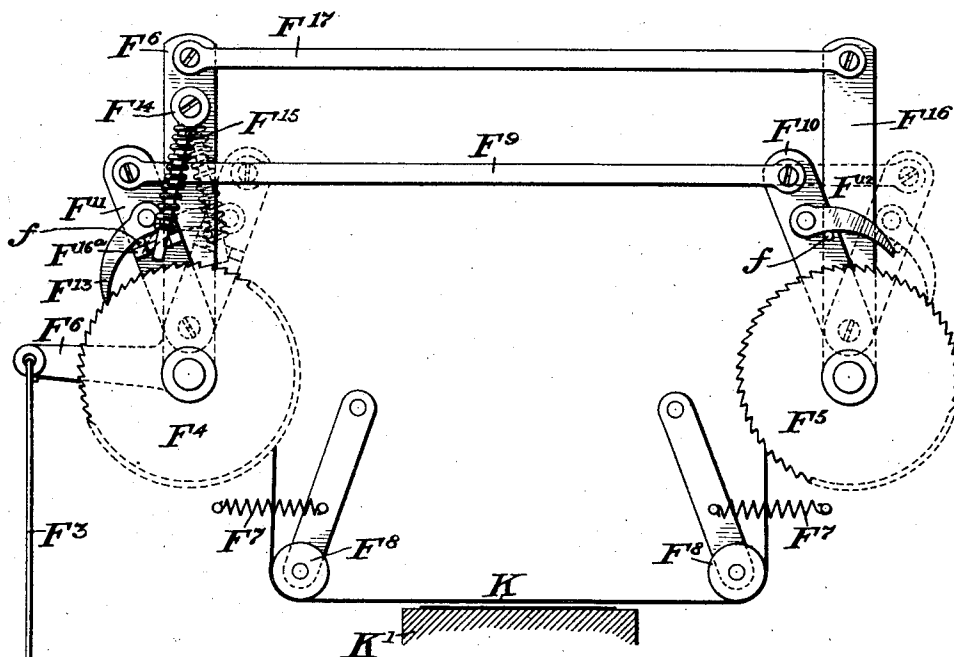


Fig. 4



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5 SHEETS—SHEET 3.

Fig. 5

Fig. 5a

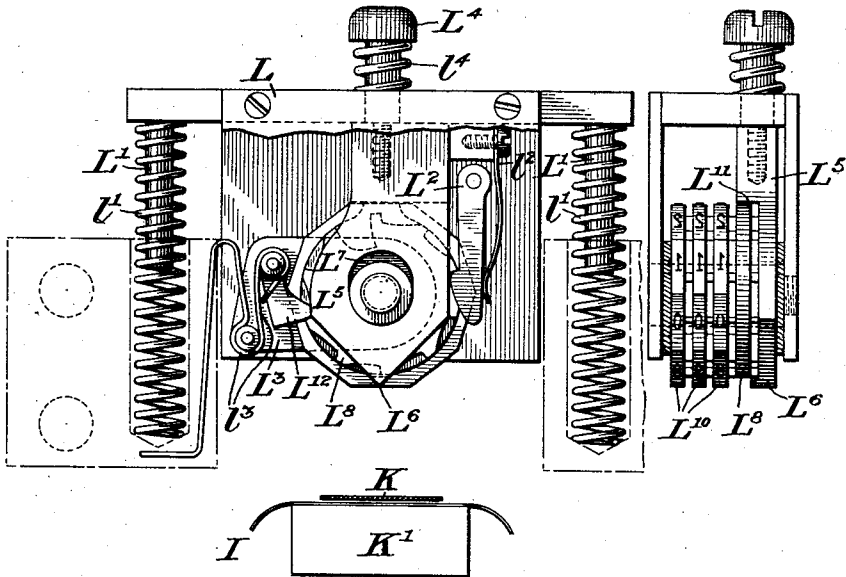
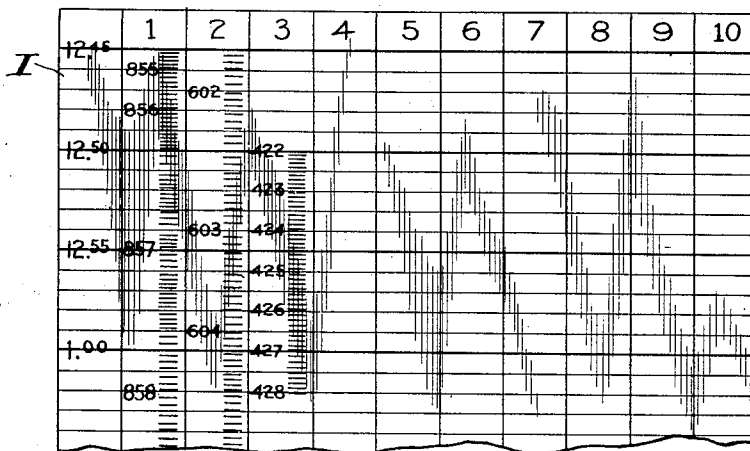


Fig. 6



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5 SHEETS—SHEET 4.

Fig. 7

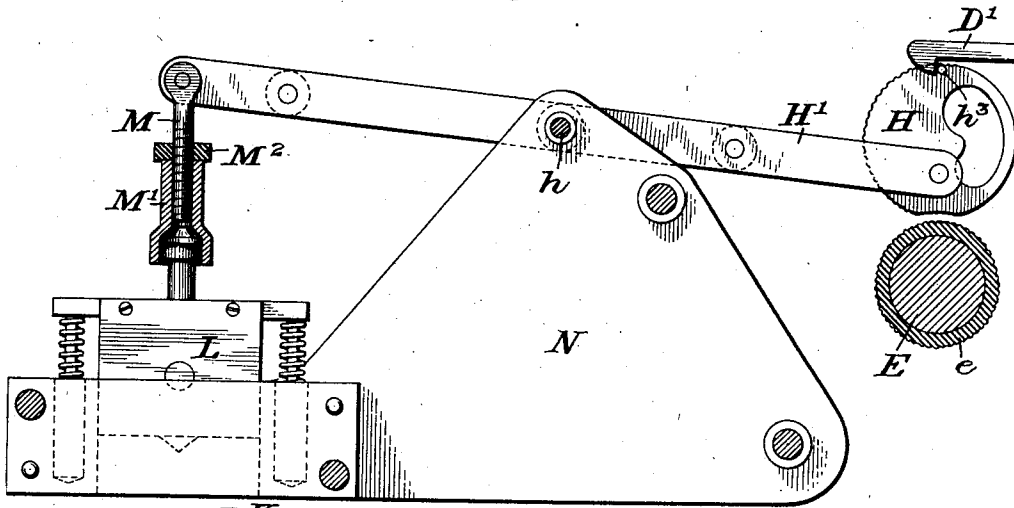


Fig. 8

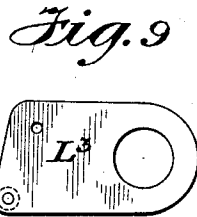


Fig. 9

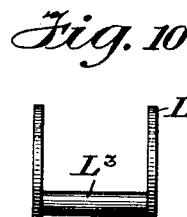


Fig. 10

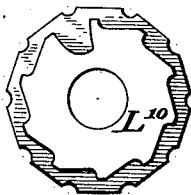


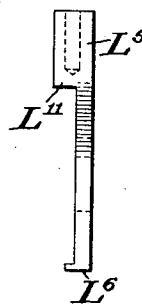
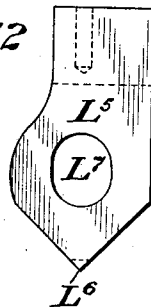
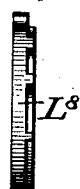
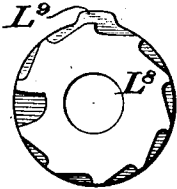
Fig. 11



Fig. 13



Fig. 14



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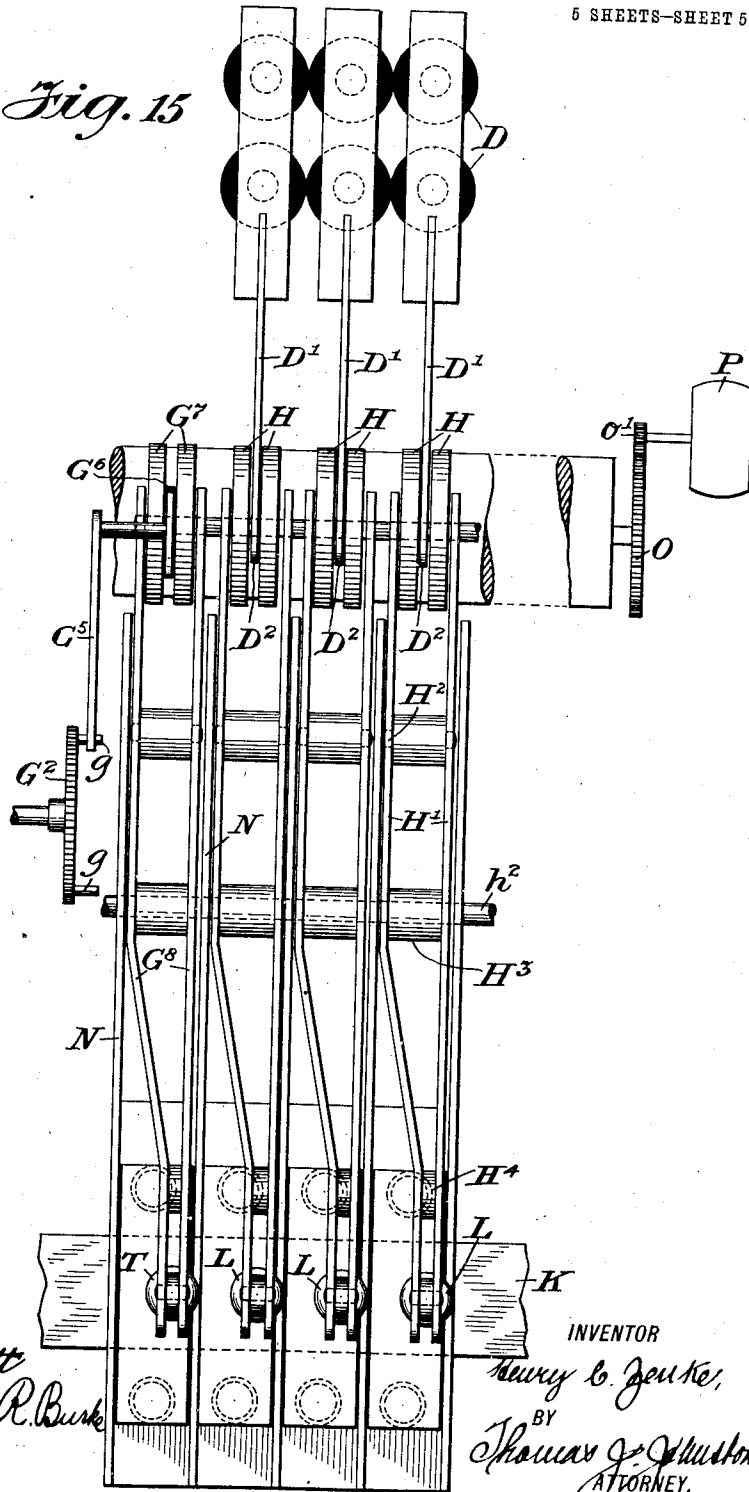
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5 SHEETS—SHEET 5.

Fig. 15



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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY C. ZENKE, a citizen of the United States, and resident of Richmond Hill, in the county of Queens and State of New York, have invented certain new and useful Improvements in Monitors, of which the following is a specification.

My present invention relates to monitors, by which I mean machines which are devised to supervise and control the operation of a number of other machines in factories or other places, either machines which are of similar character or those performing different operations. This class of apparatus will have a number of different applications, either to machines in factories or to the operation of engines in steamships, electric generators in power stations, or many other classes of apparatus which will occur to engineers.

It is well understood in modern factories that machines must be operated to their maximum capacity in order to get the minimum cost of output and the largest return upon the capital represented by the machine. It often occurs that operators of exceptional skill, if they will, are able to turn out a very large quantity of work and yet the average output when the machine is under their control is less than that of inferior operators who devote themselves more continuously to the operation for which they are paid. Being paid for work by the piece does not obviate "soldiering", as it is called, the skilled operator being still able to earn a fair wage because the price of piece-work is set for those of average ability. I am aware of newspaper offices, for example, and other large printing establishments which have twice as many linotype machines as would be necessary for the purposes of the office if the machines were operated at good efficiency at all times. As these machines cost several thousand dollars apiece it is obvious that a return on the capital invested in them is only to be expected when they are run reasonably near their maximum capacity.

I have devised the apparatus presently to be described for use in connection with a number of linotype machines, but as already indicated its application may be extended.

In general the apparatus consists of means for making a record upon a chart having a space devoted to each of the several ma-

chines which are to be supervised by the monitor, and having also a space upon which a time-record is kept. An electrical connection is made between some part of each machine supervised which is capable of operating a switch, and an operating magnet, and this in turn causes or permits actuation of a counting mechanism, preferably of the peculiar construction hereinafter described, which prints upon the chart the amount of work done by making a mark for each operation of the part controlled by the switch. In the linotype machines with which I have employed my invention this part is a rocking-bar operating the line-casting mechanism, for which may be substituted any part of the controlled machine which is necessarily operated when its functions are performed; and I prefer to use a switch of peculiar construction, presently to be described, because it can conveniently be completely inclosed so that it cannot be tampered with, as well as for other reasons. As the printing of consecutive numbers for each line is impracticable on account of the space required upon the chart and because of the difficulty of distinguishing them, I have devised a peculiar consecutive register which enables me to print a line for each line which is cast on the machine, and a number at every tenth line. In this way I am enabled to keep track of each of the machines connected to the monitor, and if any of them ceases to operate for an unreasonable time, or is operated at low speed and efficiency so that it does not turn out a reasonable quantity of work, I can at once investigate.

The accompanying drawings show an embodiment of my invention. In these, Figure 1 is a general view, partly diagrammatic, partly in side elevation, and with some parts in section, of an apparatus constructed according thereto. Fig. 1^a is a diagram showing the connection of my apparatus to the line-delivery shaft of a linotype machine. Fig. 2 is a plan view of the switch shown at B in Fig. 1, and Fig. 3 is a section thereof upon the line 3-3 of Fig. 2. Fig. 4 is an end elevation of the ribbon-feeding mechanism. Fig. 5 is a side elevation, partly broken away, of one of the consecutive registers. Fig. 5^a is an end elevation of the same parts. Fig. 6 shows a part of the chart upon which results are recorded. Fig. 110

7 is an alternative construction for the operating mechanism of the consecutive registers. Figs. 8 to 14 are details of the peculiar form of consecutive register employed. Fig. 15 is a plan of part of the apparatus, with some parts omitted.

I will describe first the general arrangement of the apparatus shown in Fig. 1, afterward describing it more particularly in detail. Upon the rock-shaft A is secured the switch B by means of the plate A, fast to the switch, and another plate A², the two plates being connected by bolts *a a* which cause them to grip the shaft. Leads *c c* pass to a battery C and an electro-magnet D, so that when the rock-shaft operates the switch the circuit is momentarily closed and the electro-magnet is energized. When this occurs the armatures *d d*, carried by the lever D¹, are attracted and the hook D² is raised momentarily, releasing the detent *h*³. The cam H then drops upon the constantly revolving roller E, it being pivoted at *h* in the lever H¹, which is pivoted at *h*²; the spring *h*⁴ presses down the lever so that the cam is firmly engaged by the roller E. As the cam, which is eccentrically pivoted, rotates, it raises the right-hand end of the lever H¹ and the left-hand end thereof forces down the consecutive register L against the ribbon K, so that it prints upon the chart I, passing over the platen K¹. The ribbon K is fed by the mechanism shown in Fig. 4, presently to be described, which is operated by the eccentric F from the shaft of the constantly revolving roller E, the rod F¹ passing from the eccentric to the bar F² and causing the rod F³ to reciprocate. A number of these mechanisms is assembled as indicated in Fig. 15, one connected to each machine the work of which is to be recorded by the monitor.

In Fig. 1^a, I show the switch B connected to the line-delivery rock-shaft A of a linotype machine, the frame of which is indicated at A³; the lever A⁴ is that of the line-delivery slide. It will be understood that the leads from the terminals *c c* of the switch pass to the battery C and magnet D, as shown in Fig. 1.

At G is a clock-driven gear which operates the roller G³, which feeds the paper, the latter being pressed against it by the pressure-roller G⁴. An idler G¹ connects the main gear of the clock to the pinion G², carrying pins *g g*, cooperating with the escapement lever G⁵ to operate the time-printing mechanism, presently to be described. The operation of the clock is such that one or the other of these pins strikes the lever G⁵ twelve times in the hour.

Referring now to Figs. 1, 2 and 3, I will describe the construction of the switch which I have devised. It is important that this switch shall operate without sticking, be-

cause, as will be manifest from Fig. 1, if the switch should stick the lever D¹ will be held down and the particular consecutive register which it controls will be operated as often as its cam H revolves. While therefore I could employ many forms of switches, and any form will be, so far as the general objects of my invention are concerned, an equivalent structure, I prefer the mercury switch shown, which operates in the manner following: The switch is shown in side elevation in Fig. 1, and is formed of any suitable substance, though in general I prefer to have it of insulating material; if the leads *c c* are properly insulated and adjusted to such a length that they do not touch any part of the channel, it is not important what the material of the switch B may be. The channels B¹, B² cross one another and connect at each end. A globule of mercury B³ is poured into one of the channels, and the cover B⁴ carrying the leads *c c* is fastened on. When the switch is in the position shown in Fig. 1, the mercury will settle into the position shown in dotted lines. When the shaft A is reciprocated, the mercury will run down the channel B² as the switch is lowered by the rotation of the shaft in the direction shown by the arrow; it will then run over into the low part of the channel B¹ at the left in Fig. 2, passing the low part *b* of the partition between the two channels as shown in the upper part of Fig. 3, bridging the contacts *c c* as it does so. When the shaft raises the switch, the mercury runs down the channel B¹, over the low spot *b*¹ between the two channels, back to the illustrated position. The length of time of the contact may be controlled to the desired extent by the amount of mercury which is used to bridge the terminals and by the pitch of the channels B¹, B²; but it will be evident that with the construction indicated there can be no maintenance of contact undesignedly, and that the inertia of the apparatus will be such that by the time the detent *h*³ passes out from the end of the hook D² (in Fig. 1) the circuit will have been opened, and the lever D¹ will have resumed its place in time to catch the detent when it comes around to the illustrated position.

I will now describe the apparatus more particularly in connection with Figs. 1 and 15. Referring particularly to Fig. 15, it will be seen that the time printing stamp T is arranged in line with the consecutive registers L L; I have only illustrated three of the latter, although the chart shown provides for ten, because the others are similar to those shown and because the selection of number is arbitrary, as will be readily understood. In Fig. 15 the parts are as before; but the roller E, which is the main operating shaft of the device, is driven by

a gear O^1 , on the shaft of a motor P , which meshes with the pinion O driving the roller; it is preferable to have a positive drive for this roller. Each of the cams H , as shown, is made in two parts, in a channel between which lies the hook D^1 , and the lever H^1 is also by preference a frame composed of side-bars united by rivets H^2 , H^3 , H^4 , having spacing washers, thus making a rigid construction not liable to tilt sidewise under strain. The levers are all journaled upon a common shaft h^2 . In practice the machine is made with one time-printing mechanism and as many as may be desired of the consecutive registers, which are assembled as independent units. The time stamp, however, is operated independently of any of the registering mechanisms. The clock gear G^2 as it brings one of its pins F under the lever G^5 raises the escapement G^6 (see Fig. 1), so that a pin, like the pin h^3 on the other cams, is released, permitting the cam G^7 to fall against the roller E and be rotated. This depresses the lever G^8 , the construction of which is the same as the levers H^1 , and operates the time-stamp. The construction of this stamp is substantially like that of the others, except that there are twelve teeth upon each of its wheels instead of ten, one of the wheels carrying the figures 1 to 12, and the other changing by fives so as to print as shown upon the left side of the chart in Fig. 6. The escapement is of well-known form, the pin escaping from the forward tooth and revolving until brought up against the right hand tooth shown in Fig. 1; when the lever G^5 drops off one of the pins g the pin in cam G^7 escapes from the rear tooth and brings up against the forward one, ready for another revolution.

An alternative construction is shown in Fig. 7, and in general I prefer to use this arrangement. There the parts are lettered as before, but the roller E is provided with a rubber covering e and the surface of the cam is roughened so as to make sure of the engagement of the two. In the frame N is pivoted the lever H^1 ; and a link M , provided with an adjusting sleeve M^1 and lock nut M^2 , connects the consecutive registering mechanism with the lever. This arrangement takes less power to operate, there being no cramping or tilting of the registers, and prevents any risk of the levers getting out of place and failing to register.

The ribbon feeding mechanism which I have devised and which is shown in Fig. 4 I believe to be new. The ribbon K is carried between the two reels F^4 F^5 over the stretching rollers F^8 , which are shown as carried upon swinging arms which may be held open by springs F^7 ; the reels F^4 F^5 have ratchet teeth oppositely disposed. To the bell-crank F^6 is attached the rod F^3 , which, as already described in connection with Fig.

1, is reciprocated from the main shaft. Pivoted to the bell-crank F^6 and to a link F^{16} , connected to the crank F^6 by a rod F^{17} so that the link and bell-crank reciprocate in unison about the centers of the reels F^4 F^5 , are links F^{10} F^{11} respectively, connected by rod F^9 . The pawl F^{13} , which operates the reel F^4 , and the pawl F^{12} , operating the reel F^5 , are respectively carried upon these links, and pins f prevent the pawls dropping too far; as the pawls are to be raised and lowered, the centers of the link F^{11} and link F^{10} must be different from those of reels F^4 F^5 . A collar F^{16} upon the link F^{11} receives one end of the pin F^{14} , and a spring F^{15} bears against the collar so that the pin and the link F^{11} constitute the two arms of a toggle, kept on one side or the other of the center by means of the spring F^{15} .

The operation of this part of the mechanism is as follows: In the illustrated position the bell-crank F^6 , carrying with it the link F^{11} and pawl F^{16} , is reciprocated by the rise and fall of the rod F^3 , pulling over the reel F^4 until the ribbon is all wound off the reel F^5 . When the ribbon is drawn taut so that the reels no longer move, the pawl F^{13} begins to climb on the teeth of the reel, carrying with it the link F^{11} and putting the spring F^{15} under tension until the pawl has passed so far over that the toggle is forced past the center, when the spring snaps over into the dotted line position, thus lowering the pawl F^{12} and causing it to engage with the ratchet on the reel F^5 , while the pawl F^{13} is raised out of engagement with reel F^4 . The reciprocation of the rod F^3 then causes the ribbon to be fed over in the opposite direction until it is all drawn off the reel F^4 , when the operation is reversed; thus giving a positive ribbon-feed, alternating in direction as soon as the ribbon is exhausted from either reel.

Fig. 6 illustrates the form of chart or record which I prefer, though the apparatus may readily be adapted to other forms. It may be ruled as illustrated, or printed entirely by the apparatus, as may be preferred; in general, however, it should be distinctly separated into columns for the different machines, so as to leave no room for controversy. The time is printed on the left; and each of the consecutive registers prints in one of the ruled columns the record corresponding to the machine to which that register is connected, as will be readily understood without further description.

It is obvious that with the ordinary forms of consecutive registering apparatus applied to the purposes of my invention either the numbers must be so small as to be illegible, or else the record must be so extensive as to impair the usefulness of the apparatus. To obviate this I have devised what I believe to be an entirely new form of consecu-

tive registering device, which prints a line instead of a unit, and at every tenth impression prints a number. The principle thus employed is capable, as will be apparent to those skilled in this art, of further extension without departing from my invention; as for example, it would be possible to print the line for each ten or one hundred spaces and then print a number, or to otherwise vary the relation. When my apparatus is used to keep track of the operations of the engines of a ship during a long voyage the printing of the units of revolutions, for example, might be unduly cumbersome and under such conditions a larger multiple might be employed, or other variation might be made.

The consecutive register which I prefer to use is shown in Figs. 5, 5^a, and 8 to 14. It is provided with an operating handle L⁴, having a spring l⁴, and also with guide-pins L¹, L¹, having springs l¹. The spring l⁴ is weaker than the springs l¹ so that the knob L⁴ begins to move before the whole apparatus, for a purpose presently to be described. The usual unit-wheel in this register is blank; it is shown in Figs. 11 and 12 in side and end elevation, respectively, and marked therein L⁸, and is provided with a lug L⁹. Adjacent to it is the unit line-printer L⁵, mounted upon the central shaft of the register by a slot L⁷ having circular ends; to this line-printer the handle L⁴ is secured. The other numbering wheels or disks corresponding to the tens, hundreds and thousands are shown in Fig. 8, and are of common construction. As seen in Fig. 5, pawls L², having springs l², hold the wheels in place ready to print when depressed, and a dog L¹² having a spring l³ operates the units-wheel in the ordinary way to change the numbers, the units-wheel operating the others as usual.

Referring also to Figs. 11 and 12, the units-wheel is shown with a lug L⁹ against which abuts the shoulder L¹¹ of the unit-printer L⁵, shown in Figs. 13 and 14. This locks the two together; but when the lug rotates, the units-printer may move up and down within the limits fixed by the dimensions of the slot L⁷, relative to the figure-wheels of the register. In Figs. 9 and 10 is shown in side and end elevation the yoke L³, which carries the several dogs for actuating the different ratchets of the device, one of these being shown at L¹² in Fig. 5.

The operation of this device is as follows: When the shoulder L¹¹ and lug L⁹ are in the illustrated position, they lock the unit-printer L⁵ so that when the lever H¹ is operated the entire register L is forced down and prints upon the chart the number to which it happens to be set, together with the line made by the point L⁶ of the unit-

printer. As it rises under the influence of the springs l¹ l¹ the dog L¹² throws over the unit ratchet one step, and the lug L⁹ is rotated out of its illustrated position, shown in Fig. 11 and in dotted lines in Fig. 5. It then does not register with the shoulder L¹¹ of the unit-printer L⁵, and the latter is free to move so far as the slot L⁷ will permit, the spring l⁴ being weaker than the springs l¹ l¹. When the lever H¹ is then operated it depresses the unit-printer as far as the slot L⁷ will permit, bringing it below the face of the type on the numbering wheels and causing it to print the horizontal line shown on the chart, the springs l¹ holding the type faces out of engagement with the ribbon K. This operation is repeated ten times; on the tenth stroke the mechanism at the top of its stroke has returned to the illustrated position shown in Fig. 5, except that the next number on the tens wheel has been brought to the printing position; the shoulder L⁹ then locks the parts of the stamp together as before, and when it is depressed the spring l⁴ is not compressed, the whole power of the lever thus being exerted upon the springs l¹, l¹, so that the whole register prints.

Having thus described my invention, what I claim and wish to protect by Letters Patent of the United States is:

1. The combination, with means for feeding a record sheet, of one or more machines the movements of which are to be recorded, and a consecutive register for marking a line upon the sheet at each desired operation of any machine, and a number at a multiple thereof.

2. The combination, with means for feeding a record sheet, of one or more machines the movements of which are to be recorded, a consecutive register means for marking upon the sheet a line at each operation of any machine, and a number at every multiple of ten operations.

3. The combination, with means for feeding a record sheet, a number of machines and a consecutive register for each machine marking its performance upon the record sheet; of a revolving shaft, actuating means for the different registers, means for operatively connecting the actuating means for the registers to the revolving shaft, and means actuated by the motion of each machine for effecting such connection at desired times.

4. The combination, with means for feeding a record sheet, and machines each having a consecutive register marking its performance upon the record sheet; of a revolving shaft, actuating means for the registers, electrically controlled means for operatively connecting such actuating means to the shaft, circuits extending from such electrically controlled means to the machine

the performance of which is to be recorded, and switches operated by the machines to close and open the circuits at desired times.

5. The combination, and means for feeding a record sheet, of machines the performance of which is to be recorded upon the sheet, consecutive registers, one for each machine; a revolving shaft; means for operating each register, normally disconnected from the shaft; electro-magnets for connecting such operating means to the shaft, circuits from the machines to the electro-magnets including a source of current; and means, operated by the machines, for opening and closing the circuits at desired times.

6. The combination, with means for feeding a record sheet, machines the performance of which is to be recorded thereon, consecutive registers for each of the machines, means for actuating a register once at each complete operation of a machine and a device for marking the time upon the record sheet.

7. The combination, with means for feeding a record sheet, a number of machines the performance of which is to be marked thereon, and consecutive registers, one for each machine, responding to each operation thereof; of a time actuated register, printing the time upon the sheet at desired intervals the elapsed time.

8. The combination, with means for feeding a record sheet, machines the performance of which is to be marked thereon, electrically operated devices for controlling the marking, circuits and a source of current; of a constantly revolving shaft, a consecutive register for each machine, switches operated by each machine, and means for operatively connecting the registers to the revolving shaft controlled by the switches; with a clock mechanism and a printing stamp controlled thereby, acting to print the time upon the record sheet at desired intervals.

9. The combination, with means for feeding a record sheet, of a machine or machines the movements of which are to be recorded, a consecutive register for each machine arranged to print upon the record sheet, and means brought into action by each machine at each complete operation thereof for actuating the corresponding consecutive register; the register being arranged to print a line at every operation and a number at every tenth operation.

10. The combination, with means for feeding a record sheet, of a machine the movements of which are to be recorded thereon, and a consecutive register connected to the machine by means brought into action by each operation of the machine which actuates the register; the unit indicator of the register having a line thereon, but no number, and being arranged to move toward the

record sheet in advance of the main body thereof for a limited distance for a number of operations, and for the next operation thereafter to be locked in place so that the whole register is actuated; whereby the unit-printer prints a line upon the sheet for each time that it is moved, but at a desired multiple impression causes the entire register to be actuated to print a number.

11. The combination, with means for feeding a record sheet, of a machine the movements of which are to be recorded and a consecutive register printing upon the sheet, with means brought into action by each operation of the machine for actuating the register; the units-printer of the register being independently movable for a number of operations and being locked in place at the next operation; with an independent time-printing mechanism recording the time upon the sheet.

12. The combination, with means for feeding a record sheet, of a number of machines the operations of which are to be marked thereon, a consecutive register for each machine, a power shaft for operating the registers, means operated by the machines for operatively connecting the registers to the shaft at desired times, a time stamp and a clock mechanism for causing the time stamp to indicate the time upon the record sheet at desired intervals.

13. The combination, with means for feeding a record sheet, a number of machines the operations of which are to be marked thereupon, a consecutive register arranged to mark the different operations upon the sheet, of a power shaft for operating the registers, and means controlled by the operation of the machines for connecting the appropriate registers to the power shaft as each machine completes an operation.

14. The combination, with means for feeding a record sheet, of a machine the operations of which are to be recorded thereon, a consecutive register, means actuated by the machine for causing the register to print at every complete operation thereof, an inking-ribbon for the register, means for feeding the ribbon in one direction until it is exhausted and for then reversing the feed thereof.

15. The combination of a record sheet, a number of consecutive registers recording thereon the operations of individual machines, a constantly revolving shaft, means actuated by the machines for connecting the registers to the shaft at desired times, a common inking-ribbon for all of the registers, and a feeding mechanism for the ribbon actuated by the shaft.

16. The combination, with means for feeding a record sheet, of a number of machines the operations of which are to be marked thereon, a consecutive register for each ma-

- chine, a constantly revolving shaft, means actuated by the machines for connecting each of the registers to the revolving shaft once at each completed motion of the machine to be recorded, a common inking-ribbon for all of the registers, feeding mechanism for the ribbon operated by the shaft in one direction until the ribbon is exhausted, and means for then reversing the feed.
17. The combination, with means for feeding a record sheet, a consecutive register, and a machine the operations of which are to be recorded upon the sheet by the register, of a constantly revolving shaft, a lever operating the register and a cam for operating the lever normally held out of contact with the shaft; and means for releasing the cam at each operation of the machine which is to be recorded.
18. The combination, with means for feeding a record sheet and a number of machines the operations of which are to be marked thereon, of a revolving shaft, a number of consecutive registers, one for each of the machines, a number of levers greater by one than the number of registers, cams carried by the levers, means operated by the machines for bringing the cams into contact with the shaft at desired times, and a time-mechanism for controlling one of the levers independent of the rest, with means operated by such lever for printing the time upon the record sheet.
19. The combination, a printing device, a revolving shaft, a lever for operating the printing device and a cam carried by the lever normally out of engagement with the shaft, of a detent for the cam, and means for releasing the detent at desired times.
20. The combination of a number of machines the operations of which are to be recorded, means for feeding a record sheet, consecutive registers, one for each machine, power-driven means normally disconnected from the registers, an electric circuit from each machine controlled by a switch thereon, and means for connecting the registers operatively to the power-driven mechanism, such means controlled by the electric circuits.
21. The combination of a number of machines the operations of which are to be recorded, means for feeding a record sheet, consecutive registers, one for each machine, power-driven means normally disconnected from the registers, an electric circuit from each machine controlled by a switch thereon, means for connecting the registers operatively to the power-driven mechanism, such means consisting of levers and cams operating the levers, the cams held in normal position by detents; and electromagnets in the respective circuits from the machines for releasing the detents at desired times.
22. The combination of a number of machines the operations of which are to be recorded, means for feeding a record sheet, consecutive registers, one for each of the machines, a power-driven shaft for operating the registers, an electric circuit from each machine, a switch upon each machine for opening and closing the circuit at desired times, means for operatively connecting the registers to the shaft, such means controlled by the electric circuits; a time-stamp, means for operating the time-stamp from the shaft which operates the registers, and a clock-mechanism for bringing such operating means into action at desired intervals.
23. The combination of means for feeding a record sheet, a consecutive register, means for operating the register to print upon the sheet, an electric circuit controlling such means, a switch for controlling the circuit, and a linotype machine; the switch operated by the line-delivery mechanism of the linotype machine to close the circuit once at each operation thereof.
24. The combination of means for feeding a record sheet, a consecutive register, power-driven mechanism for causing the register to print upon the sheet, means for connecting the register to the power-driven mechanism, such means normally inoperative, an electric circuit, an electromagnet therein for operating the connecting means, a switch controlling the circuit, and a linotype machine, the switch being operated by the line-delivery mechanism of the linotype machine to close the circuit once at each operation thereof.
25. The combination of means for feeding a record sheet, a consecutive register printing upon the sheet, power-actuated means for operating the register normally disconnected therefrom, electrically controlled means for operatively connecting the register to the power-actuated means, a linotype machine, a switch operated by the line-delivery mechanism of the linotype, a circuit extending from the switch to the means for connecting the register to the power-mechanism, a time-stamp printing upon the record sheet, means for operatively connecting the time-stamp to the power-mechanism, and a clock mechanism controlling such means.
- In witness whereof, I have hereunto set my name in the presence of two witnesses.
- HENRY C. ZENKE.
- Witnesses:
 THOMAS J. JOHNSTON,
 KATHARINE M. SHERER.

It is hereby certified that in Letters Patent No. 1,083,580, granted January 6, 1914, upon the application of Henry C. Zenke, of Richmond Hill, New York, for an improvement in "Monitors," errors appear in the printed specification requiring correction as follows: Page 4, line 107, strike out the word "means"; page 5, line 4, for the word "and" read *with*; same page, line 31, strike out the words "the elapsed time;" page 6, line 34, before the article "a" insert the word *with*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of January, A. D., 1914.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.