Nov. 3, 1970 W. W. BUECHNER 3,538,270

PHOTOGRAPHIC PROGRAM TIMER

Filed Jan. 23, 1967 2 Sheets-Sheet 1

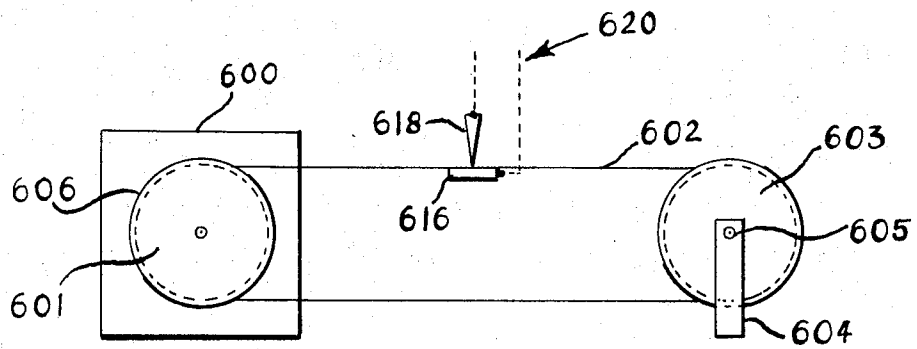


FIG. 1

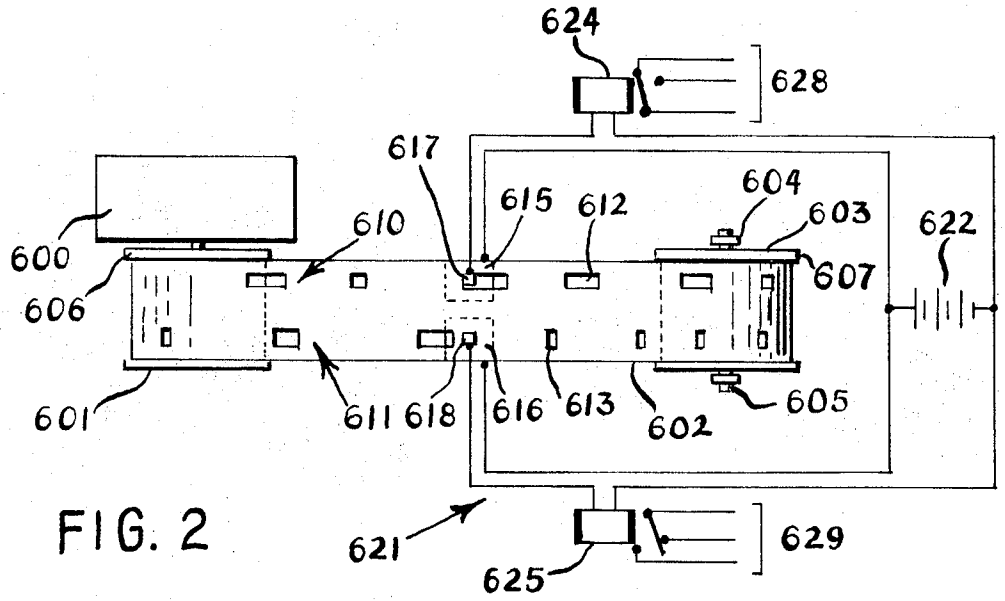


FIG. 2

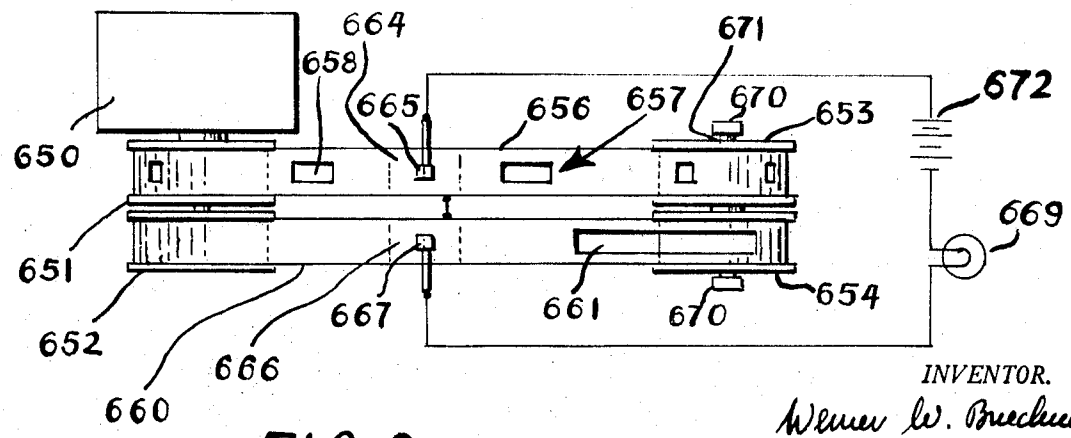


FIG. 3

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PHOTOGRAPHIC PROGRAM TIMER

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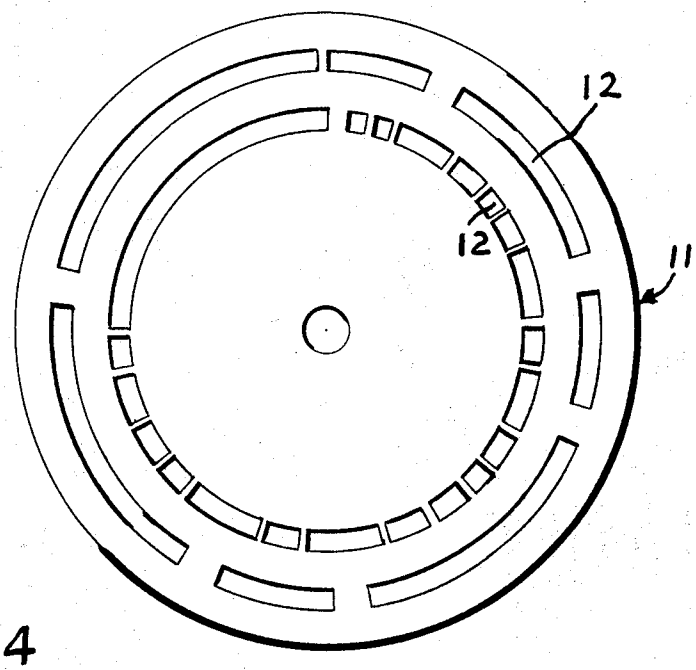


FIG. 4

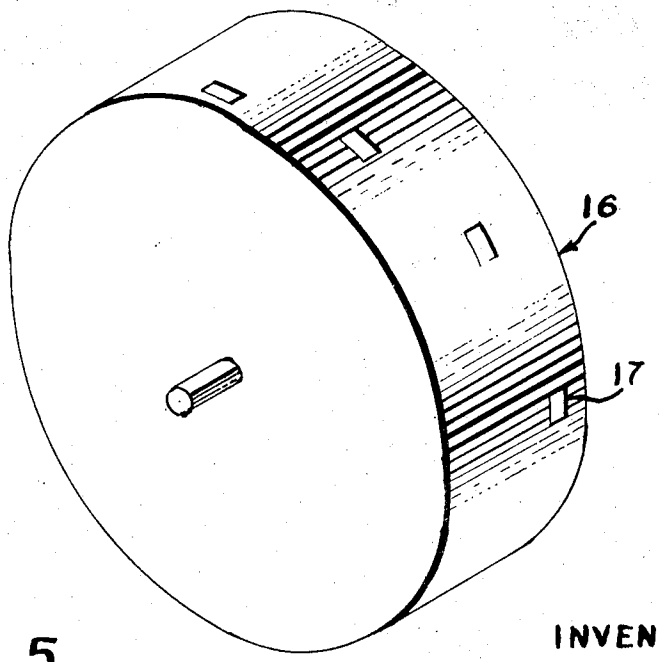


FIG. 5

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3,538,270

PHOTOGRAPHIC PROGRAM TIMER

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Continuation-in-part of application Ser. No. 530,244, Feb. 14, 1966. This application Jan. 23, 1967, Ser. No. 621,382

Int. Cl. H01h 43/08

U.S. Cl. 200—46 12 Claims

ABSTRACT OF THE DISCLOSURE

A program timer for the consecutive timing of a sequence of process steps, which comprises a pair of cooperating contacts as part of a primary circuit. A track of perforations or conductors alternating with insulating areas is drawn at a predetermined rate between the contacts, resulting in the alternating energization and deenergization of the primary circuit at predetermined time intervals, the exact points of time of the change in the state of energization of the primary circuit being the begin and the end of each of the steps of the process sequence.

RELATED APPLICATIONS

This application is a continuation-in-part of my copending application Ser. No. 302,902, filed Aug. 19, 1963 and entitled Photographic Timer and Method of Timing Photographic Treating Processes and of my copending application Ser. No. 530,244, filed Feb. 14, 1966 and entitled Photographic Method and Apparatus.

SUMMARY OF THE INVENTION

The process timer or program timer of the present invention comprises at least one pair of coordinated contacts and countercontacts, being part of a primary electrical circuit powered by an electrical power source; movable contact controlling means comprising at least one track of perforations or contact giving areas alternating with insulating areas in the direction of motion of the contact controlling means; and driving means adapted to move said contact controlling means and said track of perforations or contact giving areas and alternating insulating areas between said coordinated contact and countercontact at an essentially constant linear rate.

DRAWINGS

In the accompanying drawings FIG. 1 is a side elevation and FIG. 2 is a top plan view of a schematic representation of an embodiment of the timer of the present invention, which comprises a multitrack belt of an insulator.

FIG. 3 is a top plan view, in schematic representation, of another embodiment of the timer of the invention, comprising a basic belt of an insulator and comprising one track of alternating perforations and insulating areas travelling at a low speed, and an auxiliary belt, containing a track of one perforation and one insulating area and traveling at a higher speed than the basic belt.

FIG. 4 is an elevation of a disc-type carrier for the perforations and FIG. 5 is a perspective view of a drum-type carrier for the perforations.

DETAILED DESCRIPTION OF THE INVENTION

The timer of the present invention is programmed to the time schedule of one or more process sequences comprising a multiplicity of steps of at least two differing lengths. The program timer of the invention is particularly suited for the timing of multistep photographic treating processes and especially of the complex color developing processes. The timer which is programmed to such photographic multistep treating processes is of particular importance and is the preferred embodiment of the timer of the present invention.

The copending application Ser. No. 302,902 mentioned hereinbefore, describes and claims a program timer which is particularly adapted to provide electrical impulses at the begin and end of each treating step and of each intermediary drainage step of photographic or other multistep processes. These electrical impulses may be used for the production of susceptible signals for the operator, such as light signals, or they may be used for the control of the various functions of fully automatic developing equipment. The electrical impulses are generated by the relative movement of at least one track of alternating contact and non-contact or insulating areas and of at least one countercontact, whereby the width of the contact and insulting areas, in the direction of relative travel of the contact and countercontact, corresponds to the lengths of time of the various steps of the process.

The program timer of the present invention may likewise be used for the generation of susceptible signals or for the direct control of fully automatic processing equipment. For the control of the fully automatic photographic processing equipment, which handles batches of photographic material at a time, e.g. of the type disclosed in my copending application 350,612, one can use with particular advantage the new program timer of the present invention, which is adapted to time and initiate the forwarding, including the raising and lowering, of the photographic material from step to step, and to control and time, if desired, any other function required in the operation of fully automatic batch-wise operating automatic equipment of any design, such as the agitation, opening and closing of the drainage valves for the removal of spent wash water in the washing steps and for the addition of replenishers to the chemical treating solutions etc.

The new timer of the present invention operates on the principle, that engagement between a contact and its coordinated countercontact is broken or restored in accordance with a desired timing cycle or schedule by drawing between the contact and countercontact an insulator containing at least one track of perforations which are programmed to the desired time schedule by being dimensioned in the direction of travel and by being spaced from each other in the direction of travel such that alternatingly insulating areas and perforations represent the lengths of the individual steps. Both the contact and the countercontact of one coordinated pair are part of the same primary electrical circuit. Depending on the intended use and function, the primary electrical circuit which is powered by a suitable electrical power source, comprises an electrically operated signal source or a switch or a relay operated switch or other suitable switching means, which are operative by virtue of the change of energization in the primary electrical circuit. The said switching means operate and control an optional secondary circuit or circuits needed for the control or operation of the functions of the automatic processing equipment.

Advantageously, for each function to be controlled and timed by the timer of the present invention is provided a separate track of programmed perforations on the travelling insulator or carrier, each track having its own coordinated contact-countercontact pair or pairs which are part of their own independent primary circuit. The perforations of each track are dimensioned in their direction of travel and spaced in this direction in accordance with the programmed time schedule of the function which they control and in relation to the linear forwarding speed of the insulator or carrier containing the track of perforations. The lengths of the individual perforations, in the direction of forwarding, determines the contact time between the contact and its coordinated countercontact

and may also be used in the programming of the timer. The lengths of the insulating areas between the individual perforations, likewise in the direction of forwarding of the insulator means, determines the off times, i.e. the times for which the primary circuit is open. The off times are likewise utilized for the programming of steps, such that successive steps are alternatingly represented by on times and off times or perforations and insulating areas, respectively. The begin and end of each step is the exact point of change from on to off or from the energization to the deenergization of the primary circuit, respectively, and vice versa.

The forwarding of the insulator means or carrier, which may have the form of a strip, a continuous belt, or which may be a rotating disc **11** (FIG. 4) with the perforations **12** in the plane of the disc around in a circle or partial circle, or which may be a rotating drum **16** (FIG. 5) with the perforations **17** on the periphery of the cylindrical member of the drum, or the like, may be achieved in known manner by suitable means, e.g. by the use of a synchronous electric motor or of a clockwork or the like. The preferred carrier or insulator means is an endless belt made of a flexible insulator, which is wrapped on one end over a positively driven roll and on the other hand, optionally the other end is supported by suitable means such as an idle roll, cooperative therewith. The running belt is preferably kept under slight tension to avoid slippage, e.g. by the use of springs or the like which act on the displaceable idle roll. The positively driven roll is preferably provided with sprockets or the like, which positively engage in a track of suitably sized and spaced forwarding or sprocket perforations which are provided advantageously on one or both edges of the belt, strip or other carrier. If desired, the idle roll or other supporting means or the directly driven roll may serve as a countercontact, if they are made from an electrical conductor, or if they contain a ringlike electrical conductor at a position under the track of program perforations, in an otherwise insulated roll or the like.

The accuracy of the timer in each of the timed functions may be greatly increased by including into the primary circuit, controlled by the corresponding track of perforations, a second contact-countercontact pair, the engagement or disengagement of which is controlled by drawing between them a second, auxiliary insulator means or carrier, carrying also one or more perforations in form of a track as described hereinbefore, moving, however, at a linear speed or rate which is considerably greater than that of the first insulator means, e.g. 5, 10, 30, 60 or 100 times as fast or more. As is readily apparent, with this arrangement, the primary circuit will be closed only, if both contact-countercontact pairs are engaged with each other at the same time by virtue of the fact, that in both pairs is a perforation between the contact and the coordinated countercontact at the same time. The increase in accuracy is approximately by a factor corresponding to the speed ratio of the two independently moving tracked insulator means. The operation of this principle is described in more detail in my copending application Ser. No. 302,902 of which the present application is a continuation-in-part, and to which special reference is made. The great increase in accuracy achieved by the just described means permits the use of less exacting methods in the construction of the timer and of the programmed contact controlling means, such as the insulator or other carrier, thus permitting inexpensive or low price construction of the timer yet providing at the same time an unsurpassed accuracy, which could otherwise only be achieved by very expensive precision built instruments. The accuracy of the timer of the present invention is within a small fraction of a second depending on the speed ratio of the two insulating carriers or other contact controlling means and on the absolute size of the parts and on the workmanship. As is evident, the accuracy of the timer may be brought to a hundredths or a thousandth of a second or better by the addition of one or more additional auxiliary belts in the manner just described.

If desired, the new timer may also be used to control perceptible signals, preferably a light signal, by operating the signal source mechanically or electrically by the relay or other switching means or by directly including an electrically operated signal source, such as a light bulb, into the primary circuit, so that it is directly actuated and energized, when the primary circuit is closed or energized.

In a given timer, the tracked and programmed contact controlling means or insulating carrier may be made exchangeable, so that one single timer can be used to time and control any desired number of different timing schedules. If desired, the timer may contain also a multiplicity of differently programmed contact controlling means or insulated carriers for the tracks, all driven by the same driving means. By the use of suitable switches any one or more of the primary circuits may be activated or inactivated, as may be desired, so that any desired timing schedule or combination of timing schedules may be provided by a single timer.

A special track of perforations with its own coordinated conact-countercontact pair and primary circuit may with advantage be provided for the control of a switch which shuts off the timer at the end of a timing cycle. A manually operated switch may be provided in addition thereto, which overcomes the track operated switch and which starts the timer for a new timing cycle.

A multitrack timer, incorporating some of the hereinbefore described principles is schematically represented in FIGS. 1 and 2 of the accompanying drawings. Synchronous motor **600** positively drives roll **601** at a constant rate. Belt **602** made of a flexible insulator, such as a suitable plastic, is wrapped over idle roll **603**, which is rotatably mounted in bracket **604**, and over positively driven roll **601**, so that it is taut and does not slip on roll **601**. Rolls **601** and **603** have ring-like flanges **606** and **607**, respectively, at their outside edges, to keep the belt from running or slipping off. Belt **602** has, in the direction of travel, two parallel tracks **610** and **611** of rectangular perforations **612** of different lengths and spacing, so that the perforations are separated by insulating areas of differing length as is required by the programmed timing cycle. The lengths of the perforations and of the intervening insulating areas, in the direction of travel of the track or contact controlling means, respectively, are dimensioned to alternatingly correspond to the lengths of time or durations of the steps of the process, in the order as they occur in the process sequence.

Countercontacts **615** and **616** are mounted on the upper inside of the belt **602** so that they are in contact with the belt which slides over them as it travels. Above the belt **602**, and opposite the said countercontacts **615** and **616** are mounted contacts **617** and **618**, respectively, contact **617** being coordinated to countercontact **615** and contact **618** being coordinated to countercontact **616**. Contacts **617** and **618** are held down, towards their coordinated countercontacts by springs (not shown) so that they engage and slide on the belt and engage with their coordinated countercontact, when a perforation falls between the contact and its countercontact.

Each of the contact-countercontact pairs is part of their own primary circuit **620** and **621**, respectively, which both are powered by battery **622**. Each of the primary circuits is conductively connected to the windings of relays **624** and **625**, respectively. The switch of each of the relays is part of a separate secondary circuit, each of which secondary circuits (not shown) controls one function of an automatic forwarding mechanism in an automatic photographic batchwise color processor, one circuit controlling, for instance, the raising and lowering of the photographic material in a vertical direction in the treating and washing stations, the other circuit controlling the horizontal forwarding motion from one station to the next. Additional tracks with coordinated contact-counter-

contact pairs and separate primary circuits, relays and secondary circuits may be added to control additional functions, such as the closing and opening of the drainage valves mentioned in my copending application Ser. No. 530,244, the agitation of the photographic material by vertical reciprocation in the treating stations, the actuation of a shut-off switch at the end of the treating sequence and many other functions. As can be seen, the agitation can be made in this manner to follow any desired time schedule, particularly if the auxiliary insulated carrier or other contact control means, running at a considerably higher speed is also used. In this manner, the agitation may be made more rapidly and more frequently at the begin of a treating step, gradually falling off to a slower pace toward the end of the particular treating step etc. as is required in many color developing processes. If desired, each primary circuit may be provided with a contact-countercontact pair in addition to the basic pair, which is controlled by a faster running auxiliary belt as illustrated, for instance in FIG. 3. In this manner, each function may have it own, independent auxiliary belt, each of which runs at the most favorable speed.

FIG. 3 is a schematic representation of another embodiment of the timer of the present invention, which has a single basic belt and a single track adjuvant or auxiliary belt. Synchronous motor **650** positively drives roll **651** at a constant rate, e.g. at a peripheral speed of 1 cm. per minute. Roll **652** is driven at 100 times the rate of roll **651**, viz. at an exemplary peripheral speed of 100 cm. per minute. To both rolls **651** and **652** are coordinated idle rolls **653** and **654**, respectively. Over rolls **651** and **653** is laid base belt **656** made of a flexible insulator and having a single track **657** of perforations **658**. Over rolls **652** and **654** is laid adjuvant or auxiliary belt **660** also made of a flexible electrical insulator, which carries a single track containing a single long perforation **661** separated by a single long insulating area extending over the remainder of the belt in the direction of its travel. Idle rolls **653** and **654** are rotatably supported by bracket **670**, which is displaceable in horizontal direction. Both belts are held taut by springs provided at the bracket **670** (not shown). Underneath the upper portion of base belt **656** is mounted countercontact **664** and coordinated thereto, but above the upper portion of the belt is mounted contact **665** such that it is in positive contact with the belt and in engagement with its countercontact **664**, when any of the perforations **658** falls between the contact and the countercontact. Likewise, auxiliary countercontact **666** is mounted underneath the upper portion of auxiliary belt **660** so as to be in contact with the belt **660** as it travels and slides over it. Coordinated to countercontact **666** is mounted, above the belt **660**, auxiliary contact **667**, so that it electrically makes contact and engages with its countercontact when perforation **661** falls between the contact and its countercontact. Contact **665** and auxiliary contact **667** are conductively connected over a battery **672** and bulb **669**, and countercontact **664** and auxiliary countercontact **666** are conductively connected to each other, to form a primary circuit.

As is readily apparent, as long as one of the insulating areas of the travelling base belt and auxiliary belt is between one or both of the contact-countercontact pairs, the primary circuit is open. Only if perforations fall between both contact-countercontact pairs at the same time, the primary circuit is closed and bulb **669** lights up exactly for the length of time, that both contact-countercontact pairs are engaged and make electrical contact. Since it is desired to determine the begin and end of each step by the more accurate auxiliary belt travelling at a higher rate or speed, it is preferred to make the perforations in the base belt actually a little longer than corresponds to their time value. The perforation in the auxiliary belt is made to accurately correspond to the length of the step. In this manner the begin and end of each step is solely determined by the perforation in the auxiliary belt, the latter travelling at a high rate and giving a very high degree of accuracy.

As will be appreciated, the accuracy of the just described timer is about 100 times as high as it would be, if the base belt is used alone, with a given precision in the construction of the timer and the belt and at a given rate of travel of the base belt. This accuracy is obtained at very little extra cost and is unsurpassed by any of the program timers for photographic use known today. If still higher accuracy is desired, the auxiliary belt may be run faster or making it longer. More complex time schedules may be achieved by adding in the manner described hereinbefore a second auxiliary or adjuvant belt and/or by providing more than one long perforation in the track of the auxiliary belt or belts, respectively. In the position shown in FIG. 3, the bulb, serving as the signal source, in the timer, is extinguished, because in the illustrated position only one perforation falls between the two pairs of contact and countercontact.

As stated, the embodiment of the timer, which is provided with one or more auxiliary belts, may likewise serve as many functions, e.g. of an automatic batchwise photographic color developing machine, as is desired. This can be achieved by increasing the number of tracks on the base belt to the number of functions which are to be controlled and timed separately. The auxiliary belt may likewise be provided with a multiplicity of tracks for the control of the individual functions in the manner, described hereinbefore, or if desired, separate auxiliary belts may be provided for various of the functions, which belts may, if desired, travel at different linear speeds. Instead of controlling a bulb or other perceptible signal source, this timer may also control one or more secondary circuits through relays or other switching means as has been described hereinbefore.

The contacts and countercontacts may be mounted, in the timer of the present invention, in any other position of the belt. If contact controlling means other than belts are used as the carriers for the tracks the construction of the timer may be modified accordingly to suit the particular form of the carrier as will be apparent to the one skilled in the art in the light of the teachings given hereinbefore and in my copending application Ser. No. 302,902, which teaches disc-like and drum-like carriers for the track of contacts or countercontacts, respectively. The batteries illustrated in the drawings and described in the foregoing may be replaced by any other suitable source of AC or DC, preferably of a low voltage in the range from 1 volt to 20 or 30 volts, though higher voltages may be employed such as 110 volts or 220 volts. Many other changes and deviations may be made in the design and construction of the timer without deviating from the spirit of the invention.

The novel timer of the present invention may be used with advantage in all those cases, where a series of steps, preferably of a large number of steps of differing lengths is to be timed. This makes the timer particularly suitable for the timing of treating schedules of photographic materials, especially of color materials, which may comprise up to 10 or 20 or more treating steps of various lengths and interspersed thereinbetween drainage steps of relatively short duration e.g. of 20 or 40 seconds, while the treating steps and washing steps may vary from 30 seconds or less to 10 minutes or more as may be required in accordance with the treating schedules published by the manufacturers of the photographic materials and treating chemicals. Typical color developing processes for Kodak color materials are the processes designated "C–22," "E–2," "E–3," "P–122" and "P–111."

The programming of the track of alternating perforations and insulating areas is achieved in such manner, that the steps, in the order as they occur in the process schedule, are alternatingly represented by the perforations and by the insulating areas between perforations, in the direction of travel of the track, or by the spacing of the perforations or of the contact giving areas, respectively.

For example, if the timer is used to time a photographic color developing process, such as Kodak's Process "P-122" for the development of Kodak Ektacolor Professional Paper, the perforations may represent the drainage times of 20 seconds each, and the insulating areas in between the perforations represent in this case the chemical treating steps and the washing steps in the order as they occur in this process. The electrical impulses are generated by the change from perforation to insulating area and vice versa. In the just described example, the primary circuit is energized for the duration of each drainage step, i.e. for 20 seconds, and is deenergized for the duration of each chemical treating step, i.e. for 7, 1, 1, 2, 2, 2, 2, 4, and 2 minutes in this order, if the process is carried out at 85° F. The exact point of the end of the drainage step and the begin of each of the chemical treating steps is characterized by a change of the energization of the primary circuit from the energized state during the drainage step to a deenergized state during the chemical treating steps and washing steps, respectively. Correspondingly, at the exact point of the end of the chemical or washing steps and the begin of the subsequent drainage step the primary circuit changes from the deenergized state to the energized state. If the primary circuit contains a signal source, such as a light bulb, the bulb will be lighted during the drainage steps and extinguish exactly at the end of the drainage step to remain extinguished for the length of the subsequent chemical treating or washing step. It will light up again for the duration of the next drainage step at the exact point when the treating or washing step terminates etc. To indicate the begin of the first treating step of the process sequence, a separate perforation is provided at the begin of the track, of which only the end portion, viz. the point at which the bulb extinguishes, is utilized for the timing of the begin of the first treating step. Correspondingly, a perforation may be provided at the end of the track, which indicates, by the lighting up of the bulb, the end of the last chemical treating or washing step. If the track is on an endless belt, the perforation signaling the begin of the first step and the perforation signaling the end of the last step of the process schedule, may be combined to a single perforation, so that the bulb remains lighted between different batches of treatment of the material.

If the auxiliary belt is used in accordance with the foregoing example, the single perforation provided thereon in the track must be dimensioned correspondingly longer depending on the speed ratio (as indicated e.g. at **661**). If the belt makes one revolution per minute, the perforation for the timing of a 20 second drainage step must be one-third of the length of the belt carrying the auxiliary track.

In many photographic batch wise operated color developing processes it is desirable to increase the lengths of the treating steps, particularly in the first developer, by a certain time increment e.g., by 20 or 40 seconds as the solutions become more and more exhausted by the running through of more than one batch of material. The timer of the present invention can be readily adapted to provide automatically for the time increases of the steps in successive batches by providing in a single track for more than one successive treating schedules. In other words, the track comprises the successively programmed perforations and insulating areas for the treating sequence with the time schedule required for the fresh solutions, thereafter a time schedule with slightly increased times for the treating steps in the solution used once, etc. In this manner as many full treatment schedules may be provided in a single track, as may be desired or needed for the complete exhaustion of the treating solutions.

The photographic treating processes may also be programmed in such manner that the perforations represent the chemical treating and the washing steps, while the drainage steps are represented by the insulating areas. In this case, the foregoing description and use of the timer is similar with suitable adjustments being made for the different arrangement.

The timer of the present invention may also be suitably modified, to be useful for the timing of any other multistep processing schedules, which have steps of differing lengths and which cannot be readily timed by the conventional available timers. It can be used with particular advantage for the timing of process schedules as they occur in industrial operations.

The timer of the present invention has the great advantage over those of the prior art, that it can be used to time even the most complex time schedules, wherein various steps have differing lengths of time or wherein the steps have at least two different lengths of time. It can be readily made to have an accuracy within a tenth or one hundredth of a second or better. It is universally useful to time any desired number of different process schedules and is simple and rugged in construction and foolproof in its operation. Yet it is very inexpensive in the manufacture, requiring no precision in the manufacture. The travelling belt may be made from available plastics or like materials like polyesters, nylon, polyethylene and the like with or without a textile core. The perforations may be simply stamped out as a unit by the use of a simple cutting die. The simplicity of the construction, its ruggedness, its versatility and extreme high accuracy make the timer of the present invention far superior to any of the existing timers for the fully automatic timing of photographic development process schedules and of similar multistep process sequences.

Hereinbefore, the contact controlling means have been described as an insulator, which comprises at least one track of alternating perforations and insulating areas. Instead of providing perforations in the insulator, one may also provide in the carrier of an insulator contact-giving areas in form of an electrically conducting material, which establishes electrical contact between the contact and countercontact as an intermediary electrically conducting member, when it is located and travelling inbetween these two contact means.

In another embodiment of the timer, one may also employ as the carrier for the track of contact controlling means a material which is an electrical conductor, on which are provided perforations or overlaid sections of an insulator as the insulating areas in between the electrically conducting areas provided directly by the electrically conducting carrier. If one uses an electrically conducting belt or disc or drum or the like as the carrier for the track and perforations as the insulating areas, the cooperating contact and countercontact for each track must be at least slightly offset, so that they do not engage with each other when a perforation falls beween them. Generally, the timer comprising a carrier for the track which is an insulator in itself is preferred, because of its simpler construction and its greater versatility.

What is claimed is:

1. A program timer which is programmed to the time schedule of a multistep photographic wet treating process comprising a multiplicity of successive treating and drainage steps of different lengths, which timer comprises at least one pair of coordinated contacts and countercontacts; at least one primary circuit powered by an electrical power source, each primary circuit comprising at least one pair of said coordinated contacts; movable contact controlling means comprising at least one track of perforations alternating with insulating areas, in the direction of motion of the contact controlling means, in which track the length of at least one unit of the members selected from the perforations and insulating areas has a length, in the direction of travel of the contact controlling means which is greater than $U_T \cdot t$, wherein U_T is the rate of travel of the contact controlling means in length units per time unit and t is the number of time units of the process step represented by the respective

perforation or insulating area, and wherein each track of alternating perforations and insulating areas is coordinated to and controls no more than one single primary circuit; and in addition at least one auxiliary pair of coordinated contacts and countercontacts and at least one separate auxiliary contact controlling means coordinated thereto, which auxiliary contact controlling means is independently movable and comprises an auxiliary track of at least one perforation and at least one insulating area, whereby said auxiliary pair of contacts and countercontact is part of at least one of the primary circuits, and wherein the said auxiliary contact controlling means comprising the auxiliary track is moved between the auxiliary pairs of contact and countercontact at an essentially constant linear rate which is at least 5 times as high as the linear rate of movement of the basic contact controlling means coordinated to the basic pairs of contacts and countercontacts, and wherein the length of the perforations or of the insulating areas in the direction of travel of said auxiliary contact controlling means has the approximate value $U_{Ta} \cdot t$, U_{Ta} being the rate of travel by the auxiliary contact controlling means and t having the above meaning and wherein either the perforations or the insulating areas in the basic contact controlling means have a length which is appreciably greater than $U_T \cdot t$; said timer comprising furthermore driving means adapted to move said contact controlling means and said tracks of perforations and insulating areas between said coordinated contacts at an essentially constant linear rate, such that the primary circuit is alternatingly energized and deenergized as the track of alternating perforations and insulating areas passes between said coordinated contact and contercontact.

2. The timer of claim 1, in which the said contact controlling means is a carrier made from an electrical insulator, in which the track comprises alternating insulating areas and perforations, and in which the coordinated contact and countercontact are opposite each other, engaging each other, if a perforation falls between them, with the energization of the primary circuit.

3. The timer of claim 2, which comprises a multiplicity of pairs of coordinated contacts and countercontacts, and a multiplicity of tracks of alternating insulating areas and perforations coordinated thereto in the basic contact controlling means, each of said pairs of coordinated contacts and countercontacts being part of a separate primary circuit, and each of said primary circuits being coordinated to and controlled by one of said tracks.

4. The timer of claim 1, which comprises in addition at least one auxiliary pair of coordinated contacts and countercontacts and at least one separate auxiliary contact controlling means coordinated thereto, wherein the perforations or the insulating areas in the basic contact controlling means have all about the same length, which is appreciably greater than $U_T \cdot t$, and which represents the time value of the drainage steps of said photographic treating process, U_T and t having the meaning set out in claim 1.

5. The timer of claim 3, which comprises a multiplicity of pairs of coordinated auxiliary contacts and countercontacts, and coordinated auxiliary contact controlling means comprising a multiplicity of auxiliary tracks, each of which has at least one perforation and at least one insulating area, wherein one pair of each of the coordinated auxiliary contacts and countercontacts is part of one of the primary circuits, and wherein the auxiliary contact controlling means comprising the multiplicity of tracks of alternating auxiliary perforations and insulating areas is drawn between said auxiliary pairs of contacts and countercontacts at a linear rate which is at least 5 times as high as the rate of forwarding of the basic contact controlling means comprising a multiplicity of basic tracks of perforations and insulating areas.

6. The timer of claim 1, wherein the contact controlling means comprising the track or tracks of alternating perforations and insulating areas is an endless belt.

7. The timer of claim 1, wherein the lengths of the insulating areas in the track or tracks of alternating perforations and insulating areas correspond to the chemical treating times and washing times of the steps of a photographicc multistep color developing process in the order as the steps occur in the process schedule and the length of the interspersed perforations correspond to the drainage times between steps.

8. The timer of claim 1, which comprises as part of the primary circuit an electrically operated light source or other signal source.

9. The timer of claim 1, which comprises as part of the primary circuit an electrically operated relay or switch means.

10. The timer of claim 1, in which the perforations are dimensioned to correspond to the length of time of the steps of a photographic multistep color developing process selected from the steps of chemical treatment, washing, rinsing, and drainage between successive chemical treatment, rinsing and washing steps.

11. The timer of claim 1, in which the contact controlling means is a carrier made from an electrical insulator and selected from an endless belt and an elongated strip of material, and the countercontact is a member selected from the roll used for forwarding said carrier, and a stationary countercontact provided opposite said track and being on the opposite side of the said carrier in relation to said contact coordinated thereto.

12. The timer of claim 1, in which said contact controlling means is a member selected from a drum and a disc comprising an insulator forming alternating insulating areas and perforations therein.

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