United States Patent

Duesler

[15] **3,672,290**

[45] **June 27, 1972**

[54] FILM PROCESSING APPARATUS

[72] Inventor: **George W. Duesler,** 221 Monticello Drive, Odessa, Tex. 79760

[22] Filed: **Oct. 13, 1969**

[21] Appl. No.: **865,783**

[52] **U.S. Cl.** ..... **95/94 R,** 95/89 R

[51] **Int. Cl.** **G03d 3/12**

[58] **Field of Search** 95/89, 90.5, 94, 96; 165/64, 165/169; 134/105, 107, 108

[56] **References Cited**

UNITED STATES PATENTS

2,810,332	10/1957	Dignan	95/94
3,076,401	2/1963	Djadjich	95/94
3,143,167	8/1964	Vieth	165/169 X
3,149,551	9/1964	Cramer	95/94
3,287,013	11/1966	Fairbanks et al.	95/94 X
3,335,757	8/1967	Lynch	165/169 X
3,383,996	5/1968	Dokulil et al.	95/94
3,435,749	4/1969	Cauwe et al.	95/94
3,498,371	3/1970	Zygiel	165/169 X
3,498,373	3/1970	Lughausen	165/169
3,511,160	5/1970	Reusel	95/94 X

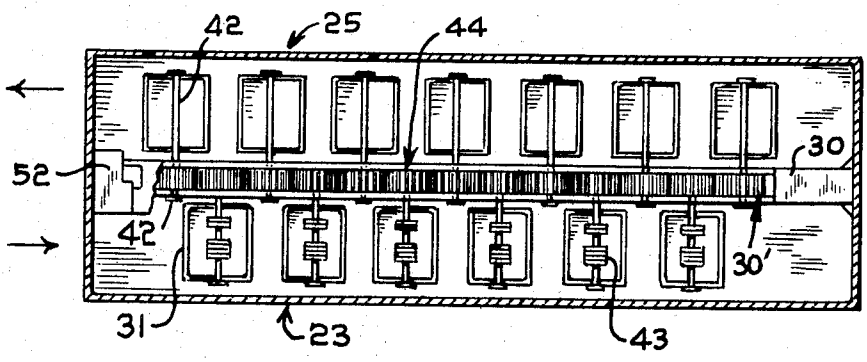
Primary Examiner—Samuel S. Matthews
Assistant Examiner—Alan L. Mathews
Attorney—Marcus L. Bates

[57] **ABSTRACT**

Film processing apparatus enclosed within a housing and having two spaced apart rows of treatment tanks, a light-proof room, a light trap which emits film from the light-proof room, a combination washing and re-exposure tank, and wherein each individual tank includes a temperature control and a fluid circulation means associated therewith.

A longitudinally extending gear train having shafts from adjacent gears extending in opposite directions to adjacent tanks of each row thereof drives the film upwardly and downwardly through the tanks in a particular manner which prevents the emulsion side of the film from contacting a supporting surface throughout the entire process.

12 Claims, 22 Drawing Figures



PATENTED JUN 27 1972

3,672,290

SHEET 1 OF 3

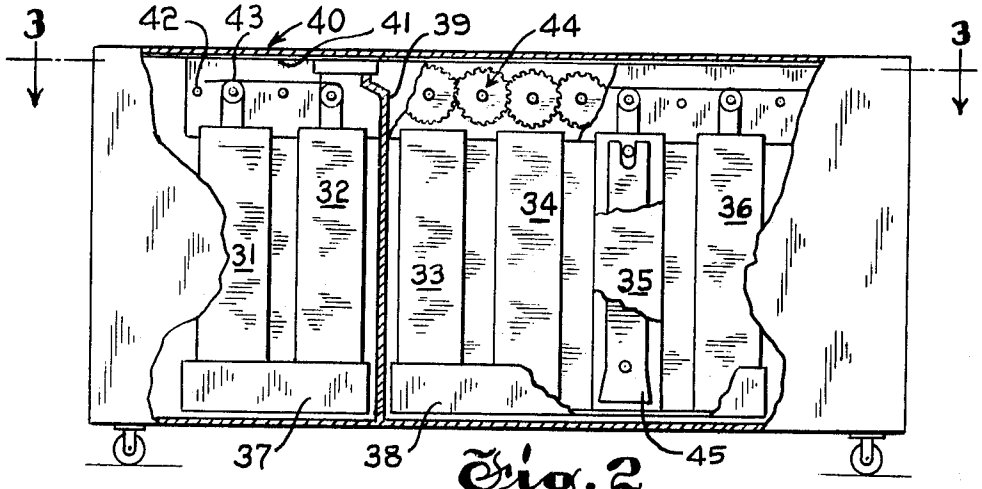


Fig. 2

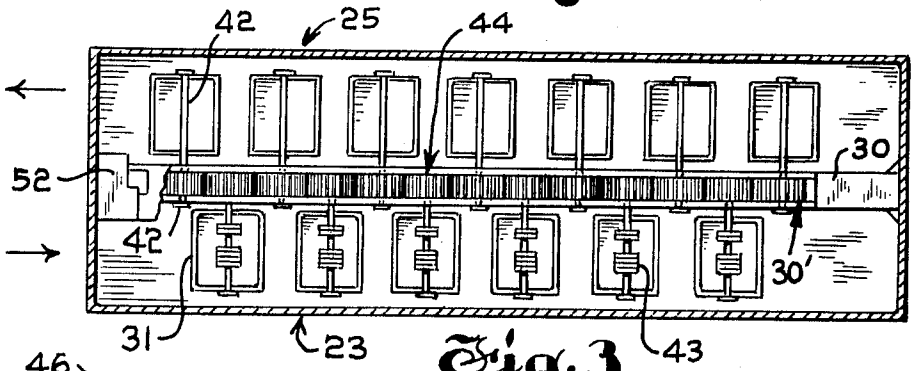


Fig. 3

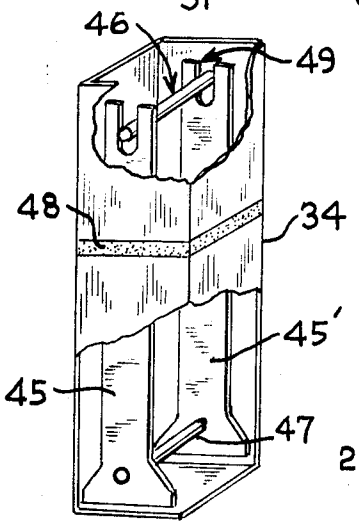


Fig. 4



Fig. 4a

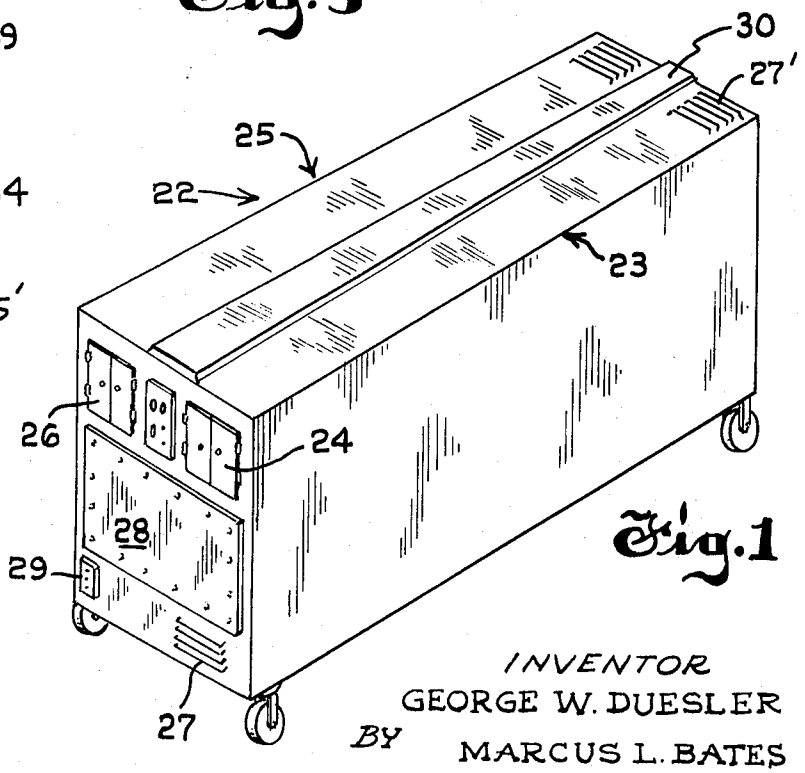


Fig. 1

INVENTOR
GEORGE W. DUESLER
BY
MARCUS L. BATES
HIS AGENT

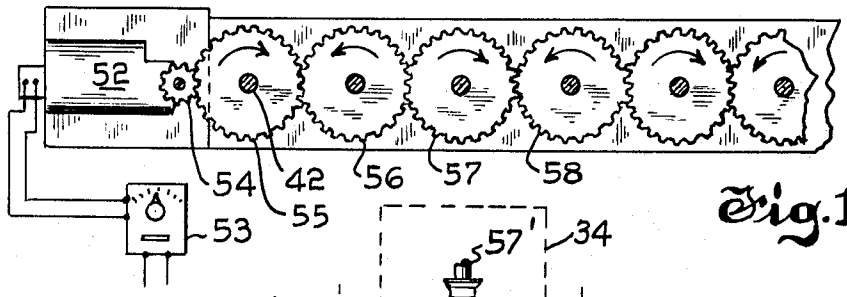


Fig. 13

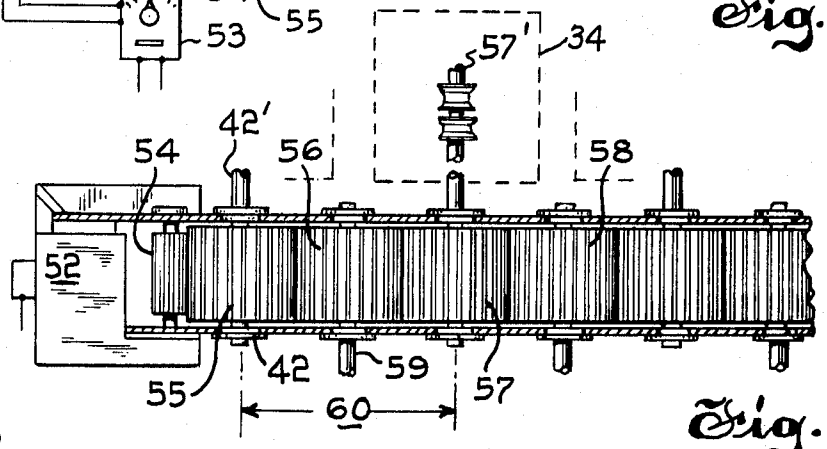


Fig. 14

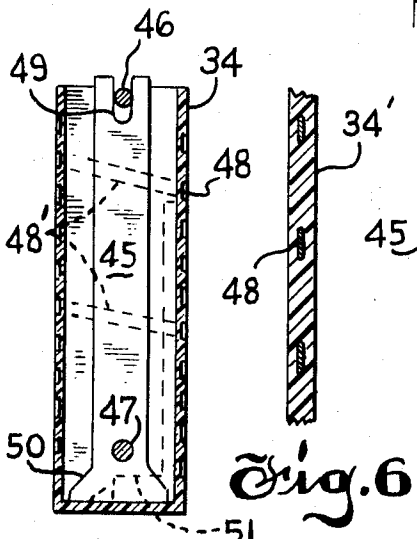


Fig. 5

Fig. 6

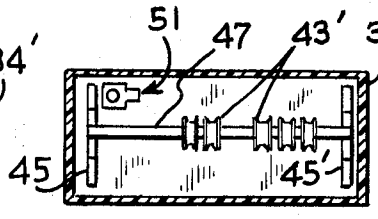


Fig. 7

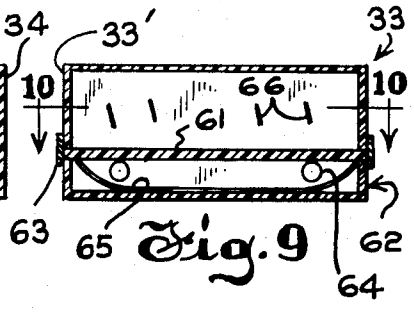


Fig. 9

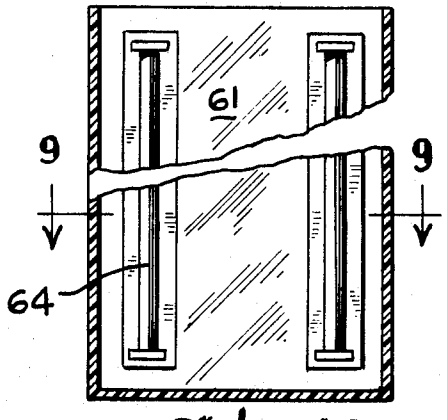


Fig. 10

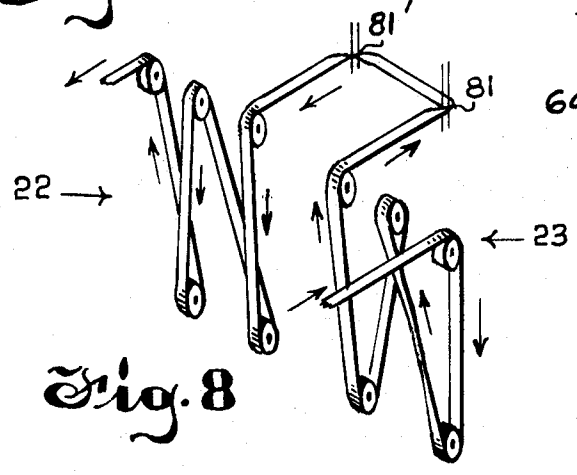


Fig. 8

INVENTOR
GEORGE W. DUESLER
BY
MARCUS L. BATES
HIS AGENT

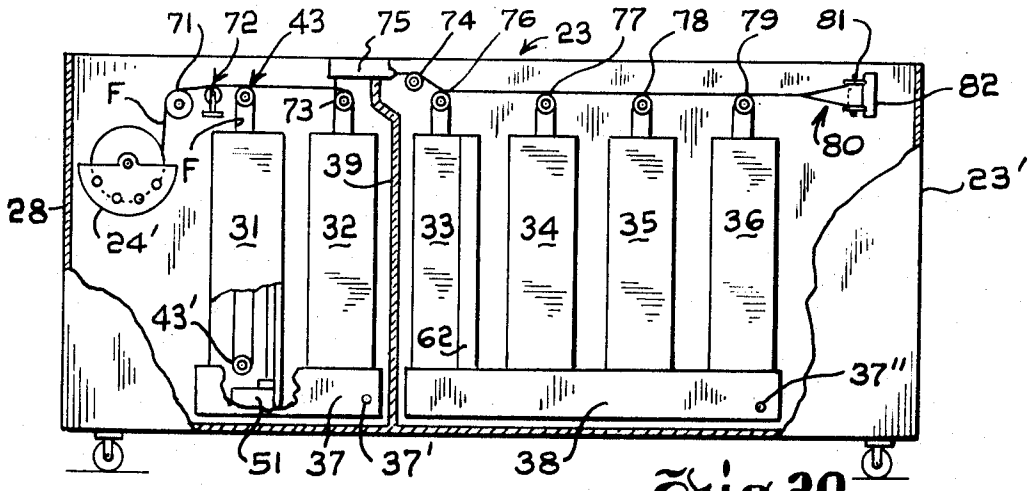


Fig.20

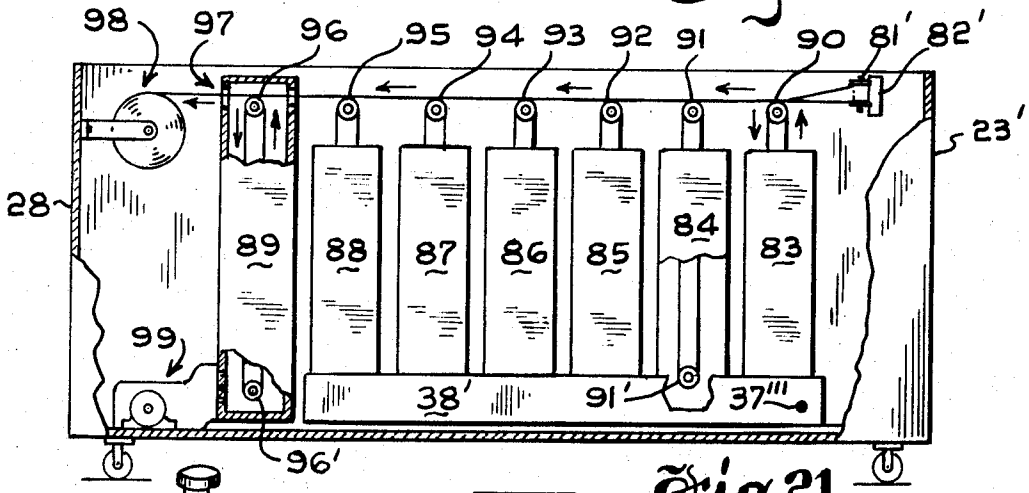


Fig.21

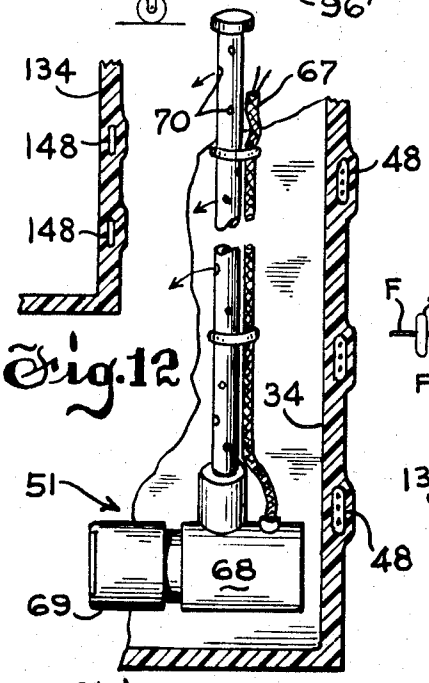


Fig.12

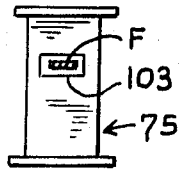


Fig.16

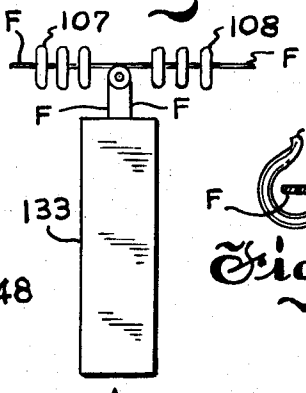


Fig.17

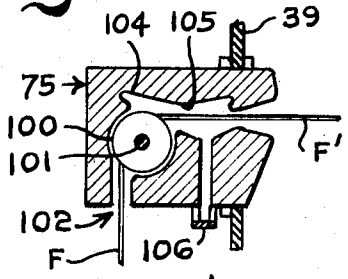


Fig.15



Fig.18



Fig.19

INVENTOR
GEORGE W. DUESLER
BY MARCUS L. BATES
HIS AGENT

FILM PROCESSING APPARATUS

BACKGROUND OF THE INVENTION

Film developing apparatus of the type which economically and efficiently processes thousands of feet of film per day are known to those skilled in the art. The initial cost of the machine and its continued maintenance is considered economically practical so long as a large volume of film is processed. Machines of this type generally require skilled technicians and sometime engineers in order to properly carry out the many complex operations peculiar thereto. Apparatus of this nature are usually unable to economically process short runs of film, that is, eight hundred feet or less per run. This is especially applicable when the expensive maintenance is considered in conjunction with the many complex manipulations involved in order to process the short run of film.

It is desirable to provide film processing apparatus which can efficiently and economically handle short runs of film, that is eight hundred feet of film or leas. An average television news story or local advertisement is comprised of approximately 200 feet of film. The news film must be processed for immediate presentation on the air or else its impact upon the audience is lost. Since the average television station newsman is generally possessed of at least a cursory knowledge of photographic processing techniques, it is accordingly desirable that he should also be able to carry out the entire operation associated with the film developing apparatus. Therefore, the contemplated apparatus must be simple, fool-proof, and should only require maintenance which is within the comprehension of the average technician employed by an average television station.

SUMMARY OF THE INVENTION

This invention relates to a film processing apparatus having a plurality of film developing tanks disposed in two spaced apart rows with a longitudinally extending gear train suitably housed and disposed above and between each row of tanks. Adjacent gears of the gear train have parallel shafts which depend in opposite directions from one another, with each adjacent shaft overlying each adjacent tank of a row, with each shaft having drive rollers thereon which are spaced apart from a similar set of idler rollers located in the lower extremity of each tank. Film is guided and conducted from a film feed magazine located in a dark room, upwardly and downwardly through each tank of each row as the film is subjected to various treatments, depending upon the fluid composition contained within the various tanks. A light trap located within a partition wall of the light-proof room prevents exposure of the film during the initial developing process. A combination washing and re-exposure tank is provided downstream of the light-proof room. The film guiding and conducting means of the present invention enables the film to complete its circuit through the entire apparatus while the emulsion side of the film is maintained free of any support surface, thereby preventing damage thereto.

It is therefore a primary object of this invention to provide improvements in apparatus for processing film which enables the film to be completely processed without contacting the emulsion side with a support surface.

A further object of the present invention is the provision of improvements in film guiding and conducting means associated with film processing apparatus.

A still further object of the present invention is the provision of an improved light trap for conducting and guiding film from a light-proof enclosure into a lighted enclosure.

Another object of the present invention is the provision of improvements in temperature control of the liquid contained within the developing tanks.

Still another object of the present invention is the provision of an improved tank construction for use in conjunction with film developing apparatus.

These and other objects of the present invention are attained by the provision of a new combination of elements

broadly fabricated in a manner essentially as set forth in the above abstract and summary. Various other objects and advantages of this invention will be readily apparent to those skilled in the art upon reading the following detailed description in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a perspective view of a portable apparatus for processing film made in accordance with the present invention;

FIG. **2** is a side elevational view of the apparatus seen in FIG. **1**, with some parts thereof being broken away in order to disclose some additional parts located in the interior thereof, and with some parts being shown in section;

FIG. **3** is a partly cross-sectional view taken along line **3—3** of FIG. **2**, with additional parts being broken away so as to disclose additional details thereof;

FIG. **4** is an enlarged view of part of the apparatus seen in the foregoing figures, with some parts thereof being broken away in order to enhance disclosure of the details thereof;

FIG. **4***a* is an enlarged fragmentary representation of part of the apparatus seen in FIGS. **2** and **3**;

FIG. **5** is a vertical cross-sectional view of FIG. **4**;

FIG. **6** is an enlarged fragmentary cross-sectional representation of a portion of FIG. **5**;

FIG. **7** is a horizontal cross-sectional view of FIG. **5**;

FIG. **8** is a schematical, part diagrammatical representation which sets forth the manner in which film travels through some of the various tanks of the apparatus;

FIG. **9** is a cross-sectional view taken along line **9—9** of FIG. **10**; while

FIG. **10** is a cross-sectional view taken along line **10—10** of FIG. **9**;

FIG. **11** is an enlarged fragmentary cross-sectional view of FIG. **5**, with additional parts being shown operatively disposed therein;

FIG. **12** is a fragmentary cross-sectional view of a modification of FIG. **11**;

FIG. **13** is an enlarged fragmentary representation of part of the apparatus seen in the foregoing figures;

FIG. **14** is a partial top cross-sectional view of FIG. **13**;

FIG. **15** is an enlarged cross-sectional view of part of the apparatus seen in FIGS. **2** and **16**;

FIG. **16** is an end view of the apparatus seen in FIG. **15**;

FIG. **17** sets forth a modification of the apparatus disclosed in FIGS. **9** and **10**;

FIG. **18** is an enlarged representation of part of the apparatus seen in FIG. **17**;

FIG. **19** sets forth a modification of the apparatus of FIGS. **17** and **18**;

FIG. **20** is a side elevational, part cross-sectional representation of the apparatus seen in FIGS. **1–3**; and

FIG. **21** is also a side elevation, part cross-sectional view of the apparatus seen in FIGS. **1–3**.

DETAILED DESCRIPTION OF THE VARIOUS EMBODIMENTS

FIG. **1** shows a portable, self contained film processing apparatus, indicated by the arrow at numeral **22**, for processing magnetic striped, photographic color film, as well as other black and white film which is adapted to be subjected to a continuous treatment by various different chemical reactions. The film processer is housed within an enclosure which is defined by side walls, with the right hand side **23** of the apparatus having access door **24** for charging exposed film thereinto, and a second or left hand side **25** of the apparatus having door **26** through which the processed film may be retrieved. Louvers **27, 27'** provide ventilation for the enclosure, while removable access panel **28** enables inspection of and access to the interior of the enclosure. Receptacle **29** provides a source of electrical current, water, and sewage. A gear train access door **30** is centrally and longitudinally disposed at the upper extremity of the enclosure.

As particularly seen in FIGS. 2 and 3, a gear train 30' is enclosed within the before mentioned housing and a plurality of film developing tanks 31–36 are disposed in one of the illustrated two spaced apart parallel rows. As further illustrated, a lower portion of the tanks is received within overflow pans 37, 38. A drain outlet is suitably connected to each of the overflow pans. Bulkhead 39 partitions light-proof room 40 from the remainder of the apparatus so as to prevent exposure of the undeveloped film while it is being processed therein.

The gear train housing includes spaced apart vertical side walls, one of which is seen at 41, for rotatably supporting journals 42 therein. Rollers 43 are driven by the gears 44 of gear train 30', the details of which will be more fully disclosed later on.

As best seen in FIGS. 2 and 4, spaced apart legs 45, 45' receive alignment rod 46 and idler shaft 47 therein with the shaft and rod being disposed at the upper and lower extremities, respectively, of the tank. An electrical heating element 48 is seen embedded within the walls forming the tank. The spaced apart removable legs are bifurcated at 49 to enable vertical movement of the legs with respect to rod 46. The lower extremity of each leg is enlarged in a manner as seen at numeral 50. Pump assembly 51 (indicated by dash lines in FIG. 5) rests on the bottom of the tank.

Looking now to FIGS. 13 and 14, in conjunction with the remaining figures, there is seen an electrical motor driven gear box 52, the speed of which is controlled by rheostat 53. One commercially available motor assembly which has proven satisfactory for some uses of the apparatus is described as follows: Dayton Gear Motor 1/15-H.P., 5,000 r.p.m. input–100 r.p.m. output (variable output 0–100 r.p.m.). This arrangement enables gear 54 to drive the gear train at a rate which provides a moderate roller speed of 36 r.p.m. which is considered adequate for a moderate film speed, and with the speed being adjustable above and below this rate. The gear box drives gear 54 which may be meshed with any of the gears 55–58, although it is preferred to drive the first gear of the gear train as indicated in the drawing. Each of the main gears, gear 56 for example, has a shaft 59 depending therefrom with adjacent gears having the shaft therefrom depending in opposite but parallel directions. Shaft 57', for example, is diametrically opposed but parallel to shaft 59 which depends from adjacent gears 57 and 56, respectively. This gear and shaft arrangement will leave a space 60 between adjacent shafts which is sufficiently large to accommodate a tank 34.

As best seen in the illustrations of FIGS. 9 and 10, a re-exposure tank, which simultaneously washes and re-exposed the film as it passes therethrough, is provided with transparent wall 61 from which there depends a light enclosure 62. The light enclosure is attached to the tank by any suitable fastening means 63. Vertically disposed parallel arranged fluorescent tubes 64 cooperate with reflector 65 so as to direct ample light through the before mentioned transparent wall. The film which is disposed between the upper and lower rollers can be rotated 360° or 180°, as desired, and as indicated by numeral 66, so as to expose both sides of the film to the light source.

The circulation means illustrated in FIG. 11 maintains ample circulation and a constant temperature throughout each chemical tank in order to establish a constant film reaction rate. The circulation means is comprised of a chemical resistant, submersible pump assembly having an electrical conduit 67 connected to motor 68 which drives pump 69 by means of a magnetic clutch (the details of which are not shown). Pump and motor assemblies of this type are known to those familiar with circulation of water in a small aquarium, and therefore the details thereof will not be further discussed. Upwardly depending from and connected to the pump outlet is a stand pipe having the illustrated apertures 70 formed therein so as to enable the suction side of pump 69 to force chemicals up through the stand pipe where the chemicals then flow through the multiplicity of spaced apart apertures.

Looking again to FIGS. 2, 3, 8, 20, and 21, it will now be realized by those skilled in the art that the emulsion side of the film is maintained free of any supporting surface in order to prevent possible injury thereto. This expedient is attained by the provision of tension and guide rollers 71, 72 which guide and control the film as it enters the first of the tanks located within the darkroom. Film from the last roller 73 within the darkroom is then fed to the first guide roller 74 located outside of the darkroom by means of light trap 75, the details of which will be more fully discussed later on. The film travels along groups of rollers 76–79 as it travels upwardly and downwardly in series relationship through each of the adjacent tanks of the row. At 80 the film is turned 90° axially where it engages roller 81 and is turned and travels laterally through tunnel 82 until emerging from tunnel 82' on the opposite side 25 of the enclosure. Roller 81' together with sets of rollers 90 again turn the film 90° and rollers 90–96 now guide and convey the film upwardly and downwardly through the remaining adjacent tanks 83–89 of the remaining row. The last tank 89 is a dryer tank having tunnels 97 through which the film freely runs. Take-up magazine 98 receives the developed and dryed unmarred film thereon. Hot air blower 99 provides the source of temperature controlled hot air for dryer tank 89.

The specific details of the light trap are illustrated in FIGS. 15 and 16 in conjunction with FIGS. 2 and 20. The light trap is provided with guide roller 100 suitably journaled at 101 within a circular race. The roller is tangentially disposed above the downwardly opening tunnel 102 and tangentially aligned with respect to lateral horizontal tunnel 103. The lateral tunnel is connected to the vertical tunnel by the circular roller race and by cavity 104. The lateral tunnel is oppositely dished at both the top and bottom, with the bottom dished portion forming a recess which is connected to a drain. The drain is provided with baffle 106 so as to preclude light shining into the darkroom. The interior of the light trap should be analogous to a black body so as to enhance adsorption of any stray light.

As seen in FIG. 12, an alternative form of the tank heating element can be in the form of fluid carrying conduits 148 which circumferentially enclose the inside peripheral wall of the tank in a helical like form.

As seen in FIGS. 17 and 18, the simultaneous washing and re-exposure of film can alternatively be carried out by the provision of curved or semicircular fluorescent lights 107, 108 which surround the film F as the film enters and emerges the washing tank 133. In the embodiment of FIG. 19, the re-exposure tubes 208, 209 can be in the form of a helical gas filled bulb, as for example, a fluorescent bulb.

OPERATION

In operation, the entire film guiding and conducting means beginning at 24', proceeding through the entire apparatus and ending at 98, is spooled with a clear plastic processing leader. This is, the leader is of sufficient length to completely thread the entire machine. This expedient leaves each of the free depending ends of the leader readily accessible at the access doors 24 and 26. A light-proof film feed magazine, which can take on several different forms, is spooled with a clear plastic processing leader of sufficient length to completely thread the entire machine. The exposed film material to be processed and developed is next attached to and rolled about the clear plastic leader in the light-proof magazine with the emulsion side of the film disposed in an upward direction. The remaining free end of the exposed film is attached to the first mentioned leader by stainless steel or Monel metal staples, thereby interposing the exposed film between the two leaders, one threaded in the machine and the other wound in the magazine.

The machine is next checked for fluid level, temperature, circulation, wash water, re-exposure lamps, hot air circulation, dry film take-up reel, film tension, and chemical strength. The motor of motor driven gear box 52 is energized and the speed of the film, as it travels upwardly and downwardly through each of the tanks, is controlled by manipulation of the rheostat 53. The film proceeds at a predetermined constant speed along the following described path: from the feed magazine the film F proceeds over roller 71 and the guide

roller switch means **72**; upwardly and downwardly within tank **31** by means of the spaced apart upper and lower plurality of rollers **43, 43'**; upwardly and downwardly within tank **32**; over roller **100** located within the light trap **75**; across guide roller **74** and upwardly and downwardly within tanks **33–36** by means of their respective rollers; whereupon the film turns 90° across roller **81** and traverses the rear of the machine into the second section of the processing apparatus. In the second section of the processing apparatus the film again assumes a horizontal position as it is turned axially by means of roller **81'** and continues upwardly and downwardly within tanks **83–88** by means of the upper and lower roller assemblies of the separate tanks, after which the film enters the drying tank **89** and exits at **97** to be immediately received upon the processed film reel **98**. As the tail-end of the leader previously placed within the film feed magazine leaves the roller **71**, the switch associated with guide roller **72** turns off the motor at **52** thereby leaving the tail or free depending end of the leader near roller **71** and readily accessible for attachment to the free end of the next film to be processed. This expedient always leaves a leader threaded through the apparatus every time it is turned off, thus eliminating the necessity of manually threading film through the multitude of rollers each time a reel of film is developed.

As the film emerges from the darkroom, that is, as the film passes through the light trap **75** located within bulkhead **39**, the emulsion side of the film is maintained free from any contacting surface while light is precluded entering the light trap because of the particular configuration of the lateral and vertical tunnels therethrough. Light which enters **103** impinges upon cavity **104** while any liquid adhering to the film drains back through the vertical passageway **102** or through the drain at **106**. The light adsorbing baffle below drain passageway **106** precludes any stray light from entering the darkroom.

As previously pointed out, each tank is provided with a driven set of rollers and a set of idler rollers. The number of rollers employed depends upon the residence time required by the film within any particular tank. The driven rollers are attached to a shaft which is attached to one of the gears of the gear train. The driven shaft overlies the tank in aligned relationship with a lower idler shaft **47** which has the desired number of rollers **43'** disposed thereon (adequately disclosed in FIG. **4***a*). The idler shaft is maintained in spaced apart relationship with respect to the driven shaft by means of legs **45, 45'** (illustrated in FIG. **4**). The legs may be removed from the tank by removing alignment rod **46** therefrom and lifting the legs along with the idler shaft in an upward direction. The bifurcated upwardly depending legs have limited vertical movement within the tank so as to maintain a proper tension on the film as well as offering a means by which the residence time of the film within each tank can be controlled.

The relatively slow speed of the film as it progresses through the apparatus reduces the probability of chemical carry-over from tank to tank, thus eliminating the necessity of an inter-tank squeegee system which is the prime source of film damage in many similar prior art devices.

Since the construction materials of the entire apparatus are selected from non-conductive or non-magnetic materials, the apparatus of the present invention is ideally suited for processing pre-recorded or post-recorded magnetic sound striped film such as is presently being used by many television newsmen. In this respect it is pointed out that the electric motors at **52, 68**, and **99** are provided with magnetic shielding, this expedient being known to those skilled in the art.

The rate of travel of the film as it progresses through the processing apparatus can be controlled by one or more of the following expedients: (1) control of motor **52** by means of rheostat **53**, taking care that the film does not remain in some chemical solution longer than the manufacturers prescribed time; (2) variation of the number of "passes" which the film makes through each tank; or (3) raising or lowering the idler shaft with respect to the driven shaft, thus shortening or lengthening the amount of film which is exposed to the chemical in a specific development tank, while holding the speed of motor **52** constant.

It is considered within the comprehension of those skilled in the art to vary the number of rollers associated with a particular tank, to vary the number of tanks associated with a particular row of tanks, and to vary the number of tanks enclosed within the darkroom. Moreover, those skilled in the art will realize that extra stand-by loops and rollers can be provided in the individual tanks, with the rollers being threaded with a plastic leader to enable the leader to be rapidly spliced into the circuit where a greater residence time is required in a particular tank.

I claim:

1. Apparatus for processing photographic film comprising:

a plurality of film developing tanks disposed in two spaced apart rows;

a drive shaft and an idler shaft for each said tank; means mounting said idler shaft in the lower extremity of said each said tank; means mounting said drive shaft in spaced apart overhanging relationship with respect to said idler shaft; roller means attached to said idler and drive shaft for guiding and conducting the film upwardly and downwardly through each of the tanks;

an elongated gear train housing, a series of meshed gears forming a gear train, journal means rotatably mounting said gear train within said housing, drive means for imparting rotational motion into one gear of said gear train;

each gear of said gear train having one said drive shaft attached thereto and depending therefrom with adjacent gears having the shafts thereof arranged parallel to and extending in directions opposed with respect to one another;

and means for guiding and conducting film from one row of tanks to the other row of tanks;

one of said tanks having means associated therewith for simultaneously washing and re-exposing film, said tank having upwardly extending side walls and a bottom wall, at least a portion of said side walls being of light passing material;

a light source, a reflective surface spaced apart from said light passing material for reflecting light into said tank;

said light source being interposed between said reflective surface and said light passing material;

an elongated heating means circumferentially disposed about the inside peripheral wall of said tank, said heating means being embedded within and forming an integral portion of said wall;

and temperature control means for energizing said heating means to maintain the fluid contained within the tank within predetermined temperature limits;

and further including chemical circulating means comprised of a pump having an inlet and an outlet, a motor, an upstanding conduit having means forming spaced apart apertures therein with the lower extremity of the pump being in communication with the pump outlet, whereby fluid is circulated from the tank into the pump inlet, through the conduit and back into the tank.

2. Apparatus for processing photographic film comprising:

a plurality of film developing tanks disposed in two spaced apart rows;

a drive shaft and an idler shaft for each said tank; means mounting said idler shaft in the lower extremity of said tank; means mounting said drive shaft in spaced apart overhanging relationship with respect to said idler shaft; roller means attached to said idler and drive shafts for guiding and conducting the film upwardly and downwardly through each of the tanks;

an elongated gear train housing, means mounting said gear train housing between said two spaced apart rows, a series of meshed gears forming a gear train, journal means rotatably mounting the meshed gears of said gear train within said housing, drive means for imparting rotational motion into one gear of said gear train;

adjacent gears of said gear train each having one said drive shaft coaxially attached thereto for rotation therewith, said shafts of said adjacent gears being arranged parallel to and extending in directions opposed with respect to one another, so that shafts associated with tanks of one row rotate in the same direction while adjacent shafts associated with tanks of the other row rotate in the opposite direction;

and guide means for guiding and conducting film from one row of said two rows of tanks to the other row of said two rows of tanks.

3. The apparatus of claim 2 wherein one of said tanks includes apparatus associated therewith for simultaneously washing and re-exposing film, said tank having upwardly extending side walls and a bottom wall, at least a portion of said side walls being of light passing material;

a light source, a reflective surface spaced apart from said light passing material for reflecting light into said tank;

said light source being interposed between said reflective surface and said light passing material.

4. The apparatus of claim 2 wherein at least one of said tanks is located in a light-proof chamber and an adjacent tank is located externally of the light-proof chamber, a partition between the two recited two adjacent tanks;

a light trap located in said partition, means forming a vertical film inlet passageway, means forming a horizontal film outlet passageway which is in communication with said inlet passageway to thereby form a continuous tunnel through the light trap;

roller means for guiding the film from the vertical to the horizontal passageway while maintaining the film free of the tunnel walls;

said horizontal passageway having a dished bottom wall, drain means connected to the lower extremity of the bottom wall; whereby:

film travels from the tank adjacent the partition and within the light-proof chamber, enters the vertical passageway, and is turned laterally to the horizontal passageway where it continues to the tank adjacent the partition wall externally the chamber, while light is precluded from entering the chamber.

5. The apparatus of claim 2 wherein at least one of said tanks is comprised of an upwardly opening container for holding liquids therein;

an elongated heating means circumferentially disposed about the inside peripheral wall of said tank, said heating means being embedded within and forming an integral portion of said wall;

and temperature control means for activating said heating means to maintain liquid contained within the tank within predetermined temperature limits.

6. The apparatus of claim 2 and further including chemical circulating means comprised of a pump removably placed within a tank and having an inlet and an outlet, a motor, an upstanding conduit having means forming spaced apart apertures therein with the lower extremity of the conduit being in communication with the pump outlet, whereby fluid is circulated from the tank into the pump inlet, through the conduit and back into the tank.

7. The apparatus of claim 5 wherein said tank is fabricated from laminated fiberglass and said heating means is an electrical resistance heating element.

8. The apparatus of claim 5 wherein said tank is fabricated from laminated fiberglass and said heating means is a tubular conduit through which a liquid heat transfer medium is circulated, said conduit being embedded within the side walls of the tank.

9. Apparatus for processing photographic film comprising:

a plurality of film developing tanks disposed in two spaced apart rows;

a drive shaft and an idler shaft for each said tank; means mounting said idler shaft in the lower extremity of said tank; means mounting said drive shaft in spaced apart overhanging relationship with respect to said idler shaft; roller means attached to said idler and drive shafts for guiding and conducting the film upwardly and downwardly through each of the tanks;

one film developing tank of one row being misaligned with respect to one film developing tank of another row with adjacent drive shafts of adjacent gears being connected to each of the last two recited tanks;

an elongated gear train housing, means mounting said housing adjacent to said tanks, a series of meshed gears forming a gear train, journal means rotatably mounting the gears of said gear train within said housing, drive means for imparting rotational motion into one gear of said gear train;

adjacent gears of said gear train each having one said drive shaft coaxially attached thereto for rotation therewith, said shafts of adjacent gears being arranged parallel to and extending in directions opposed with respect to one another;

and guide means for guiding and conducting film from one said row of tanks to the other said row of tanks; whereby:

said film commences at one end of the apparatus, proceeds through the tanks of one of said two rows, whereupon the film enters the second row of tanks at the opposed end of the apparatus, proceeds through the tanks of the remaining of said two rows, and terminates at said one end of the apparatus.

10. The improvement of claim 9, wherein said film developing tank is comprised of an upwardly opening container for holding liquids therein;

an elongated heating means circumferentially disposed about the inside peripheral wall of said tank, said heating means being embedded within and forming an integral portion of said wall;

and temperature control means for activating said heating means to maintain liquid contained within the tank within predetermined temperature limits.

11. The apparatus of claim 10 wherein said tank is fabricated from laminated fiberglass and said heating means is an electrical resistance heating element.

12. The apparatus of claim 10 wherein said tank is fabricated from laminated fiberglass and said heating means is a tubular conduit through which a liquid heat transfer medium is circulated.

* * * * *