Oct. 3, 1967 P. D. BARTLETT ET AL 3,344,730

PHOTOGRAPHIC PROCESSING APPARATUS

Filed July 12, 1965 5 Sheets-Sheet 1

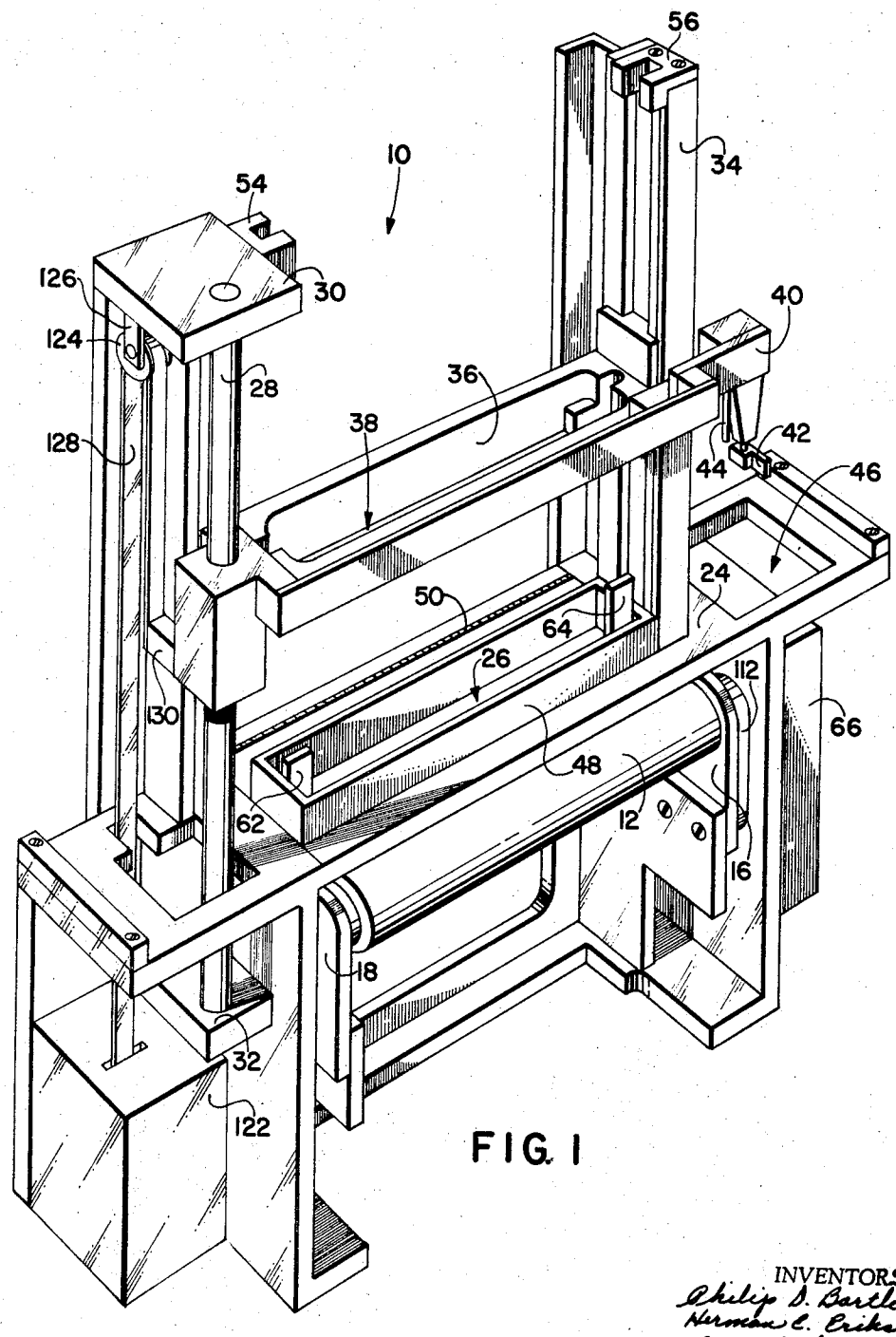

FIG. 1

INVENTORS
Philip D. Bartlett
Herman C. Erikson
Joseph F. Sadlow
Browne and Mikulka
Charles and L. McGuire
ATTORNEYS

Oct. 3, 1967 P. D. BARTLETT ET AL 3,344,730

PHOTOGRAPHIC PROCESSING APPARATUS

Filed July 12, 1965 5 Sheets-Sheet 2

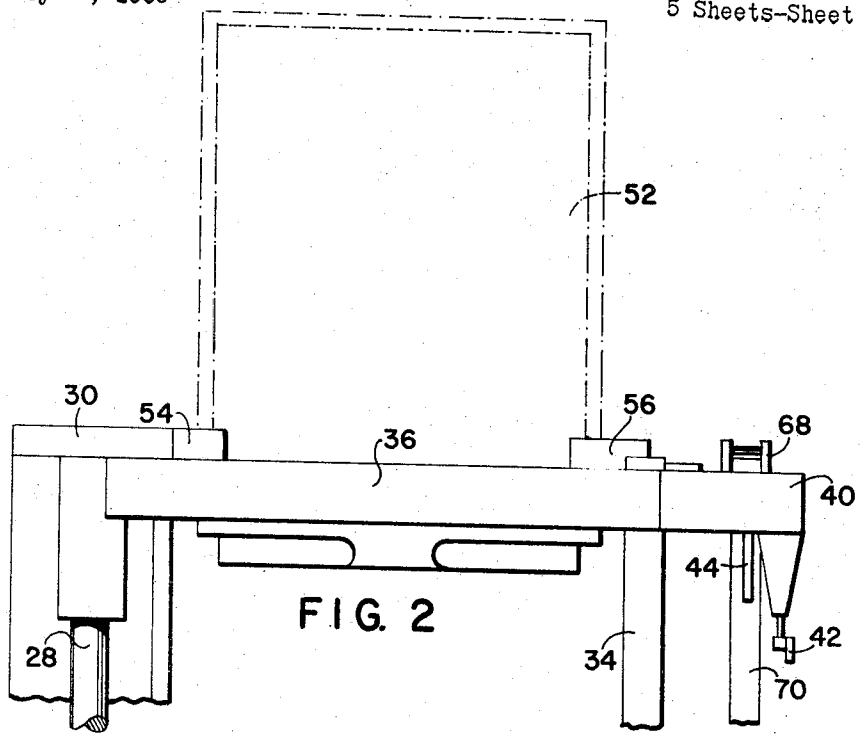

FIG. 2

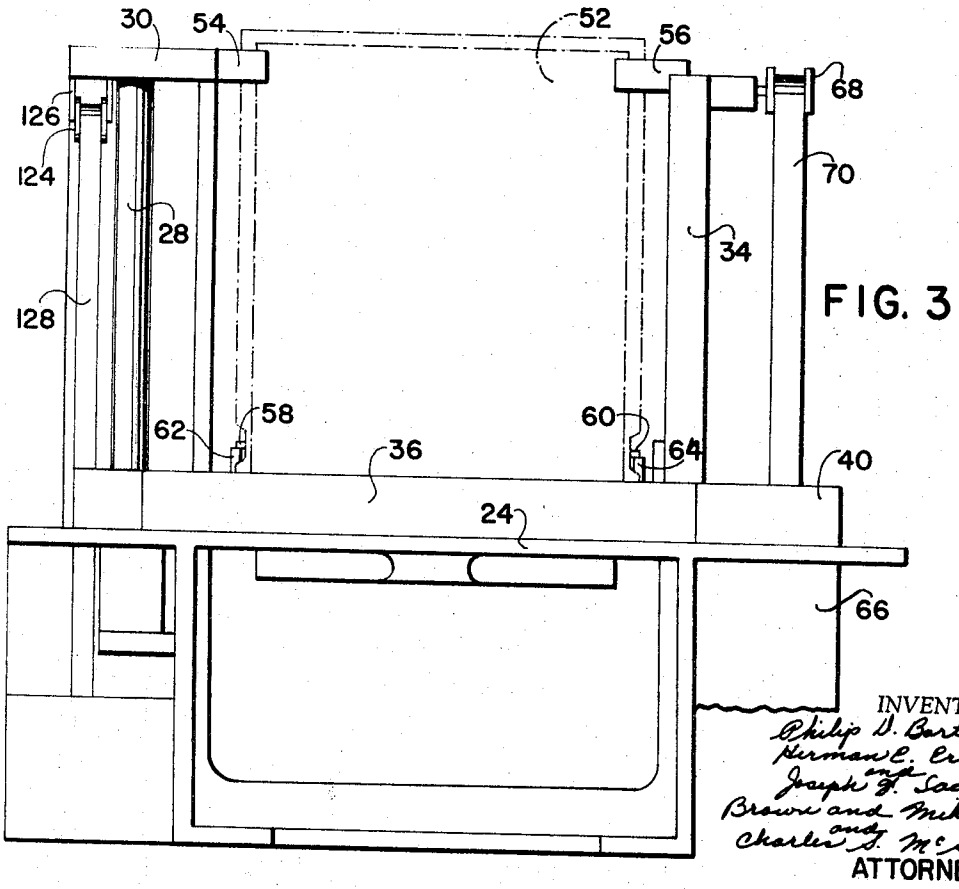

FIG. 3

INVENTORS
Philip D. Bartlett
Herman C. Erikson
Joseph F. Sadlow
Brown and Mikulka
Charles and F. McGuire
ATTORNEYS

Oct. 3, 1967 P. D. BARTLETT ETAL 3,344,730

PHOTOGRAPHIC PROCESSING APPARATUS

Filed July 12, 1965 5 Sheets-Sheet 3

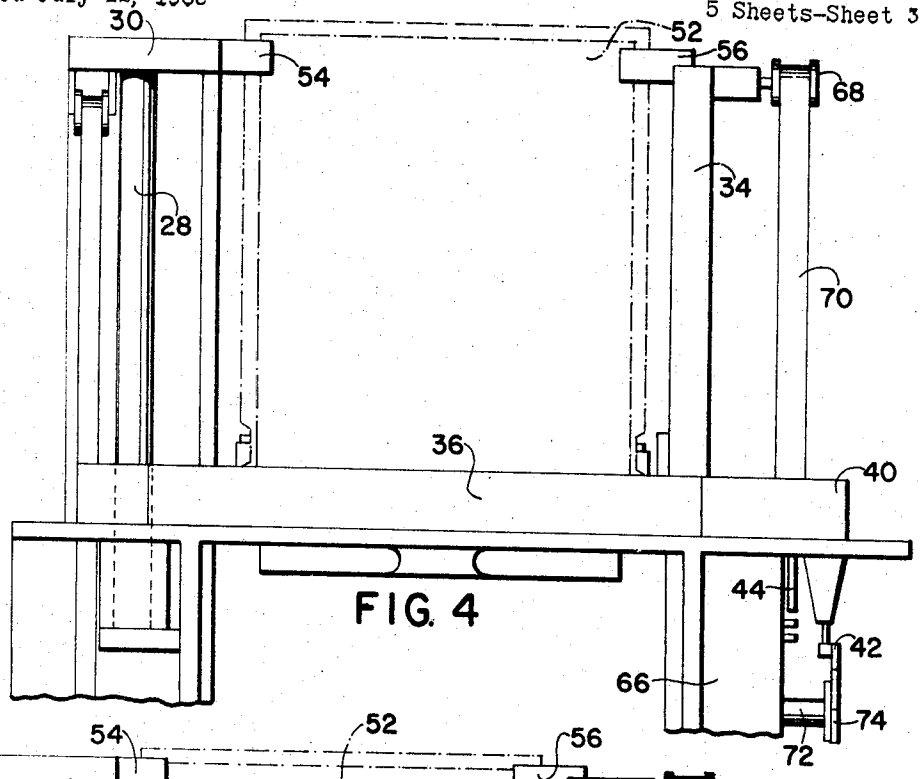

FIG. 4

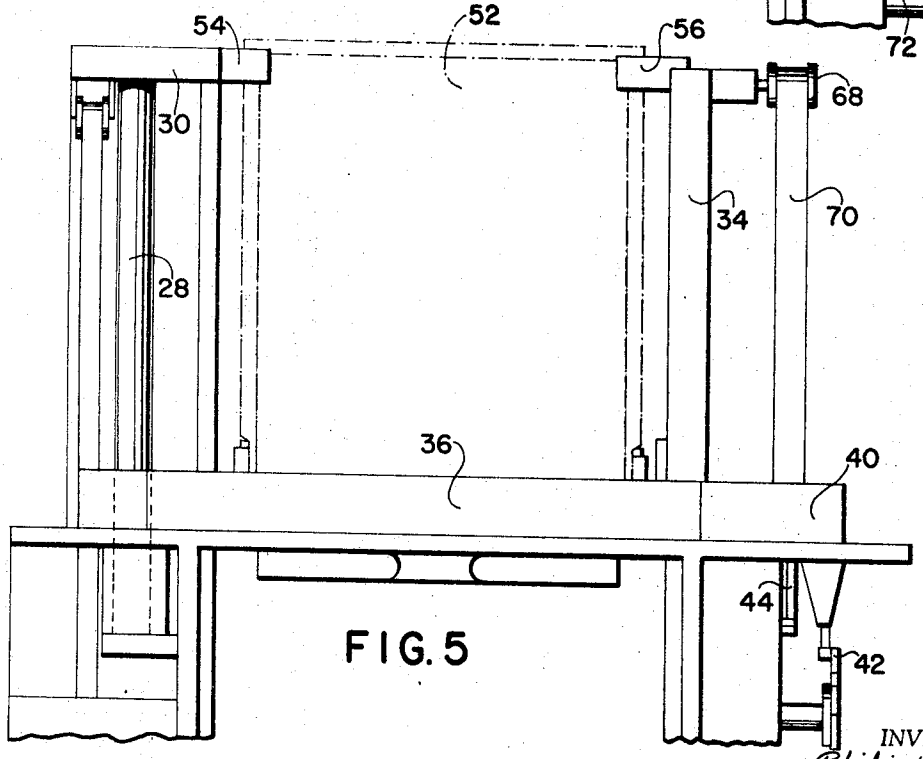

FIG. 5

INVENTORS
Philip D. Bartlett
Herman C. Erikson
and
Joseph B. Sadlon
Brown and Mikulka
and
Charles S. McGuire
ATTORNEYS

Oct. 3, 1967 P. D. BARTLETT ET AL 3,344,730

PHOTOGRAPHIC PROCESSING APPARATUS

Filed July 12, 1965 5 Sheets-Sheet 4

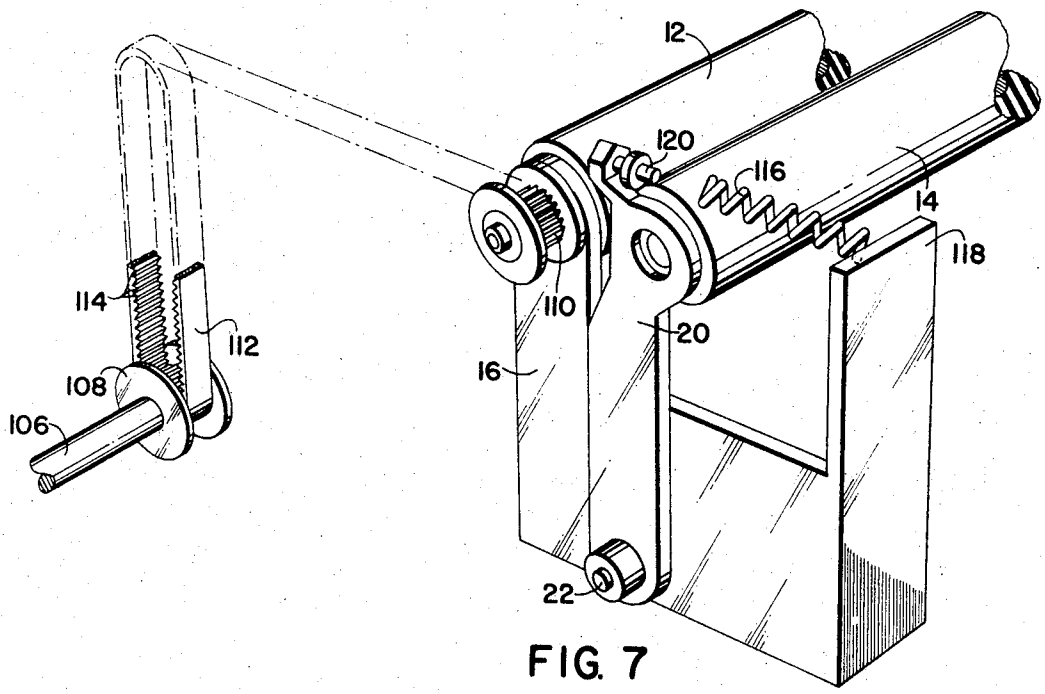

FIG. 7

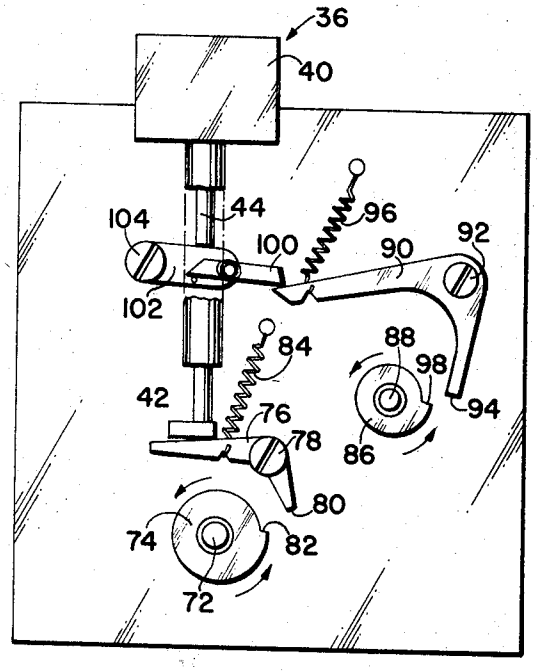

FIG. 6

INVENTORS
Philip D. Bartlett
Herman C. Erikson
and
Joseph J. Sadlow
Brown and Mikulka
and
Charles L. McGuire
ATTORNEYS

Oct. 3, 1967 P. D. BARTLETT ETAL 3,344,730

PHOTOGRAPHIC PROCESSING APPARATUS

Filed July 12, 1965 5 Sheets-Sheet 5

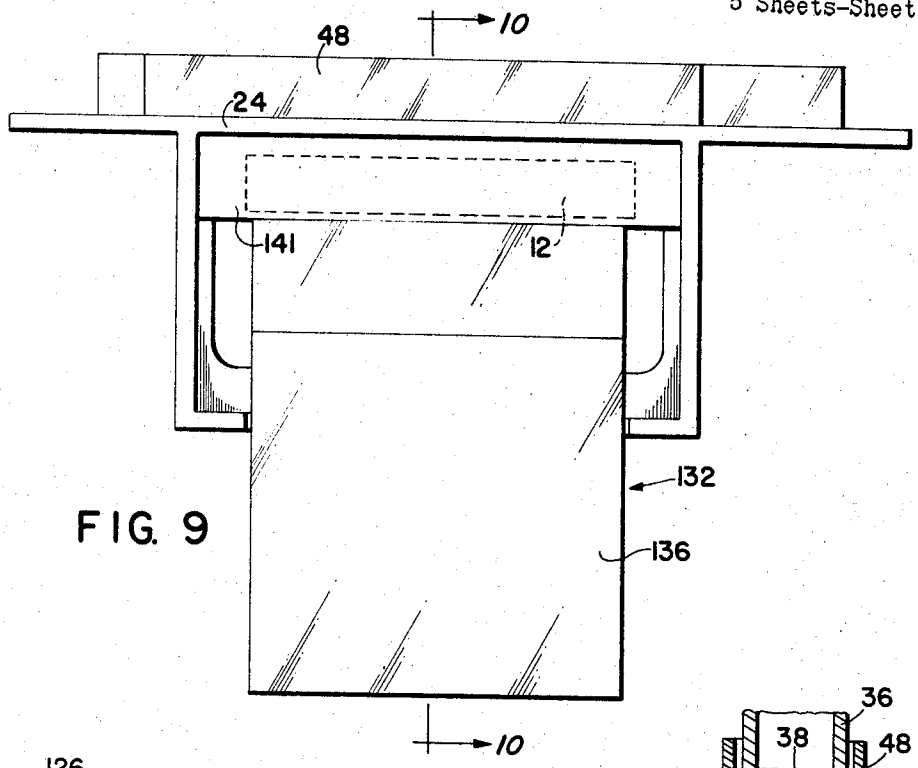

FIG. 9

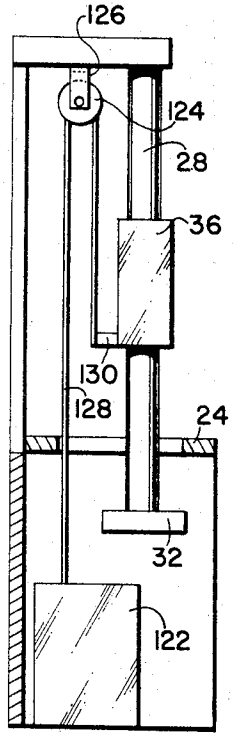

FIG. 8

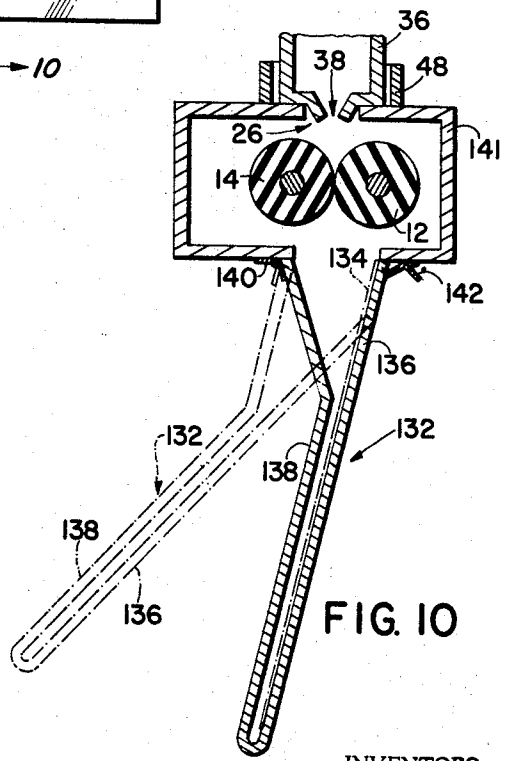

FIG. 10

INVENTORS
Philip D. Bartlett
Vernon C. Erickson
and
Joseph F. Sadlow
Brown and Mikulka
and
Charles L. McGuire
ATTORNEYS

United States Patent Office 3,344,730 Patented Oct. 3, 1967

3,344,730

PHOTOGRAPHIC PROCESSING APPARATUS

Philip D. Bartlett, Worcester, Herman E. Erikson, Winchester, and Joseph F. Sadlow, North Reading, Mass., assignors to Polaroid Corporation, Cambridge, Mass., a corporation of Delaware.

Filed July 12, 1965, Ser. No. 471,091
18 Claims. (Cl. 95—89)

This invention relates to processing apparatus for film assemblies of the self-developing type and, more specifically to apparatus for effecting advancement of a film unit through a pair of rotatable pressure rolls and including novel means for imparting rotation to said rolls.

Many forms of photographic processing apparatus are known which include a pair of juxtaposed, rotatably mounted rolls for applying a compressive force to a film unit advanced therebtween. Some forms of such apparatus include means for exposing a photosensitive portion of the film unit prior to advancement between the pressure rolls, while others are adapted to effect processing of a film unit previously exposed in other photographic apparatus. The present invention is principally concerned with apparatus of the latter type, and more specifically with such apparatus wherein drive means, in the nature of a motor or the like, are utilized for imparting rotation to the rolls, as opposed to apparatus wherein the rolls are rotated by grasping and advancing the film unit itself, manually or otherwise. The invention is also concerned with means for supplying energy to a motor or other such means which expends such energy during the processing of a photographic film unit.

It is a principal object of the present invention to provide processing apparatus for a self-developing film unit wherein one or more motor means may be supplied with energy in the process of inserting the film unit in the apparatus.

A further object is to provide apparatus for processing a film unit held in a cassette which is positioned on a movable portion of the apparatus and moved toward a pair of pressure rolls while charging a motor which supplies power for rotating the rolls.

Another object is to provide processing apparatus for a self-developing film unit including a timer for indicating the expiration of a predetermined processing period for said film unit, and further including means for winding said timer in response to insertion of the film unit into the apparatus for processing.

Still another object is to provide processing apparatus having movable means for positioning the film unit for advancement through a pair of pressure rolls, and including means for both winding and actuating a motor which drives the pressure rolls in response to movement of said movable means.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the apparatus possessing the construction, combination of elements and arrangements of parts which are exemplified in the following detailed disclosure, and the scope of the application of which is indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings wherein:

FIGURE 1 is a perspective view of one embodiment of the apparatus of the invention with certain portions removed for clarity of illustration;

FIGS. 2–5 are fragmentary front elevational views of portions of the apparatus of FIGURE 1 showing certain movable elements in various positions during operation of the apparatus;

FIG. 6 is a side elevational view of portions of the apparatus shown in FIGS. 2–5;

FIG. 7 is a fragmentary, exploded perspective view of additional elements of the apparatus;

FIG. 8 is a fragmentary, side elevational view of portions of the apparatus shown in FIGS. 1–5;

FIG. 9 is a fragmentary, front elevational view of still another portion of the apparatus; and

FIG. 10 is a side view in vertical section on the line 10—10 of FIG. 9.

The processing apparatus of the present invention is suitable for effecting advancement of a self-developing film unit through a pair of pressure-applying members of the apparatus while spreading a liquid processing composition between a pair of liquid confining layers of the film unit. The processing operation is performed according to the well-known diffusion transfer process, wherein a pair of flexible sheet elements, one of which includes a photosensitive portion with a latent image formed therein, are superposed with a layer of suitable processing composition distributed therebetween. Photosensitive film units or assemblies of the type intended for processing in the apparatus of the present invention have been well known for many years and a number of different commercial embodiments thereof are presently manufactured and sold by Polaroid Corporation of Cambridge, Mass. The apparatus of the present invention is especially suited for processing such film assemblies when the latter are to be withdrawn from film holding means such as an X-ray cassette, or the like, wherein the film is held and positioned during exposure. Specific examples of film structures of the type referred to, as well as principles and methods for effecting processing thereof according to the aforementioned diffusion transfer process are set forth in U.S. Patents Nos. 2,543,181, 2,544,268, 2,634,886, 2,603,-565, 2,647,056 and 2,565,378 all to Edwin H. Land, said Patents Nos. 2,544,268 and 2,565,378 being specifically to film assemblies especially adapted for X-ray photography. These various patents include detailed descriptions of film assemblies which employ a liquid-confining layer having a photosensitive area and a liquid-confining layer in the nature of a print carrying element which are adapted to contain all of the photographic materials needed to process the assembly. Also, the said patents are detailed as to containers for holding processing materials and further include descriptions of liquid processing compositions usable with such film assemblies and including, in Patents Nos. 2,544,268 and 2,565,378, a liquid processing composition employable to develop the negative without forming a positive image. The practices, photographic materials and compositions described in said patents are generally suitable for carrying out a photographic processing operation according to the present invention.

Referring now to the drawings, the processing apparatus shown in FIGURE 1 is designated generally by the reference numeral **10** and includes a pair of juxtaposed pressure-applying members in the form of rotatably mounted pressure rolls **12** and **14**. Roll **12** is mounted upon suitable spindle and/or bearing means for rotation about a fixed axis extending through portions **16** and **18** of the fixed frame of the apparatus. Roll **14** is likewise mounted for rotation about an axis parallel to the axis of rotation of roll **12**. The axis of rotation of roll **14** extends through an end portion of arm **20** (FIG. 7) and a similar arm (not shown) at the opposite end of roll **14**. Arm **20** is pivotally mounted on pin **22** extending fixedly from frame portion **16** whereby the axis of rotation of roll **14** is laterally movable with respect to that of roll **12**, in a manner and for a purpose explained more fully hereinafter.

Horizontally disposed frame portion **24** includes opening **26** adjacent one side of the bite of rolls **12** and **14**. Apparatus **10** is adapted, as later explained, to have a

leading portion of a film assembly inserted through opening 26 for engagement and advancement between rolls 12 and 14. Vertically extending column 28 is mounted between fixed frame portions 30 and 32, on one side of opening 26, and fixed guide member 34 extends vertically from frame portion 24 on the other side of opening 26. Movable member 36 is mounted between column 28 and guide member 34 for vertical, sliding movement toward and away from opening 26. Member 36 further includes end portion 40 extending horizontally outward from guide member 34, on the opposite side thereof from opening 26. Extending downwardly from end portion 40 are contact members 42 and 44 which are adapted to extend through opening 46 in horizontally disposed frame portion 24 when movable member 36 is moved to a lower position, in proximity to opening 26. Rectangular, vertically disposed, wall portion 48 extends upwardly from frame portion 24 in encircling relation to opening 26. Wall portion 48 is adapted to cooperate with movable member 36 when the latter is moved to its lower position to form an essentially light-tight engagement between wall 48 and member 36. Hinge means 50 provides a pivotally movable mounting for a portion of frame portion 24 lying between hinge 50 and opening 26, thus allowing access to the surfaces of rolls 12 and 14 for cleaning purposes, etc.

Turning now to FIGS. 2–5, movable member 36 is shown in a number of positions of its movement. In FIG. 2, member 36 is shown in its uppermost position, wherein frame portion 30 acts as a vertical stop, thus limiting and defining the uppermost portion of member 36. Member 36 is designed to accept on an upwardly disposed surface thereof, a film holder or cassette such as that indicated in phantom lines in FIG. 2 and designated by the reference numeral 52. Although the specific construction of cassette 52 forms no part of the present invention, a suitable example of the constructional details of such a cassette are disclosed in copending applications Serial Nos. 471,090 and 471,275, both filed July 12, 1965. In general, cassette 52 or other film holding means, is adapted to hold a film assembly of the type previously described with a leading portion of the film assembly extending out of the cassette along an edge thereof positioned adjacent opening 38 of member 36. Guide block 54 is fixedly attached to frame portion 30 and guide block 56 is likewise attached to an upper portion of guide member 34. Guide blocks 54 and 56 present inwardly facing channels within which side portions of cassette 52 are intended to be constrained. Thus, cassette 52 may be positioned in contact with movable member 36 when the latter is in its upper position, as shown in FIG. 2, and moved downwardly therewith toward opening 26 with the side edges of cassette 52 guided by blocks 54 and 56, and the downward path of member 36 defined by column 28 and guide member 34.

When movable member 36 approaches the lower position of its movement, as shown in FIG. 3, the previously mentioned leading portion of the film assembly which extends out of cassette 52 and through opening 38 is guided through opening 26 and into the bite of rolls 12 and 14. In response to appropriate actuation, rotation is imparted to rolls 12 and 14 so that the leading portion of the film assembly, which extends outside the cassette, is frictionally engaged therebetween and rotation of the rolls in the proper direction will effect advancement of the film unit.

Depending upon the particular film holding means used, means may have to be provided for releasing the film assembly for withdrawal from the holding means. This may be effected in certain cassettes or other film holders by manual movement or actuation of portions of the holder prior to movement thereof to the lower position of FIG. 3. For purposes of illustration only, cassette 52 includes arms or buttons 58 and 60 extending outwardly from the sides adjacent the edge from which the film unit is withdrawn. Stationary fingers 62 and 64 are provided, one at each side of opening 26. As member 36 reaches the lower position, fingers 62 and 64 extend through end portions of opening 38 and engage buttons 58 and 60, respectively, on cassette 52. The buttons are connected in known manner to latching means adapted to hold cassette 52 in a closed position and to be opened in response to movement of the buttons toward the rear of the cassette, i.e., upwardly, as shown in FIG. 3.

As a means for imparting rotation to rolls 12 and 14, apparatus 10 is provided with a spring-powered motor indicated generally by reference numeral 66. Motor 66 is of conventional construction and includes one or more spring elements adapted to store energy by being moved to a tensioned position and retained therein. Upon actuation the retaining means are moved so that the springs may return to the untensioned position, thereby releasing the stored energy. Appropriate gear or pulley means may be provided to transfer the energy released from the spring means to one or more output shafts of the spring motor, thus releasing the energy in the form of torque or rotational force of the output shafts.

According to the present invention, connecting means are provided between movable member 36 and spring motor 66 to effect movement of the springs of the motor to a tensioned position in response to movement of member 36 from the upper (FIG. 2) position to the lower (FIG. 3) position thereof. Pulley 68 is rotatably mounted on a fixed shaft extending horizontally outward from an upper portion of guide means 34. Belt 70 passes over pulley 68 and is attached at one end to end portion 40 of member 36, and at the other end to the winding or tensioning means for spring motor 66. Belt 70 may be in the form of a metallic spring element, a chain which engages a sprocket in the motor, or any other convenient form.

Spring motor 66 is provided with a conventional mechanism such as a clutch, ratchet and pawl, etc., so that the spring means within the motor continue to wind in response to movement of belt 70 as long as the mechanism is engaged. Shaft 72 is connected to the mechanism which permits winding of the motor when engaged and prevents winding when disengaged, and wheel 74 is mounted on the end of this shaft. As seen most clearly in FIG. 6, crank arm 76 is pivotally mounted on pin 78 and includes end portion 80 adapted to engage step 82 on wheel 74. Appropriate spring means 84 are provided for biasing crank 76 in a clockwise direction as seen in FIG. 6, i.e., into engagement with step 82. Contact member 42, associated with movable member 36, is positioned for engagement with crank 76 when member 36 approaches the lower limit of its movement. As member 36 continues to move downward after contact of member 42 with crank 76, the latter is rotated in a counterclockwise direction, whereby end portion 80 is removed from engagement with step 82. This allows wheel 74 to turn in a counterclockwise direction, thus disengaging the aforementioned mechanism and preventing further winding or tensioning of the spring means of motor 66. In other words, the transmission of energy from belt 70 into the motor is cut off when the said mechanism is actuated by rotation of wheel 74.

An additional wheel 86 is also mounted on the end of shaft 88 extending from motor 66. Shaft 88 is connected in known manner with the means for releasing the springs from the tensioned position, thereby releasing the energy stored therein. Crank arm 90 is pivotally mounted on pin 92 and includes end portion 94 biased, by spring 96, toward engagement with step 98 on wheel 86. Arm 100 is pivotally mounted on arm 102, and the latter is pivotally mounted by means of pin 104 on the side of the housing of spring motor 66. Contact member 44, associated with movable member 36, is arranged to contact arm 102 when member 36 approaches the lower limit of its movement. Additional movement of member 36 after contact member 44 has engaged arm 102 will produce rotational move-

ment of the latter in a clockwise direction. Appropriate stop means (not shown) are provided on arm **102** to prevent counterclockwise rotation with respect thereto of arm **100**, whereby the latter contacts and rotates crank arm **90** in a counterclockwise direction, out of engagement with step **98** on wheel **86**. Thus, wheel **86** is allowed to rotate in a counterclockwise direction, actuating the mechanism which retains spring motor **66** in the tensioned position, allowing energy to be released from the motor and transmitted to the output shaft thereof.

It may be seen that further movement of contact member **44** beyond the position shown in FIG. 6 will cause arm **100** to override the end of crank arm **90** with which it is in contact thereby allowing spring **96** to effect clockwise rotation of crank arm **90** so that end portion **94** thereof will engage the periphery of wheel **86**. Therefore, after one rotation of wheel **86**, step **98** thereon will again contact end portion **94** of crank arm **90** and restrain further rotation of wheel **86**. The spring motor is so constructed that the required amount of energy has been removed therefrom after one rotation of wheel **86**, whereby engagement of end portion **94** with step **98** acts as a stop for the unwinding of the motor at the proper time.

Thus, the sequence of operations in movement of movable member **36**, with cassette **52** positioned thereon, from the upper to the lower position is as follows: cassette **52** is positioned between guide blocks **54** and **56** with the leading edge thereof in contact with member **36** and the leading portion of the film unit extending through opening **38** (FIG. 2); member **36** and cassette **52** are moved downwardly, pulling belt **70** over pulley **68**, thereby moving spring motor **66** to the tensioned position; fingers **62** and **64** make contact with buttons **58** and **60** to effect upward movement thereof with respect to cassette **52** as the latter continues to move downward (FIG. 3); contact member **42** engages crank arm **76** and moves the latter out of engagement with wheel **74**, thus preventing further winding of spring motor **66** (FIG. 4); contact member **44** engages arm **102**, resulting in movement of crank arm **90** to disengage wheel **86**, thus releasing the means retaining the spring motor in the tensioned position and allowing the latter to release the energy stored therein (FIG. 5). When member **36** is moved from the lower back to the upper position thereof, contact members **42** and **44** are removed from engagement with crank arm **76** and arm **102**, respectively. Spring **84** then urges crank arm **76** back into engaging relation with wheel **74** and other appropriate spring means cause counterclockwise rotation, as seen in FIG. 6, of arm **102**. Although stop means are provided to prevent counterclockwise rotation of arm **100** with respect to arm **102**, as previously noted, arm **100** may rotate in a clockwise direction with respect to arm **102** as the latter is rotated counterclockwise, thereby allowing the end of arm **100** to ride past the end of crank arm **90** and again be positioned for engagement therewith to effect the previously described rotation when member **36** is again moved to its lower position.

Spring motor **66** is provided with output shaft **106**, a fragment of which is shown in FIG. 7, having gear **108** mounted on an end portion thereof. Shaft **106** is connected to the motor in known manner to rotate in the desired direction as energy is released from the motor, as previously described. Appropriate rotational speed governing means, such as a conventional centrifugal governor may be provided to maintain the rotational output of shaft **106** substantially constant throughout the operation of the motor. Gear **110** is connected to the spindle or other mounting means of roll **12** and endless belt **112** passes around both gears **108** and **110**. The inner surface of belt **112** is provided with a plurality of evenly spaced lugs **114** which engage the teeth on both gears **108** and **110** to transmit rotation from the former to the latter. In this manner, rotation is imparted from spring motor **66** to roll **12** as the energy of the motor is released.

As previously mentioned, roll **14** is rotatably mounted

on arm **20**, which is pivotally mounted on fixed pin **22**, and on a similarly mounted arm at the opposite end of the roll. Spring **116** is shown as anchored to a portion of the frame as diagrammatically indicated at **118**, and is compressed between the frame and end portion **120** of arm **20** to urge the latter toward rotation in such a direction that roll **14** is pressed into engagement with roll **12**. If desired, additional means, such as disclosed in copending application Ser. No. 471,314, filed July 12, 1965, may be provided to vary the pressure urging roll **14** into engagement with roll **12**, and for moving the rolls out of contacting engagement, at various points in the advancement of a film unit therebetween.

Turning now to FIG. 8, there is shown a portion of the apparatus at the opposite end of pressure rolls **12** and **14** from spring motor **66**. The elements of a mechanical timer are contained within a suitable enclosure attached to the frame, and indicated generally by the reference numeral **122**. The structural details of timer **122** are not shown, since any of a number of commercially available timers, of the type adapted to be wound or tensioned and to unwind in a timed manner, may be used. The timer associated with apparatus **10** is intended to establish a time period, indicated by appropriate physically observable means such as a bell or buzzer, indicative of a predetermined processing period of the film unit advanced through the apparatus.

Pulley **124** is mounted on bracket **126** extending from frame portion **30**. Belt **128**, similar in construction and function to belt **70**, is attached at one end to end portion **130** of movable member **36** and at the other end to the winding mechanism of timer **122**. Thus, it may be seen that movement of movable member **36** from the upper to the lower position serves to wind timer **122** in the same manner as spring motor **66**. This is easily accomplished since the constructional details of conventional timers and spring motors are in many ways similar. Timer **122** may be of the type which begins unwinding automatically when a given tensioned position is reached, or additional actuating means (not shown) may be provided to release the timer to begin the timing operation in response to arrival of movable member **36** at its lower position, completion of advancement of the film unit through the pressure rolls, or other appropriate means, synchronized in some way with the processing or imbibition period of the film unit.

In FIGS. 9 and 10 is shown a preferred embodiment of a light-tight imbibition chamber wherein the film unit is contained subsequent to advancement through the pressure rolls until the processing operation is complete. The chamber, indicated generally by the reference numeral **132**, is arranged below rolls **12** and **14** so that film unit **134** is advanced from the rolls into the chamber. As best seen in the side sectional view of FIG. 10, chamber **132** includes a pair of wall members **136** and **138**, closed at the bottom and along each side, having adjacent, parallel, lower portions arranged at an angle to the vertical. In this way a plurality of film units such as that indicated at **134** may be accommodated within chamber **132** since the angle of the walls tends to stack the units along one side of the chamber, thereby allowing additional film units to advance into the chamber without interference from one or more units already contained therein.

Hinge means **140** are provided for pivotally moving chamber **132** with respect to the remainder of apparatus **10** to expose an open, upper end of the chamber for removal of the film units. In the position shown in solid lines in FIG. 10, the upper end of chamber **132** is positioned below rolls **12** and **14** in light-tight engagement with roll housing portion **141** of apparatus **10** wherein it is retained by latch means **142**. Chamber **132** is shown in dotted lines rotated to the open position to allow removal of the film units at the expiration of the processing period.

From the foregoing description it may be seen that the processing apparatus of the present invention is completely

self-contained and requires no external power source, being supplied with energy solely through the necessary operations of inserting the film unit therein. Drive means for an imbibition timer may be charged in the same manner, and at the same time, as the means for imparting rotation to the pressure rolls. Actuation for such drive means is also provided by movement of a portion of the apparatus which transports the film unit, or holding means therefor, into the processing apparatus.

Since certain changes may be made in the above apparatus without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Processing apparatus for a self-developing film unit held in a cassette and adapted to be withdrawn from a leading edge thereof, said apparatus comprising, in combination:
   (a) a pair of juxtaposed, rotatably mounted pressure rolls;
   (b) a movable member;
   (c) mounting means constraining said member for movement toward and away from said rolls;
   (d) positioning means for holding said cassette on said member with said leading edge directed toward said rolls;
   (e) mechanically wound motor means; and
   (f) means connecting said movable member to said motor means to transmit movement of said member toward said rolls to said motor means to effect winding movement thereof.

2. The invention according to claim 1 wherein said motor means is adapted to unwind in a timed manner and provide a physically observable signal at the termination of a predetermined time period.

3. The invention according to claim 1 wherein said motor means includes an output shaft rotatable in response to actuation of said motor and means for imparting rotation thereof to said rolls.

4. The invention according to claim 3 and further including contact means on said movable member positioned for engagement with actuating means for said motor, whereby the latter is actuated in response to movement of said member to the limit of its travel toward said rolls.

5. Processing apparatus for a film assembly of the self-developing type adapted to be processed by advancement through a pair of pressure-applying members, said apparatus comprising, in combination:
   (a) a pair of rotatably mounted, juxtaposed pressure rolls;
   (b) drive means adapted to store a supply of energy and to transmit said energy, upon actation, to said rolls for imparting rotation thereto;
   (c) movable means mounted for movement between a first position, substantially spaced from said rolls, and a second position, in proximity to said rolls;
   (d) connecting means between said movable means and said drive means for supplying said energy to said drive means in response to movement of said movable means from said first to said second position; and
   (e) actuating means operable in response to movement of said movable means to said second position to actuate said drive means, thereby allowing the latter to transmit said energy to said rolls.

6. The invention according to claim 5 wherein said drive means includes at least one spring member movable to a tensioned position, thereby storing said energy, in response to movement of said movable means from said first to said second position.

7. The invention according to claim 6 wherein said drive means includes retaining means for holding said spring member in said tensioned position and said actuating means comprises a member positioned in the path of movement of a portion of said movable means for contact with and movement of said member by said portion as said movable means approaches the limit of its movement to said second position, movement of said member by said portion being effective to release said retaining means.

8. Processing apparatus for a film assembly of the self-developing type adapted to be processed by advancement through a pair of pressure-applying members to effect spreading of a liquid processing composition between a pair of superposed, liquid-confining layers of said film assembly and allowing said layers to remain in superposition for a predetermined processing period, said apparatus comprising, in combination:
   (a) a pair of juxtaposed, pressure-applying members adapted to apply a compressive force to said film assembly as the latter is advanced therebetween;
   (b) a mechanical timer;
   (c) movable means mounted for movement between a first position, substantially spaced from said pressure-applying members, and a second position in proximity to said members;
   (d) said movable means being so arranged with respect to said pressure-applying members that, in order to position said film assembly for advancement through said members, said movable means must be moved from said first to said second position; and
   (e) connecting means between said movable means and said timer for transmitting movement of said movable means to said second position to the winding mechanism of said timer, thereby effecting winding movement of said timer in response to movement of said movable means from said first to said second position.

9. The invention according to claim 8 wherein said pressure-applying members comprise a pair of rotatably mounted pressure rolls.

10. The invention according to claim 9 wherein said connecting means comprises a flexible member connected at one end to said movable means and at the other end to said timer.

11. The invention according to claim 10 wherein said timer means is adapted to unwind in a timed manner to indicate a predetermined processing period for said film assembly.

12. Processing apparatus for a film unit of the self-developing type adapted to be processed by advancement through a pair of pressure-applying members, said apparatus comprising, in combination:
   (a) a pair of juxtaposed, rotatably mounted pressure rolls;
   (b) movable carriage means;
   (c) mounting means constraining said carriage for reciprocal movement between a first position, substantially spaced from said rolls, and a second position, in proximity to said rolls;
   (d) mechanically wound motor means;
   (e) means for transmitting rotation from an output shaft of said motor to said rolls;
   (f) a flexible member connected at one end to said carriage and at the other end to the winding mechanism of said motor;
   (g) pulley means over which said flexible member passes, between the ends thereof, whereby said motor is wound in response to movement of said carriage from said first to said second position;
   (h) retaining means for holding said motor in a wound condition, and movable to release said motor for rotation of said output shaft; and
   (i) contact means on said movable carriage arranged to move said retaining means to release said motor in response to movement of said carriage to said second position.

13. The invention according to claim 12 wherein said rolls are contained in a lighttight housing and said film unit is advanced through said rolls into a portion of said housing.

14. Processing apparatus for a film assembly of the self-developing type adapted to be processed by advancement through a pair of pressure-applying members to effect spreading of a liquid processing composition between a pair of superposed, liquid-confining layers of said film assembly and allowing said layers to remain in superposition for a predetermined processing period, said apparatus comprising, in combination:

(a) a pair of juxtaposed, pressure-applying members adapted to apply a compressive force to said film assembly as the latter is advanced therebetween;

(b) movable means mounted for movement between a first position, substantially spaced from said pressure-applying members, and a second position in proximity to said members;

(c) a mechanical timer;

(d) mechanically wound motor means;

(e) means for transmitting rotation from an output shaft of said motor to said rolls;

(f) said movable means being so arranged with respect to said pressure-applying members that, in order to position said film assembly for advancement through said members, said movable means must be moved from said first to said second position; and

(g) connecting means between said movable means and both said timer and said motor for transmitting movement of said movable means from said first to said second position to the welding mechanism of both said timer and said motor.

15. The invention according to claim 14 wherein said movable means comprises a carriage mounted for movement on guide members fixed with respect to said rolls.

16. The invention according to claim 15 wherein said connecting means comprises a pair of flexible members each connected at one end to said carriage and one connected at the other end to the winding mechanism of said timer and the other connected at the other end to the winding mechanism of said motor.

17. The invention according to claim 16 wherein said rolls are enclosed in a lighttight housing and said film assembly is advanced through a lighttight path, through said rolls and into a portion of said housing.

18. The invention according to claim 17 wherein said timer and motor are disposed on opposite sides of said rolls and said flexible members are connected to opposite end portions of said carriage.

References Cited

UNITED STATES PATENTS

2,689,306	9/1954	Land	95—89
3,271,571	9/1966	Klem et al.	95—89 X
3,286,092	10/1966	Sames	250—66 X

NORTON ANSHER, *Primary Examiner.*

F. L. BRAUN, *Examiner.*