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Hart et al.

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[45] **Oct. 2, 1973**

[54] **FILM PROCESSING APPARATUS**

[75] Inventors: **James L. Hart**, Rochester; **Peter T. Kao**, West Webster; **George T. Negus**, Penfield; **Peter E. Cumbo**, Rochester, all of N.Y.

[73] Assignee: **Eastman Kodak Company**, Rochester, N.Y.

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[21] Appl. No.: **126,979**

Related U.S. Application Data

[63] Continuation of Ser. No. 820,379, April 30, 1969, abandoned.

[52] **U.S. Cl.** ..... **95/89 R,** 198/85

[51] **Int. Cl.** **G03d 3/08,** G03d 13/00

[58] **Field of Search** ..... 95/89 R, 89 D, 94 R; 198/33 R, 85

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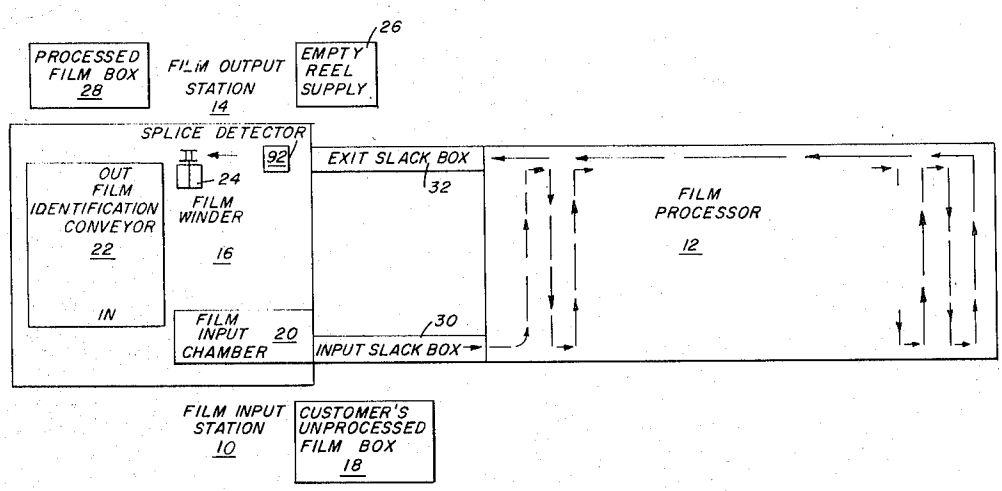
Primary Examiner—Fred L. Braun

Attorney—Robert L. Randall

[57] **ABSTRACT**

Apparatus for continuously processing film strips wherein the individual lengths of film are spliced into a substantially continuous strip which is passed through a film processor. The individual lengths of film are identified by use of a film identification conveyor that operates substantially in parallel with the film processor to convey a film identification envelope, from the input end to the output end of the processor. The film identification conveyor has a plurality of movable carriers, each arranged to accept an envelope. The conveyor presents only a single carrier at one time at the input end of the processing apparatus, and advances the carrier from the input end only after an envelope is inserted therein and the corresponding film is fed to the film processor. The carriers are advanced in synchronization with the film processor whereby a carrier and the corresponding processed film are delivered to the output end of the processor substantially simultaneously. The film processor and the identification conveyor operate in a manner which insures coordinated delivery of film on the corresponding envelope at the output end of the processor.

8 Claims, 3 Drawing Figures



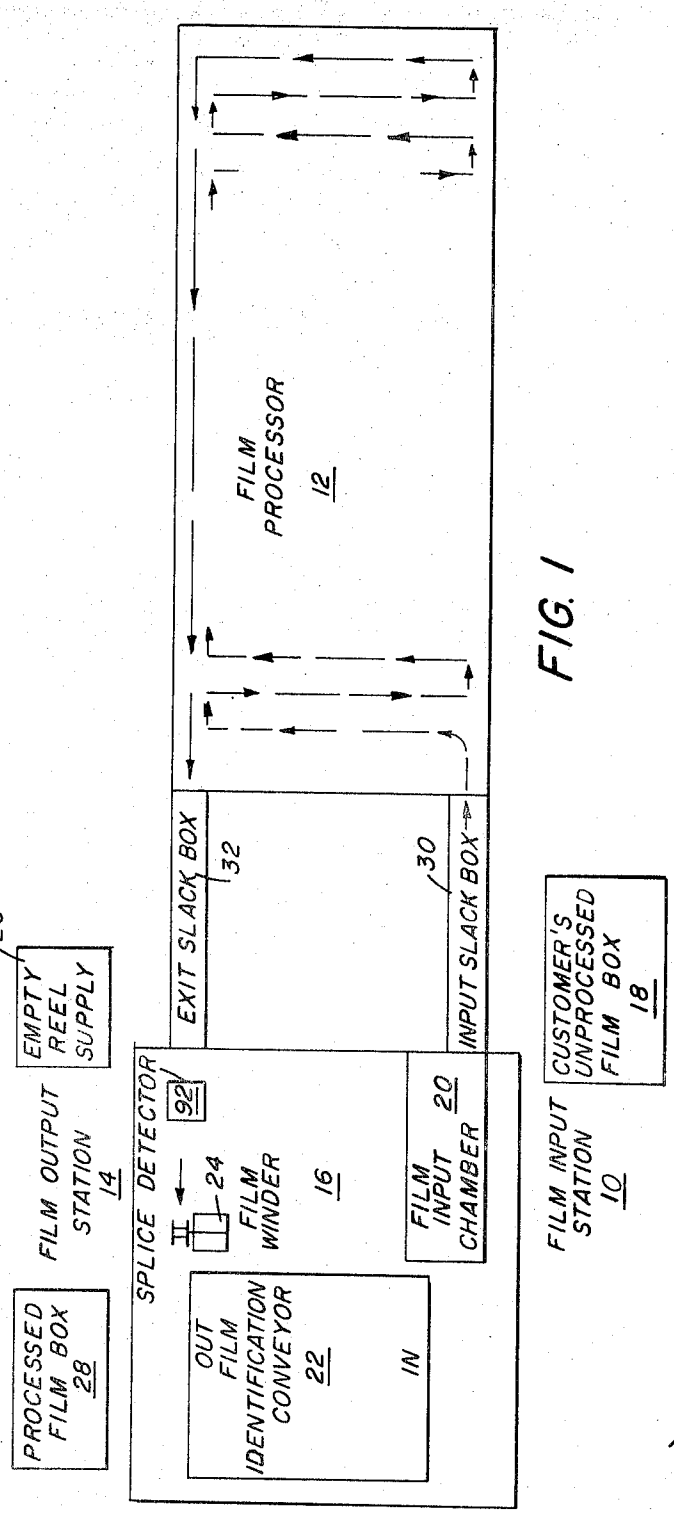


FIG. 1

JAMES L. HART
PETER T. KAO
GEORGE T. NEGUS
INVENTORS

BY Walter O. Hodsdon
Robert R. Randall
ATTORNEYS

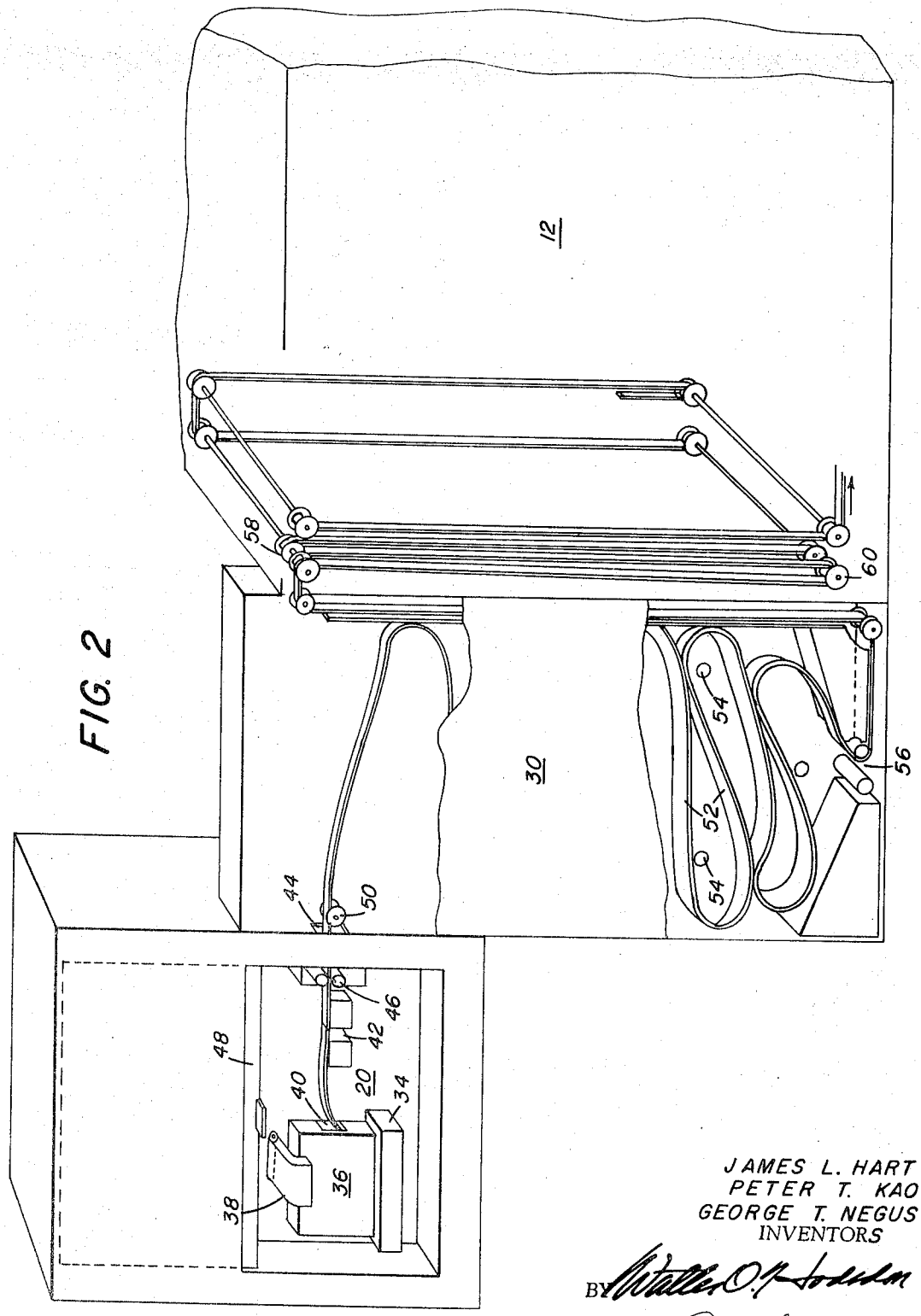


FIG. 2

JAMES L. HART
PETER T. KAO
GEORGE T. NEGUS
INVENTORS

BY Walter O. Hodsdon
Robert K. Landell
ATTORNEYS

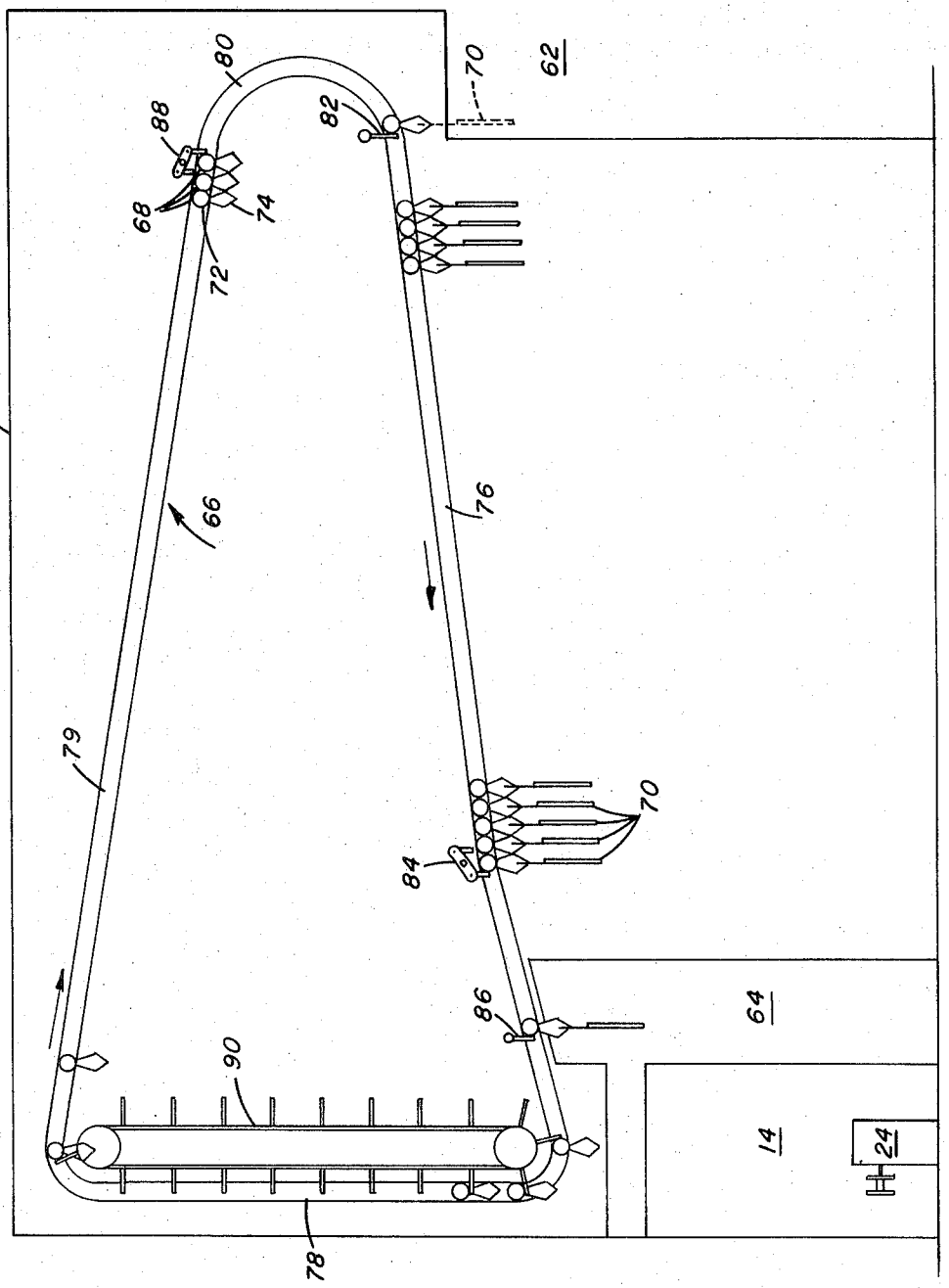


FIG. 3

JAMES L. HART
PETER T. KAO
GEORGE T. NEGUS
INVENTORS

BY Walter O. Hodsdon
Robert L. Randall
ATTORNEYS

FILM PROCESSING APPARATUS

This application is a continuation of Ser. No. 820,379, filed Apr. 4, 1969, and now abandoned.

BACKGROUND OF THE INVENTION

Commercial film processing apparatus generally utilizes a film processor and exposed film is passed in sequence through a series of operation-performing stations, including developing, fixing, washing and drying stations. Many commercial film processors operae continuously whereby the individual strips of exposed film as received from the customer are spliced into a continuous length which is the passed in a substantially continuous manner through the processor. Inasmuch as the exposed film is susceptible to fogging by light, it is necessary for the film to be handled in substantial darkness. Generally, the film arrives at the film processing plant in an identifying envelope bearing the name and address of the film owner, or other owner identification. The film, still in its light-tight container and in the customer identification envelope, is usually placed with other film of similar characteristics and is transported to a darkroom. In the darkroom, the film is removed from the customer identifying envelope and the light-tight film container is opened. One end of the strip of film is then spliced to the trailing end of the preceding strip of film and is unwound from the container onto a master roll.

Inasmuch as the film must pass through operations in which it is immersed in chemicals and liquids which would destroy the customer identification accompanying the film on its arrival at the plant, another form of identification must be applied to the film while it passes through the processor. Normally, at the time the film is spliced to the preceding strip of film, a common identification symbol is applied to both the film and the customer identification envelope. Examples of such identification markings include a perforated number in the film leader and a corresponding perforated number in the customer identification envelope or number-bearing tapes utilized for the splice between the adjacent strips of film and a correspondingly numbered tape applied to the envelope.

After a sufficient length of film has been spliced together to form a master roll, the roll is transferred to the input end of the processor. Thus, the processor is continuously supplied with film from master rolls. After the film has passed through the processor it is again wound onto a master roll which is then removed from the processor area for subsequent cutting, spooling and return to the customer. At the time the processed film is packaged for return to the customer it is necessary to rematch the identification number on the film with the same identification number on the customer identification envelope.

It will be appreciated that each of the foregoing operations, which require handling of the film and/or the customer identification envelope, introduces a possibility of damage to the film and/or error in, or loss of, the identification thereof. Also, each of the foregoing handling steps is both time consuming and expensive, requiring substantial amounts of time of an employee. Moreover, each of the foregoing steps creates a delay in the flow of the film from receipt to packaging the finished film, increasing the time required for returning the film to the owner.

It is apparent that an arrangement which permits the processing of individual articles, such as film strips, without the necessity of providing secondary identification thereto, while still assuring the proper identification of the individual articles after processing, is extremely desirable. Such an arrangement would permit increased processing rates and reduced costs by substantially reducing the handling steps necessary to properly identify the articles after processing.

SUMMARY OF THE INVENTION

Accordingly, the present invention relates to an apparatus for sequentially processing a plurality of articles, each of which is furnished to the apparatus with an article identification member. The apparatus has a plurality of article work stations including an initial station and a terminal station, and article transport means are provided for conveying a plurality of articles in an inalterable order from the initial station to the terminal station. Conveyor means has an input end adjacent the initial station and has an output end adjacent the terminal station. The conveyor means includes a carrier for each of a plurality of the article identification members, and the conveyor transfers carriers from the input end to the output end of the conveyor means in an inalterable order. Operation of the article transport means and the conveyor means is coordinated to effect delivery of a particular article at the terminal station on the article transport means when a carrier for the related article identification member reaches the output end of the conveyor means.

More specifically, the present invention provides apparatus for continuously processing successive lengths of film strips through sequential steps of removing a film strip container from a film identification container and presenting only a single film identification container carrier at the input end of the processing apparatus. The film strip container is inserted in a container holder in an open input chamber and the identification container is inserted in the presented container carrier. The leading end of the film strip is removed from the film container and is spliced to the trailing end of a preceding strip of material. The splice is inspected and the cover on the input chamber is closed, excluding all light therefrom. A film input feed is activated, feeding the film strip through a light lock into an input slack box. Simultaneously with feeding the film to the input slack box, the presence of a film identification container in the container carrier is confirmed and the carrier and the container are then advanced onto an identification conveyor. The trailing end of the film strip is sensed and the trailing end is stopped at the splicing station with only a short length of the film strip in the input chamber. The cover on the input chamber is then reopened. The film is removed from said slack box and is passed sequentially through a plurality of film processing stations and then through a static eliminator into an output slack box. Simultaneously, the identification container carrier and the container are moved on the identification conveyor from the input end of the processing apparatus to the output end of the processing apparatus with the carrier movement being synchronized with the movement of the film through the processing stations. Thus, the film and the container simultaneously arrive at the output end of the processing apparatus. The leading end of the film strip is detected at the output of the output slack box and is then

threaded onto an empty film reel. Only the corresponding container carrier and the film identification container carried thereby are presented at the output end of the processing apparatus at that time. The film strip is wound onto the reel and the trailing end of said film strip is detected and the winding is stopped. The film strip is then cut from the next succeeding film strip. The film identification container is removed from the carrier, and the wound reel is removed from the winder and is placed in the film identification container for return to the customer.

The various features of novelty which characterize the present invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and the specific objects obtained by its use, reference should be had to the accompanying drawings and descriptive matter in which a preferred embodiment of the present invention is illustrated and described.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic illustration of a preferred embodiment of the processing and handling apparatus of the present invention;

FIG. **2** is a fragmentary perspective broken away, view, partially of the film loading station slack box and film processor of the preferred embodiment illustrated in FIG. **1**; and

FIG. **3** is a view of an article identification conveyor located at the left end of FIG. **1.**

DECRIPTION OF A PREFERRED EMBODIMENT

A schematic plan view of a preferred embodiment of the apparatus comprising the present invention is illustrated in FIG. **1** and broadly comprises a film input station **10,** a film processor **12** and a film output station **14.** As illustrated, the input and output stations are disposed onn opposite sides of a counter or table **16** situated at one end of a photographic film processor **12,** at the input end and the output end, respectively, thereof. The film loading or input station **10** provides an area for an input operator and gives easy access to a film box or container **18** in which the unprocessed film is delivered in bulk to the processor. The film is preferably delivered in the film box as received from the customer, in the identification envelope, having been sorted only as to film type to minimize handling time and expense. A film input chamber **20** is conveniently disposed adjacent the input operator's station. A film identification conveyor **22** is disposed on the table **16** and is arranged with an input end at the film input station **10** and an output end at the film output station **14.** A film winder **24,** an empty film reel supply **26,** and a container **28** for processed film is disposed at the film output station **14** within easy reach of an output operator.

The film input chamber **20** is connected in a light-tight manner to an input slack box **30.** The film is supplied from the input chamber **20** to the input slack box **30** in an intermittent manner to be continuously supplied from the input slack box to the film processor **12,** the inlet of which is connected to the outlet of the input slack box. The film processor **12** comprises a plurality of processing stations through which the film is continuously passed in a manner well known in the art. For example, the processor includes a developing section, followed by fixing, bleaching, etc. stations whereby the film is completely processed. Preferably, the processor is provided with a film drier and lubricator at the outlet end thereof. The output end of the processor is connected to the input of an exit slack box **32,** whereby the finished film is continuously fed to the exit slack box for intermittent removal and packaging at the film output station **14.** While the processor may be of nearly any type presently utilized for processing film, it is ideally constructed to permit operation in daylight conditions so that all processing operations may be conducted internally of the processor without the need for additional light-proofing other than that provided by the processor itself. On the other hand, another form of film processor may be used, in which case it would be disposed within a separate, adjacent darkroom, in a manner well known in the art. Moreover, the processor incorporated in the present invention ideally utilizes a relatively short film threading path and contains a relatively small number of individual strips of film at one time. At the same time, the processing time required is preferably short so that, even through containing relatively few rolls of film at a single time, the overall production of the processor is relatively high.

Referring now to FIG. **2,** the film input chamber **20,** the input slack box **30,** and the input end of the film processor **12** are illustrated in greater detail. The apparatus illustrated is adapted to process super-**8** film and comprises a fixture **34** adapted to accept a super-**8** film cartridge **36** containing exposed film. The fixture incorporates a movable clamp member **38** to secure the cartridge in the desired orientation, with the cartridge aperture **40** to the right in the illustration. The cartridge holding fixture **34** may be constructed as illustrated, or as taught in co-pending application Ser. No. 813,526, filed Apr. 4, 1969, in the names of Sutliff and Tucker now U.S. Pat. No. 3,550,877 issued Dec. 21, 1970. Once the film cartridge is positioned in the cartridge fixture **34** and the clamp **38** has been closed over it, the cartridge normally will be held until automatically released, as will be described hereinafter. A film splicing station **42** is provided in the input chamber and is disposed adjacent a light lock inlet **44** to the input slack box **30.** A film end detector **46** is disposed in the input chamber between the splicing station and the light lock entrance to the input slack box. A vertically sliding door or cover **48,** shown in its open position, can be closed to make the input chamber light-tight.

In operation, the operator selects a customer identification envelope containing a film cartridge from the film box or container **18** and removes the film cartridge from the envelope. The cartridge is placed in the cartridge holding fixture **34** in the film input chamber **20** and the clamp **38** is closed over it. The customer identification envelope is inserted in the identification conveyor means (FIG. **3**) as will be described hereinafter. The trailer end of the film (not containing any exposed pictures) is withdrawn from the cartridge aperture **40** and is brought to the splicing station **42** where it is spliced to the end of the preceding strip of film remaining in the input chamber. The splice is visually inspected by the operator and, if satisfactory, the light tight door **48** on the film input chamber is closed and automatically latched by suitable means (not shown). This light-tight door excludes any light from the interior of the film input chamber so that the exposed film in the cartridge may be safely withdrawn from the cartridge and fed to the input slack box **30** by means of

feed drive roller **50** in the upper portion of the input slack box. As the input chamber door **48** is latched, feed drive roller **50** at the inlet of the input slack box is activated, drawing the film out of the cartridge through the light lock and into the input slack box, forming a plurality of loops **52** therein, in a manner well known in the art. The film end detector **46** in the input chamber **20** detects the end of the film as it is withdrawn from the cartridge and stops the input drive roller **50** so that the end of the film (the leader in the cartridge and containing no exposure) remains in the input chamber in proper position at the splicing station **42**. The input chamber door **48** is then automatically reopened by means (not shown) and the cartridge fixture latch **38** is released, permitting the removal of the empty cartridge so that a new film cartridge may be inserted.

The film forms a plurality of loops **52** in the input slack box **30** and is prevented from crushing the lowermost film loops by a plurality of ball members **54** which are spring biased toward the film so that they absorb a portion of the weight of the upper loops while still permitting the film to be drawn to the outlet **56** of the slack box. The film is threaded through the slack box outlet in the bottom of the slack box and up to an inlet to the film processor **12**. In the processor, the film is threaded around a plurality of upper and lower film support spools **58** and **60** to form a plurality of loops in a manner well known in the art. The film is intermittently fed into the input slack box from the input chamber, forming the plurality of loops therein, so that the film processor may be supplied with film continuously even though each cartridge supplies only a short length of film. Thus, the feed to the processor itself is continuous and not completely dependent upon the rate at which the film cartridges are emptied.

The input slack box **30** is provided with an upper film level sensor (not shown) which interlocks with the feed drive roller **50** whereby the roller will not be activated if there is not sufficient room in the slack box to accept an entire strip of film. Similarly, a low film level detector (not shown) is provided which activates an alarm signal to alert the operator to splice a leader strip to the end of the film in the film input chamber to prevent the necessity of stopping the processor transport while customer's film is still therein with the possible accompanying damage thereto.

Similarly, the exit slack box **32** is provided with a low film level sensor (not shown) which interlocks with the film winder whereby the winder **24** will not be activated if there is not enough film in the slack box to permit winding a complete roll. Furthermore, the inlet of the exit slack box is provided with a film static eliminator which removes or minimizes the static charges on the film which would cause adjacent loops of film in the exit slack box to repel each other, reducing the effective capacity of the slack box.

Referring now to FIG. **3**, conveyor **22** comprises an identification input at **62** at the film input station **10** adjacent the film input chamber **20**, and an output at **64** adjacent the film output station **14**. The conveyor generally comprises an endless track **66** adapted to guide and transport a plurality of film identification container carriers **68**. The identification carriers in the preferred embodiment each accommodate a single customer film identification envelopes **70** of the type well known in the art in which the film is sent to the processor with the customer's name and address, or other identification, written on the outside. In their simplest form, the container carriers **68** comprise a roller member **72**, or other track-following member, that can be supported and guided by the track **66**. Dependent from the roller member **72** is a spring clip portion **74** arranged to releasably grasp one end of an envelope **70**.

As illustrated in FIG. **3**, the track **66** comprises a lower portion **76** which slopes downwardly from the input end **62** to the output end **64**. Beyond output end **64**, the track is provided with a vertical portion **78** which leads to an upper, sloping portion **79** which slopes downwardly to the input end **62**. The upper sloping portion **79** is connected via a vertically curved portion **80** to the inlet end of lower portion **76** of the track. In the embodiment illustrated, the track is disposed in a housing **81** arranged to substantially enclose the track. The housing is provided with carrier openings at the inlet **62** and the outlet **64** whereby the spring clip portion **74** of the carrier is accessible to the respective operators to permit insertion or withdrawal of an envelope **70**.

The lower portion **76** of the track is provided with a single gate **82** adjacent the inlet **62**, a double gate **84** just before the outlet **64**, and a second single gate **86** just after the outlet **64**. The upper portion **79** of the track is provided with a double gate **88** just before the inlet **62**. The single gates **82** and **86** are normally closed and hold a single carrier in the carrier openings at inlet **62** and outlet **64**. The double gates **86** and **88** are arranged to permit selective passage of a single carrier while holding back the following carriers, in a manner well known in the art. The vertical portion **78** of the track is provided with an elevator means such as belt **90** which is arranged to lift carriers **68** from the end of the lower portion **76** of the track beyond outlet **64** to the upper end of the upper portion **79** of the track.

In operation, the input operator picks an envelope **70** containing a film cartridge **36** from the film box **18**. The film cartridge is removed from the envelope and is inserted in the fixture **34** in the input chamber **20**. The empty envelope **70** is inserted in the spring clip portion **74** of the empty container carrier **68** accessible at the identification input **62**. This carrier has previously been released from the upper portion **79** of track **66** by the double gate **88** and, following the curved portion **80**, was stopped and held by gate **82** in the carrier input opening. The fixture clamp **38** in the input chamber **20** is closed over the cartridge and the end of the film is withdrawn from the cartridge aperture **40** and is pulled to the splicing station **42** where it is spliced to the trailing end of the preceding strip of film. The splice is visually inspected and the light-tight door **48** is closed. If the identification envelope is present in the carrier **68** at the inlet **62** and, the door **48** is latched closed, then the feed drive roller **50** at the inlet of the input slack box is activated, feeding the film into the input slack box **30**. At the same time, gate **82** is opened permitting the carrier **68** containing the identification envelope to slide down the lower portion **76** of the track until it abuts the preceding carriers held behind double gate **84**. Gate **82** is controlled by suitable means (not shown) so that it will not release the carrier at the inlet **62** unless: (1) an identification envelope **70** is attached to such carrier; (2) a film cartridge **36** is latched in fixture **34**; and (3) the light-tight door **48** of the film input chamber is closed. Likewise, the inlet chamber door **48**

will not latch nor will the feed drive roller **50** be activated unless the three foregoing conditions are met.

The feed drive roller **50** withdraws film from the cartridge **36** through the closed, dark input chamber **20** until the film end detector **46** detects the end of the film and stops the drive roller with the end of the film at the splicing station **42.** The latch on door **48** is then released and the door automatically opens. At the same time the fixture latch **38** is released and the empty cartridge may be automatically ejected or be removed by hand. As the door **48** is opened, double gate **88** is opened, releasing an empty identification carrier which advances to the input opening **62,** ready to accept the next identification envelope.

The film is thereafter pulled from the lower end of the slack box and is fed into the processor **12,** wherein it is processed in a manner well known in the art. At the same time, the film identification carrier will be progressing towards the outlet **64.** The number of carriers **68** in the lower portion **76** corresponds to the number of strips of film in the slack boxes and the processor. Inasmuch as the apparatus is controlled so that no film can be removed from the exit slack box without the removal of the corresponding identification envelope and vice versa, and since no film or identification carriers and/or envelopes can be introduced into the system without the other, the processed film will reach the film output station at the same time the corresponding identification envelope does.

The output operator at the output station **14** picks an empty film reel from the supply **26** and places it onto the spindle of the film winder **24.** The end of the processed film at the outlet of the exit slack box is threaded onto the empty film reel and the winder is actuated. Only if the preceding envelope carrier has been emptied and passed by gate **86,** will the film winder wind the strip of film until the end of the strip is detected by a splice detector **92** at the outlet of the exit slack box **32,** stopping the film winder **24.** After the film winder is stopped by the splice detector **92,** the splice is cut and double gate **84** is actuated, advancing the carrier and identification envelope corresponding to the film just wound. The operator removes the envelope **70** from the carrier **68,** and the full reel from the winder **24,** and inserts the reel in the corresponding envelope which is then placed in the processed film box **28.** As the envelope is removed from the carrier **68,** gate **86** is opened releasing the now-empty carrier to be picked up by belt **90** and carried to the upper end of the upper portion **79** of track **66** for return to the inlet end **62** of the identification conveyor.

While the preferred embodiment of the film identification conveyor has been illustrated and described above, the identification conveyor may take many forms so long as it provides the ability to convey the film identification from the input station of the processor to the output station of the processor in an inalterable order and in an intermittent manner. Moreover, the conveyor must be provided with the necessary interlocks to assure that all of the necessary conditions are met before the film identifier is either accepted into the conveyor or is discharged at the film output station.

An alternate embodiment of a film identification conveyor includes a pair of intermittently driven belt members which are arranged to mate along a path extending from the input station to the output station and to grasp a film identifier therebetween. The belt drive is connected to an interlock system similar to that of the preferred conveyor so that the belts are not driven unless the conditions set forth above are met.

Similarly, the identification conveyor function can be accomplished by electronic memory means whereby the film identification would be introduced into the memory at the input station with the same interlock system as above. The identification is sequentially relayed toward the output station so that it is presented, either visually or in printed form, at the same time as the corresponding film is fed from the exit slack box.

In summary, the present invention provides apparatus for continuously feeding successive lengths of strips to a strip processing apparatus, e.g., a film processor, having an input end and an output end. The strips are identified by an identification conveyor including means for presenting only a single identification carrier at a time at the input end of the processing apparatus, which carrier is arranged to accept a strip identifier. A strip input chamber is provided which communicates with the input of the processing apparatus and includes means for holding a strip container therein. Means for removing a leading end of the strip from the strip container and means for splicing the leading end of the strip to the trailing end of a preceding strip of material are disposed in the input chamber. The input chamber also includes means for feeding the strip to the processor inlet. An identification conveyor transfers the identification carrier from the input end to the output end of the processing apparatus. The presence of a strip identifier in the identification carrier is confirmed simultaneously with feeding the strip to the processor inlet and for advancing the carrier and identifier are advanced along the identification conveyor. A strip trailing end sensor in the input chamber stops the trailing end of the strip at the splicing means with only a short length of the strip in the input chamber for the repetition of the foregoing steps with a subsequent strip.

The present invention provides a film processing apparatus comprising a plurality of sequential film processing stations for developing and finishing film, and a film transport for conveying the film sequentially through the film processing stations. A film identification conveyor operates substantially in parallel with the film transport to convey a film identifier, i.e., a film identification envelope, from the input end to the output end of the processing apparatus. The film identification conveyor includes a plurality of film identifier carriers, each of which accepts a single film identifier. The identification conveyor presents only a single film identifier carrier at one time to the input end of the processing apparatus, and advances the film identifier carrier from the input end only after a film identifier is inserted therein and the corresponding film is fed to the processor. The conveyor moves the carriers in synchronization with the film transport whereby the film identifier carrier and the corresponding processed and finished film are delivered to the output end of the processing apparatus substantially simultaneously. The film transport and the identification conveyor prevent the output of film without only the corresponding film identifier being at the output end of the processing apparatus.

The present invention provides a film processing apparatus which permits increased ease and economy of film handling eliminates the need for placing supplementary identification on the film and yet maintains the

correlation between the identification and the film. Moreover, ultimate film quality is improved by substantially reducing the number of times that the film is wound and unwound at the processing plant.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinabove and as defined in the appended claims.

We claim:

1. Apparatus for sequentially processing a plurality of photographic materials each of which ordinarily is furnished to the apparatus with a separate identification member and each of which ordinarily is to be returned to the same member after processing, the apparatus comprising:

means defining a plurality of photographic material processing stations including an initial station and a terminal station;

photographic material transport means for conveying a plurality of photographic materials in an inalterable order through said processing stations from said initial station to said terminal station;

identification member conveyor means having an input end adjacent said initial station and having an output end adjacent said terminal station, said conveyor means including a carrier for each of a plurality of said identification members, said conveyor means being operable to convey carriers from the input end to the output end of the conveyor means in an inalterable order; and

means coordinating operation of the transport means and said conveyor means to effect conveyance of photographic materials on the transport means and carriers on the conveyor means so that a particular photographic material is delivered at the terminal station of the transport means substantially when a carrier for the identification member, identifying the particular photographic material, is delivered at the output end of the conveyor means.

2. Apparatus for sequentially processing a plurality of strips of film each of which ordinarily is received at the apparatus in a separate envelope and each of which ordinarily is to be returned to the same envelope after processing, the apparatus comprising:

means defining a plurality of film processing stations including an initial station and a terminal station;

film transport means located between said stations for conveying strips of film sequentially through said film processing stations from the initial station to the terminal station, said transport means including drive means for advancing the film;

conveyor means for customer envelopes, said conveyor means being separate from said film transport means and being operable to convey an envelope from an input end of the conveyor means adjacent the initial station to an output end of the conveyor means adjacent the terminal station, said conveyor means including a plurality of envelope carriers each of which is adapted to carry a single envelope, each of said carriers being movable independently with respect to the other carriers, said conveyor means having means for presenting one carrier at a time to the input end of said conveyor means and for advancing a carrier from said input end after an envelope is furnished to the carrier and the corresponding strip of film is furnished to said film transport means, said conveyor means sequentially advancing said carriers in synchronization with advancement of strips of film by said film transport means so that a carrier for a particular envelope and the corresponding strip of film arrive substantially simultaneously at the output end of the conveyor means and at the terminal end of the film transport means, respectively.

3. Apparatus as set forth in claim 2 further comprising means at said initial station defining a film input chamber, said chamber defining means including a door movable between an open position and a closed position with said chamber being substantially light-tight when the door is in its closed position, film splicer means within said chamber for splicing film strips together end-to-end, and said station between said initial station and said terminal station comprising a developing station and a fixing station for developing and fixing film, and said means defining film processing stations including means for excluding light from said developing station and said fixing station.

4. Apparatus as set forth in claim 2 further comprising means at said initial station defining a film input chamber, said chamber defining means including a door movable between an open position and a closed position with said chamber being substantially light-tight when the door is in its closed position, and film splicer means within said chamber for splicing film strips together end-to-end.

5. Apparatus as set forth in claim 4 wherein each of said strips of film is furnished to the apparatus in a light-tight film cartridge, and the apparatus further comprises a cartridge holding fixture positioned within said chamber, said fixture including means for clamping a cartridge in the chamber in a position for removing the film strip from the cartridge and furnishing it to the splicer means, a film strip in a cartridge being removable from the cartridge by operation of said drive means after such film strip has been spliced to the end of the preceding film strip.

6. Apparatus as set forth in claim 2 wherein said conveyor means comprises a track having first and second elongate track portions, the first track portion extending from the input end to the output end of said conveyor means and the second track portions, the first track portion extending from the input end to the output end of said conveyor means and the second track portion extending from the output end to the input end of said conveyor means, and each of said carriers comprises (1) means for mounting the carrier on said track portions for movement therealong and (2) means for grasping an envelope.

7. Apparatus as set forth in claim 6 wherein the first and second track portions are connected together at the input end of said conveyor means, and said means for presenting one carrier at a time to the input end of said conveyor means comprises a first gate located along the first track portion and operable selectively (1) to prevent passage of a carrier from said input end of the conveyor means and (2) to permit passage of a carrier, and a second gate located along the second portion of said track and operable to permit passage of a single carrier past said second gate while preventing passage through the gate of following carriers, whereby a carrier passed by the second gate can travel along

said track to the first gate and be retained by said first gate at the input end of said conveyor means.

8. Apparatus as set forth in claim 7 further comprising a third gate located along said first track portion at the output end of said conveyor means, and a fourth gate located along said first track portion between said first gate and said third gate, said third gate being operable selectively (1) to hold a carrier at said output end of said conveyor means and (2) to permit passage of a carrier, and said fourth gate being operable to permit passage of a single carrier past said fourth gate toward said third gate while preventing passage through the fourth gate of following carriers, whereby a carrier passed by the fourth gate can travel along the first track portion to the third gate and be retained by the third gate at the output end of the conveyor means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,762,300 Dated October 2, 1973

Inventor(s) James L. Hart, Peter T. Kao, George T. Negus, Peter E. Cumbo

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 11, change "operae" to --operate--.

Column 1, line 14, change "the" to --then--.

Column 3, lines 26 and 27, delete "broken away, view, partially" and insert --view, partially broken away,--.

Column 3, line 39, delete "onn" and insert --on--.

Column 4, line 36, change "Dec. 21, 1970" to --Dec. 29, 1970--.

Column 5, line 14, after "by" insert --suitable--.

Column 5, line 59, after "62" insert --located--.

Column 10, lines 47-49, Claim 6, after "second track" delete "portions, the first track portion extending from the input end to the output end of said conveyor means and the second track".

Signed and sealed this 19th day of February 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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