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Schlagheck et al.

[11] **3,901,435**

[45] **Aug. 26, 1975**

[54] **INFORMATION CARRIER FOR USE ON EXPOSED FILMS AND FILM-CONTAINING RECEPTACLES**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 182,979, Sept. 23, 1971, Pat. No. 3,766,525.

[30] **Foreign Application Priority Data**

Sept. 25, 1970 Germany 2047236

[52] **U.S. Cl.** ..... **235/61.12 R;** 235/61.12 N

[51] **Int. Cl.** **G06k 19/00;** G06k 19/06

[58] **Field of Search** ...235/61.12 R, 61.12 N, 61.11 E; 250/555, 566

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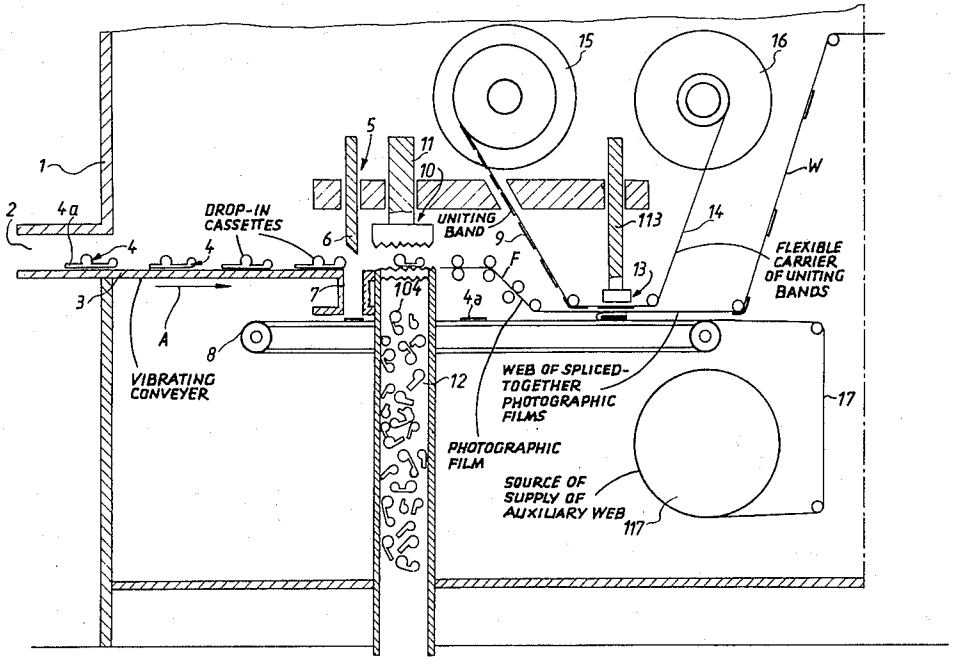
[57] **ABSTRACT**

Drop-in cassettes or analogous receptacles for exposed photographic customer films are processed one after the other in a light-tight enclosure wherein successive receptacles are opened to permit removal of reels with convoluted films thereon so that the films can be withdrawn from the reels and spliced to each other to form a continuous web which can be conveyed through a developing, printing or copying machine. Each receptacle carries a tag with information pertaining to the identity and/or other data concerning the respective customer, and such tags are separated from the receptacles prior to or during opening of receptacles and are attached to the respective films of the web by transparent and/or opaque uniting bands. The information on each tag can be read by a row of photoelectric detectors.

9 Claims, 3 Drawing Figures



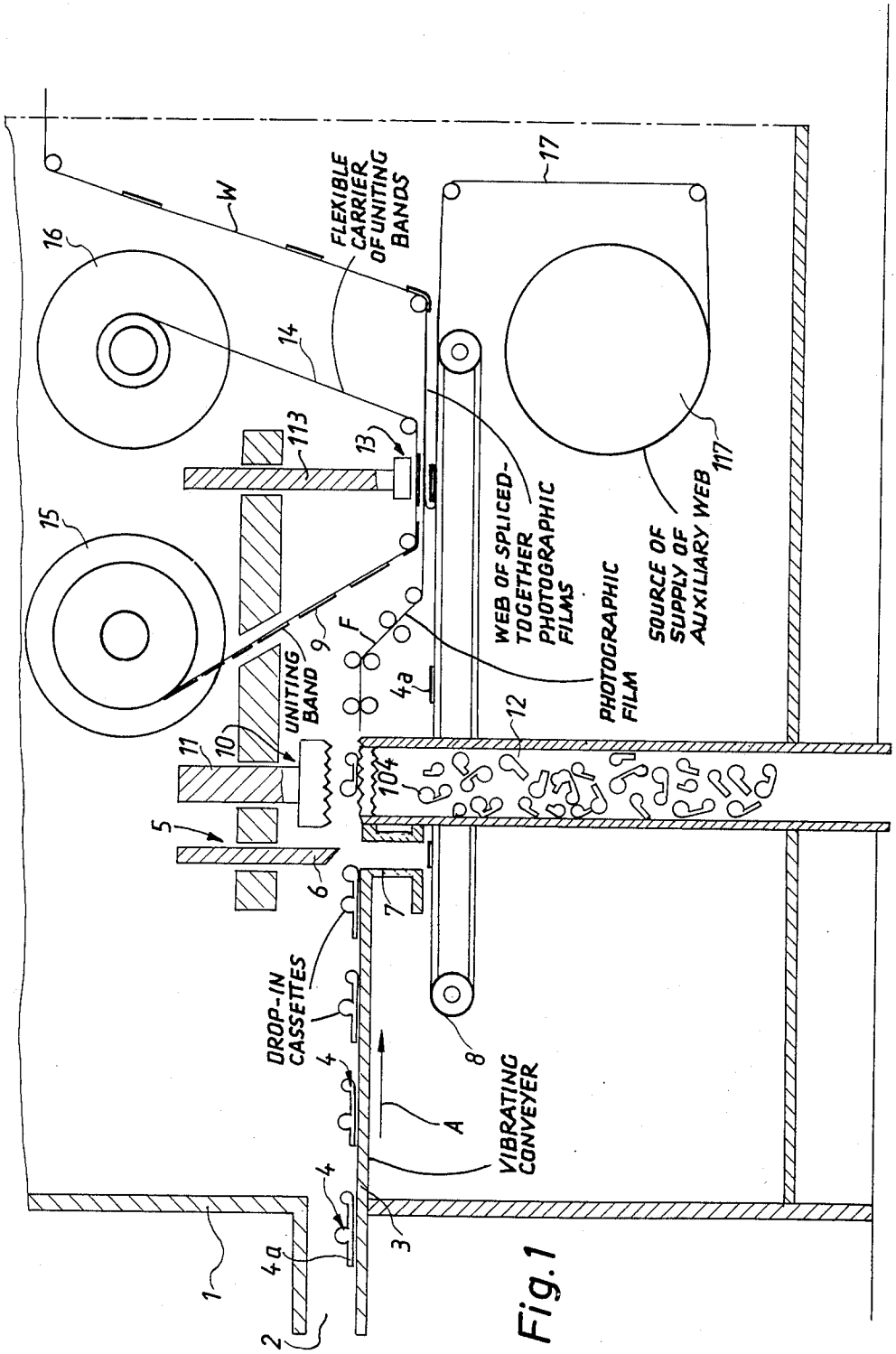
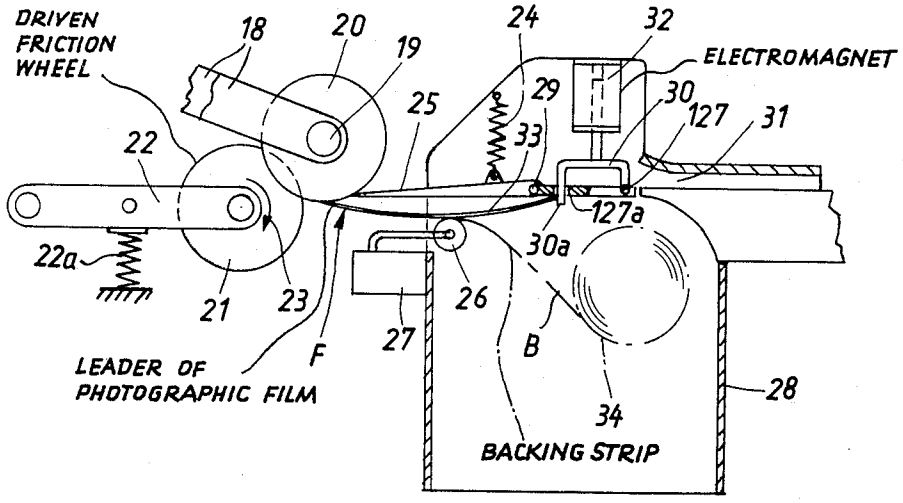

W
FLEXIBLE CARRIER OF UNITING BANDS
17
16
14
113
13
15
WEB OF SPLICED-TOGETHER PHOTOGRAPHIC FILMS
SOURCE OF SUPPLY OF AUXILIARY WEB
117
9
F
4a
PHOTOGRAPHIC FILM
UNITING BAND
12
11
10
104
5
6
7
DROP-IN CASSETTES
4
8
A
VIBRATING CONVEYER
1
2
3

Fig. 1

Fig. 2


DRIVEN FRICTION WHEEL
18
20
19
24
32
ELECTROMAGNET
29
30
127
31
25
33
22
127a
30a
22a
21
23
26
27
B
28
LEADER OF PHOTOGRAPHIC FILM
F
34
BACKING STRIP

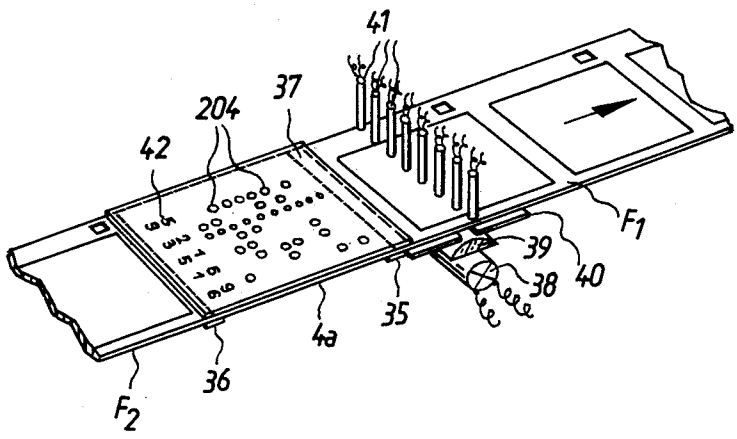


Fig.3

INFORMATION CARRIER FOR USE ON EXPOSED FILMS AND FILM-CONTAINING RECEPTACLES

CROSS-REFERENCE TO RELATED APPLICATION

This is a continuation-in-part of the commonly owned copending application Ser. No. 182,979 filed Sept. 23, 1971, now U.S. Pat. No. 3,766,525 granted Oct. 16, 1973.

BACKGROUND OF THE INVENTION

The present invention relates to treatment of cassettes, (cartridges) or analogous receptacles for exposed photographic films, especially customer films which are delivered or mailed to a processing laboratory for development and/or the making of prints. More particularly, the invention relates to improvements in preparation of a substantial number of customer films which are confined in light-tight receptacles for development and/or other treatment in a continuous developing, printing or copying machine.

Cameras employing photographic roll film which is confined in cassettes, cartridges or analogous light-tight receptacles are becoming increasingly popular with amateur photographers. Such cameras can be readily loaded simply by inserting a fresh receptacle into the camera body, and the receptacles with exposed but undeveloped film can be delivered or mailed to a processing laboratory without necessitating any rewinding or similar manipulations of the exposed film. Many presently popular receptacles for roll film comprise a substantially U-shaped casing having two enlarged portions one of which contains a supply reel and the other of which contains a takeup reel, and a flat median portion having a window which allows incoming scene light to impinge upon successive frames of that portion of the film which extends between the supply and takeup reels. In many instances, the film is convoluted with and moves lengthwise with a backing strip consisting of paper or the like.

Economical development and copying of films can be achieved by connecting a substantial number of exposed films end-to-end so as to form an elongated web which is transported through a developing machine and, if necessary, through a copying or printing machine. It is already known to employ in a photographic processing laboratory a complete production line which is utilized to effect rapid development of customer films, the making of prints from developed films, and the insertion of films and prints into customer envelopes. Such automatic operation is practical and economical only if the films are united (end-to-end) to form a continuous web. Heretofore known methods and apparatus for uniting customer films end-to-end have failed to gain widespread acceptance, either because of the complexity of equipment and/or because of frequent malfunctioning, particularly as concerns false labelling of films and introduction of developed films and prints into wrong envelopes.

SUMMARY OF THE INVENTION

An object of the invention is to provide a novel method of manipulating the information which is associated with each receptacle for exposed customer film to identify the customer, to record the customer's address and/or account number, to record the number of prints desired, and/or to furnish other data.

Another object of the invention is to provide a novel and improved method of identifying the films which form a continuous web by data containing the information which identifies the customer and/or pertains to other facts facilitating proper manipulation of films and/or prints which are obtained by copying the images of film frames.

A further object of the invention is to provide novel means for insuring that each of a series of films which form a continuous web is properly identified prior to its introduction into a developing, printing, copying or like machine.

Another object of the invention is to provide a film processing apparatus wherein each film of the web is automatically identified by a carrier of information containing data which facilitate proper classification of developed films and/or prints which are obtained from such films.

In accordance with a feature of the invention, the carrier of information may be in the form of a tag or the like which is attachable to and separable from receptacles for confined exposed photographic roll films. The width of such information carriers preferably equals or closely approximates the width of the respective films, and the information on such carriers can be in the form of photoelectrically readable data. Each information carrier can be provided with a light-transmitting adhesive-coated uniting band which can serve to attach the information carrier to two neighboring films and is applied over the respective data in such a way that the data can be detected by an automatic reader through the uniting band.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved information carrier itself, however, both as to its construction and the mode of manipulating the same, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of certain specific embodiments with reference to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a schematic longitudinal vertical sectional view of an apparatus which can manipulate the improved information carriers;

FIG. 2 is an enlarged view of certain details at the receptacle-opening station of the apparatus shown in FIG. 1; and

FIG. 3 is a perspective view of an information carrier and an automatic reader of data on the carrier.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 1, there is shown an apparatus which manipulates receptacles 4 in the form of so-called "drop-in" containers or cartridges which are employed in many still cameras. Each such receptacle comprises a casing 104 having two enlarged portions one of which accommodates a supply reel and the other of which accommodates a takeup reel 20 (see FIG. 2), and an intermediate portion which is provided with a window to enable scene light to reach a film frame which extends between the supply and takeup reels. Each of the receptacles 4 shown in FIG. 1 is assumed to contain exposed customer film F which is convoluted on the respective takeup reel 20. Each receptacle

4 is further connected with a separable sheet or tag 4*a* which serves as a carrier of information or data identifying the customer, the address of the customer, the number of prints desired, the account to be charged, the nature of shipment desired, and/or other information. In the illustrated embodiment, the tags 4*a* are attached directly to the casings **104** of the respective receptacles **4**, but it is equally within the purview of the invention to apply data to boxes or containers or bags for receptacles which contain exposed film. The information on the tags 4*a* can be in the form of handwriting or in the form of symbols which can be read by automatic apparatus. It is assumed that the tags 4*a* are applied by the personnel accepting receptacles **4** with exposed films from customers or by persons in charge of opening the mail. Each tag 4*a* extends beyond the respective receptacle **4** in a predetermined direction so that it can be readily separated from such receptacle and properly transported during movement toward a uniting or splicing station **13** where it is attached to the respective exposed film F.

The apparatus of FIG. **1** comprises a light-tight enclosure **1** having a suitable inlet **2** for introduction of successive receptacles **4** which are maintained in a predetermined orientation so that (in the illustrated embodiment) the tags 4a extend rearwardly. The conveyor which introduces successive receptacles **4** into the housing **1** by moving them through the inlet **2** is a vibrating trough **3** whereon the receptacles **4** advance in a direction indicated by the arrow A. The inlet **2** is properly sealed to prevent entry of actinic light into the interior of the housing **1** where the receptacles **4** are opened and the exposed films F removed so that they can be joined end-to-end to form a continuous web W which is ready for introduction into a developing machine, not shown. The conveyor **3** can receive receptacles **4** from a further conveyor, e.g., a feeder in the form of a vibrating magazine or hopper, or the receptacles **4** can be placed onto the conveyor **3** by one or more attendants.

Successive receptacles **4** which enter the housing **1** by way of the inlet **2** move past a separating device or transfer means **5** having a vertically reciprocable knife **6** which separates the tags 4*a* from the corresponding receptacles and introduces such tags into a chute **7** wherein the tags descend to reach the upper stretch of an endless data-storing conveyor belt **8** and to advance with such belt toward the splicing station **13.** The knife **6** can detach, break or cut the tags 4*a* off the casings **104** of the respective receptacles **4.** The duct **7** causes each tag 4*a* to descend therein in a predetermined orientation and the tags retain such orientation during transport by the conveyor belt **8** toward the splicing station **13.** At this station, successive films F are united end-to-end by adhesive-coated uniting bands **9** which are supplied by a further conveyor including a flexible carrier **14** having its leading and trailing ends respectively attached to the cores of two spools **16** and **15.** That portion of the carrier **14** which is convoluted onto the core of the spool **15** is provided with equidistant uniting bands **9** of predetermined size and shape, and a uniting band is removed from the carrier **14** at the splicing station **13** to connect the trailing end of a preceding film F to the leading end **33** (see FIG. **2**) of a next-following film F when such ends arrive at the station **13.** If desired, the conveyor including the flexible carrier **14** can be dispensed with; the conveyor belt **8** (or a similar conveyor for the tags 4*a*) then serves to transport to the splicing station **13** successive tags 4*a* which are separated from the casings **104** of the associated receptacles **4** by the knife **6** as well as uniting bands **9** which are used to splice the ends of films F to each other and to simultaneously secure the tags 4*a* to the respective films. The tags 4*a* are attached to the respective uniting bands **9** in a predetermined orientation which is particularly important if the information on such tags is encoded so as to be interpreted by an automatic decoding device (see FIG. **3**). As a rule, the tags 4*a* are attached to the respective films F so that two of their edges are exactly parallel with the adjoining edges of the respective uniting bands **9.** The length of each uniting band **9** is selected in such a way that the bands can properly adhere to the respective tags 4*a* and can extend beyond both ends of the thus attached tags to insure satisfactory splicing of the respective films F to each other.

The receptacles **4** which are separated from the respective data (tags 4*a*) are transported to an opening station **10** wherein the takeup reels **20** are removed from the respective casings **104** and the convoluted films F are withdrawn from the takeup reels **20** for transport along a predetermined path toward the splicing station **13.** Certain parts which are mounted at the opening station **10** are shown in detail in FIG. **2.** FIG. **1** merely shows a vertically movable ram **11** which has a serrated lower end portion and serves to crack open or to completely break the casings **104** so as to afford access to the respective takeup reels **20.** The exact manner in which the casings **104** are opened by cracking or complete breakage into two or more discrete fragments forms no part of the present invention. Many opening devices for the casings of drop-in cartridges or cassettes for photographic film are known, for example, from U.S. Pat. No. 3,580,443, and widely used in processing laboratories. It is assumed that the ram **11** cracks the casings **104** of successive receptacles **4** to such an extent that a bearing device including two arms **18** (FIG. **2**) can properly engage the ends of a takeup reel **20** so that the reel can be rotated in a direction to pay out the film F. The remaining parts of the opened receptacles **4** (namely, the casings **104** and the supply reels in such casings) are permitted to descend into a chute or duct **12** to be conveyed to a salvaging station where the usable parts can be recovered for renewed use or for use in the manufacture of fresh receptacles.

The splicing station **13** accommodates any one of many known automatic splicing devices which are capable of uniting the films F end-to-end and of simultaneously attaching the tags 4*a* to the respective films so as to insure that each film is properly identified and can be automatically introduced into an envelope bearing the address and/or name of the customer. Reference may be had to German Utility Model No. 1,954,281 which discloses a splicing device capable of being used at the station **13** of the apparatus shown in FIG. **1.** As mentioned before, the flexible carrier **14** constitutes an optional feature of the apparatus because the uniting bands **9** can be furnished by the conveyor belt **8** in such a way that successive bands **9** are connected with successive tags 4*a* before they reach (or not later than when they reach) the splicing station **13.**

FIG. **1** further shows a source of supply **117** of a convoluted auxiliary web **17** which is utilized to pass through the housing **1** and a developing or other pro-

cessing machine in the absence of films F. This insures that the leading end of a freshly introduced film which was removed from the foremost one of a substantial number of receptacles **4** can be properly threaded through the housing **1** and through the next-following processing machine or machines. The transverse dimensions of the auxiliary web **17** preferably match or approximate those of a film F. The presence of the web **17** becomes important when the feeding of receptacles **4** into the inlet **2** is interrupted for a relatively short interval of time; the auxiliary web **17** then takes the place of missing films F by being automatically attached to the trailing end of the rearmost film as well as to the leading end of the next following film which is spaced apart from the preceding film so that it cannot be directly spliced thereto. The auxiliary web **17** can be used with advantage in apparatus which supply a web W of films F to a developing or like processing apparatus of relatively small capacity.

Referring to FIG. **2**, the aforementioned bearing for takeup reels **20** which are removed from freshly opened receptacles **4** at the station **10** comprises two arms **18** having axially aligned pins **19** which can penetrate into the ends of central openings in the cores of the reels **20** to hold a thus engaged reel **20** for rotation about its axis. The manner in which the pins **19** can be introduced into and withdrawn from the openings of the cores of the reels **20** forms no part of the present invention. A driven friction wheel **21** is mounted on a lever **22** which is biased in a counterclockwise direction, as viewed in FIG. **2**, by a helical spring **22***a*. The wheel **21** is driven in the direction indicated by arrow **23** and is movable into frictional engagement with the outermost convolution of the film F on a takeup reel **20** which is held by the pins **19** of the arms **18**. Such rotation of the wheel **21** causes the reel **20** to pay out the film F whereby the leading end or leader **33** of the film exhibits a natural tendency to curl upwardly and to pass along the idler roller **26** of an electric switch **27** mounted on a chute **28** for reception of backing strips B which are separated from the films F at the opening station **10**. The means for rotating the friction wheel **21** in a direction indicated by the arrow **23** may comprise a suitable belt drive, not shown. A tongue-like deflector **25** is pivotable on a horizontal pin **29** and is biased in a clockwise direction by a helical spring **24** so that its left-hand end portion or tip normally bears against the outermost convolution of film F which is convoluted on the core of the takeup reel **20** held by the pins **19** of the arms **18**. When the reel **20** is driven by the friction wheel **21**, it rotates in a counterclockwise direction, as viewed in FIG. **2**, whereby the leader of the backing strip B and thereupon the leader **33** of the film F moves away from the core of the reel **20** and is caused to advance along a predetermined path. The roller **26** of the switch **27** is mounted below the deflector **25** at such a level that the leader of the backing strip B as well as the leader **33** of the film F is free to advance in a direction to the right by moving in the space between the roller **26** and the deflector **25**.

The deflector **25** is followed by a pivotable switching device **127** in the form of a plate which can turn about the aforementioned pivot pin **29** and is articulately connected with the armature **30** of an electromagnet **32**. The switching device **127** can seal the inlet to a channel **31** wherein the leader **33** of the film F can advance toward the splicing station **13**. An aperture **127***a* of the switching device **127** permits the passage of an extension or prong **30**a which is provided on the armature **30** and can extend to the illustrated position in which it serves as an abutment or stop for the leader **33**. The dimensions of the chute **28** below the switching device **127** are selected in such a way that this chute allows for practically unimpeded coiling of the backing strip B into a roll **34** which thereupon descends by gravity to enter the chute **12** of FIG. **1** or to be delivered to another collecting station.

When the electromagnet **32** is energized in response to downward movement of the roller **26** which thereby closes the switch **27**, the switching plate **127** is pivoted in a counterclockwise direction, as viewed in FIG. **2**, and allows the leader **33** of a film F to enter the inlet of the channel **31** for transport toward the splicing station **13** in response to rotation of the reel **20** between the arms **18** under the action of the friction wheel **21**. When the electromagnet **32** is energized, the prong **30***a* of the armature **30** is retracted into or beyond the opening **127***a* of the switching plate **127** so that this prong cannot interfere with entry of a leader **33** into the channel **31**.

The operation:

A receptacle **4** which is already provided with a data carrying tag **4***a* is deposited onto the vibrating conveyor **3** and passes through the inlet **2** of the enclosure **1** to advance toward the separating device **5**. The receptacle **4** is arrested when the tag **4***a* overlies the chute **7** and the knife **6** is thereupon caused to descend and to separate the tag **4***a* which descends onto the upper stretch of the data-storing conveyor belt **8**. The speeds of successive films F, successive adhesive-coated uniting bands **9** and successive tags **4***a* are synchronized in such a way that a tag **4***a* which advances along the path defined by the upper stretch of the conveyor belt **8** reaches the splicing station **13** at the exact moment when, or even before, a uniting band **9** is ready to be attached to the associated film F. It is immaterial whether the tag **4***a* reaches the station **13** simultaneously or substantially simultaneously with the leader or with the trailing end of the respective film F.

The receptacle **4** from which the tag **4***a* has been removed by the knife **6** advances into the range of the ram **11** which performs a downward stroke and cracks or destroys the respective casing **104** to such an extent that the takeup reel **20** can be withdrawn and engaged by the arms **18** of the bearing whereby the pins **19** enter the respective ends of the central opening in the core of the reel **20**. The casing **104** descends in the duct **12**. The reel **20** which is held by the pins **19** of the arms **18** supports a supply of convoluted film F and a supply of convoluted backing strip B whereby the leader of the backing strip B normally extends forwardly beyond the leader **33** of the film F. Thus, as the outermost convolution of the strip B is engaged by the driven friction wheel **21** which rotates in the direction indicated by arrow **23** and is biased against the outermost convolution of the strip B by the spring **22***a*, the leader of the backing strip B advances along the underside of the deflector **25** and above the roller **26** without, however, depressing the roller **26**, i.e., without actuating the switch **27**. The front edge portion of the leader of the backing strip B reaches the abutment **30***a* of the armature **30** and is caused to flex downwardly against the wheel **26**. The stiffness of the backing strip B is normally negligible so that the leader of this strip is incapa-

ble of displacing the roller **26** downwardly and away from the deflector **25**. The backing strip B normally consists of relatively thin and readily flexible paper sheet stock. The leader of the strip B is curved in such a way that its concave side faces upwardly and, as the friction wheel **21** continues to feed successive increments of the strip B into the upper end of the chute **28**, the weight of the thus introduced material suffices to cause the gradually growing roll **34** of paper to descend by gravity so that the strip B is spaced from the abutment **30***a*.

The leader **33** of the film F on the reel **20** which is held by the pins **19** of the arms **18** can be engaged and deflected by the tip of the spring-biased deflector **25** after the chute **28** accumulates a certain length of convoluted backing strip B. The thus deflected leader **33** also advances through the space between the underside of the deflector **25** and the roller **26**, and its front edge face moves against the abutment **30***a*. The stiffness of the leader **33** normally greatly exceeds the stiffness of the backing strip B so that the loop which is formed by the leader **33** in response to engagement with the abutment **30***a* and in response to further rotation of the reel **20** in a direction to pay out the film F causes the looped leader **33** to depress the roller **26** whereby the switch **27** automatically completes the circuit of the electromagnet **32**. The latter is energized and moves the armature **30** upwardly whereby the switching plate **127** moves in a counterclockwise direction and the abutment **30***a* is retracted into or is lifted upwardly and beyond the aperture **127***a* so that the leader **33** automatically finds its way into the channel **31** and advances toward the splicing station **31** in response to further unwinding of film F by the rotating friction wheel **21**. The circuit of the electromagnet **32** preferably comprises a holding contact (not shown) which remains closed and thus prevents deenergization of the electromagnet **32** as long as the reel **20** is held by the arms **18**. In other words, the switching plate **127** allows the film F to enter the channel **31** as long as such film is being paid out by the respective takeup reel **20**.

When the electromagnet **32** is energized, the switching plate **127** is preferably arrested by the armature **30** in such angular position that its underside automatically guides the leader **33** into the channel **31**. It will be noted that, in FIG. **2**, the leader **33** exhibits the tendency to curl upwardly so that its front edge face abuts against the underside of the switching plate **127** during travel toward the inlet of the channel **31**. The roll **34** of convoluted backing strip B cannot interfere with such lengthwise movement of the leader **33** and/or the remaining portion of the film F because the weight of the roll **34** increases in response to continued rotation of the reel **20** between the arms **18** and the growing roll **34** descends further away from the path for the film F below the deflector **25** and switching plate **127**.

The drive for the friction wheel **21** is arrested in automatic response to entry of the leader **33** into the splicing station **13**. The means for effecting such stoppage of the drive for the friction wheel **21** may comprise a photoelectric detector or the like, not shown. The splicing operation is carried out in response to downward movement of a splicing member **113** which is reciprocable at the station **13** and serves to attach the foremost uniting band **9** to the adjoining leading and trailing ends of two films F as well as to a tag **4***a* which thereby adheres to the leading or trailing end of the respective film. The unwinding of film F from the reel **20** between the arms **18** at the opening station **10** is continued upon completion of the splicing operation at the station **13**. When the film F is completely detached from the core of the takeup reel **20** between the arms **18**, the backing strip B is also detached and the roll **34** of such backing strip descends in the chute **28**. The empty takeup reel **20** is then separated from the pins **19** of the arms **18** and is allowed or caused to enter the duct **12**. The arms **18** then move to receiving positions in which they are ready to accept and to hold the takeup reel **20** which was removed from the casing **104** of the next-following receptacle **4**.

It is clear that the mechanical detector (roller **26**) for the flexibility of films F and backing strips B can be replaced by other types of detectors which can discriminate between other characteristics of a paper strip and a photographic film. For example, the detector including the roller **26** and switch **27** can be replaced by a photoelectric detector which can discriminate between the smoothness, opacity, reflectivity, conductivity and/or other characteristics of the strip B and film F. All that counts is to energize the electromagnet **32** or analogous means for moving the switching plate **127** from the illustrated arresting position when the leader **33** of a film F is ready to enter the channel **31** in order to advance toward the splicing station **13**.

The auxiliary web **17** is employed when necessary as a substitute for one or more films F. The leader of the auxiliary web **17** is held ready at the splicing station **13** and is attached to the trailing end of the last film F of a series if such film is not immediately followed by a further film. The auxiliary web **17** is being withdrawn from the roll **117** until a new film F enters the splicing station **13** on its way from the opening station **10** or when the last film F of the preceding series has moved through and beyond the developing machine which receives the web W. The apparatus is then automatically arrested and the auxiliary web **17** extends from the splicing station **13** into the developing machine so that it can entrain the leader of the first film F of the next series of films when the apparatus is started again.

If the information on the tags **4***a* is of such nature that it can be read and evaluated by automatic photoelectric or other scanning devices, the tags **4***a* are preferably overlapped by the respective uniting bands **9** in such way that the uniting bands protect the information against the action of chemicals in the developing machine. Such photoelectrically readable information is preferably in the form of dark or white symbols which can be readily distinguished from the less opaque or darker surroundings on the web W. The width of the tags **4***a* and uniting bands **9** preferably equals or approximates the width of the films F.

The structure which is shown in FIG. **2** can be used in many other types of apparatus wherein the leaders of convoluted films must be deflected and thereupon guided along a predetermined path toward a splicing station. For example, such devices can be used in connection with film wherein the information pertaining to customers, exposure factors and/or others is exposed directly onto the photosensitive material of a film. Also, such information can be punched into each film or into the uniting bands **9** so that the tags **4***a* need not first be separated or diverted from the associated receptacles and thereupon attached to the respective films. The opening station **10** may accommodate an au-

tomatic reader which reads the information on tags 4*a* or on containers for receptacles 4 and furnishes the thus detected information to a signal storing device. The latter stores such information until the leading or trailing end of the respective film is removed from the corresponding takeup reel **20.** The information is then permanently encoded in the leading or trailing end of the respective film, such as by resorting to a puncher or perforator or to a device which exposes the information on an unexposed portion of the respective film. Furthermore, the information which is stored in such storing device can be transferred onto uniting bands which are thereupon attached to the respective films.

If the information pertaining to customers is stored on or in boxes, bags or analogous containers for the receptacles **4,** the information can be detached or severed from the containers not later than at the opening station **10** and transported by the conveyor **8** to the splicing station **13** for application to the leading or trailing ends of the respective films. As mentioned before, the information on containers for the receptacles 4 can also be read at the station **10,** stored in a suitable storing device, and encoded on the leading or trailing portions of the respective films at the splicing station **13** or upstream of the splicing station. The information which is retrieved from the containers can be encoded in the uniting bands **9** prior to attachment of such bands to the respective films.

An advantage of the feature that the data pertaining to customers are attached to the web W between successive films F is that such data do not interfere with the development of exposed film frames and/or with the making of prints, as well as that the necessary information is immediately at hand when the processing of films is completed. Such information will normally contain the name and/or address of the customer, the account of the customer and/or the correction factors for proper exposure of prints.

FIG. 3 illustrates a splice between a preceding film F_1 and the next-following film F_2. A tag 4a is coplanar with the films F_1, F_2 and is attached to these films by preferably opaque adhesive-coated strips **35, 36.** A fully transparent adhesive foil **37** overlies the entire tag 4*a* and preferably also the adjacent portions of the films F_1 and F_2 all the way to the foremost frame of film F_2 and to the rearmost frame of film F_1. The foil **37** is used when the tag 4*a* consists of ordinary paper whose strength decreases substantially during transport through one or more liquid baths. The reduction in strength may be due to wetting and/or to the action of chemicals in the bath or baths. Moreover, the foil **37** protects the information which is applied to the tag 4*a*. By using a foil **37,** it is possible to make the tag 4*a* of inexpensive fibrous material whose tensile strength is low and which would be likely to tear or to disintegrate during transport through a developing machine. The foil **37** corresponds to one of the uniting bands **9.**

If the tag 4*a* consists of a synthetic plastic material which is resistant to the action of chemicals in the developing machine, the foil **37** can be dispensed with. Such plastic tag is preferably black and the information is imprinted onto one of its sides.

The adhesive-coated strips **35, 36** can be omitted if the foil **37** is strong enough to properly connect the tag 4*a* to the films F_1 and F_2, especially if the foil **37** overlies relatively large portions of the trailing end of the film F_1 and of the leader of the film F_2.

The information on the tag 4*a* of FIG. 3 is evaluated in the copying machine or at the locus where the prints made from films F_1 and F_2 are assembled with the respective films for shipment to a dealer or directly to a customer. As a rule, the films are coiled or subdivided into sections of predetermined length (each such section normally consists of six frames) and are placed into a first compartment of a container or envelope another compartment of which receives the prints.

The apparatus for reading the information on a tag 4*a* comprises an elongated light source **38** at one side of the path for successive films and tags, a cylindrical lens **39** in front of the light source **38,** a diaphragm **40** which defines a slot-shaped aperture in front of the lens **39,** and a row of photosensitive receivers **41** at the other side of the path in line with the aperture of the diaphragm **40.** The number of receivers **41** equals the maximum number of perforations **204** in the tag 4*a*, as considered transversely of the films F_1 and F_2. Each receiver **41** scans a strip-shaped portion of the tag 4*a* and produces a signal in response to detection of a perforation **204** in the respective strip-shaped portion. The signals are evaluated by a suitable decoding circuit which thereby determines the numeral represented by the perforations in the corresponding strip-shaped portion of the tag 4*a*. The numerals are preferably imprinted on the trailing portion of the tag 4*a*, as at **42.**

The numerals **42** on the tag 4*a* represent the following information:

As a rule, cartridges **4** with exposed films F therein are delivered or mailed by customers to a dealer or agent who forwards them to a processing laboratory. The laboratory develops the films and makes prints therefrom and thereupon ships the films and prints to the dealer for mailing to customers (or to be picked up by customers at the dealer's shop). Each dealer is identified at the laboratory by a code number which enables the laboratory to return the film and prints to the proper party as well as to charge the account of the respective dealer. One of the numerals **42** on the tag 4*a* of FIG. **3** is assumed to represent the code number of the dealer who delivered or sent in the film F_1 or F_2. This one numeral is scanned to enable the laboratory to send the developed film F_1 or F_2 and the corresponding prints to the dealer having the respective code number and to charge the account of the dealer for development of film and making of prints.

Another numeral **42** on the tag 4*a* of FIG. **3** represents the order number, i.e., that number which an order receives when the exposed film is delivered or mailed to the dealer by a customer. The order number enables the dealer to rapidly locate the film and prints when the customer calls therefor or when the dealer wishes to ship the developed film and the prints to the customer. The order number is of no particular importance to the processing laboratory; however, it can be used to facilitate locating a misplaced order in the processing laboratory. This will be readily appreciated by bearing in mind that the tags 4*a* are furnished to dealers by the processing laboratory and that a dealer normally receives a series of tags having imprinted or otherwise applied serial numbers. Thus, and since the laboratory normally maintains records of the serial numbers of tags 4*a* which were sent to a particular dealer, a tag 4*a* bearing a particular serial number can be readily associated with the appropriate dealer if such tag (together

with the corresponding film and prints) becomes misplaced in the laboratory.

The code number and the order number constitute a minimum of information which is recorded on a tag 4*a*. No other information is absolutely necessary if a given number of prints (e.g., one print) is to be made from each and every satisfactory frame of a film and if the size of each print is the same. Additional numerals 42 are necessary if the number of prints varies from film to film and/or if the size of prints varies from order to order.

While it is not absolutely necessary that the width of a tag 4*a* equal or closely approximate the width of a film F, such dimensioning of tags is advantageous and desirable for a number of reasons. Thus, the tag can store more data if its width equals that of a film, and the tag is less likely to be destroyed and/or distorted as a result of tensioning during lengthwise transport of films through a developing machine.

The width of the tag 4*a* could but preferably should not exceed the width of films because the guide means in the developing machine is designed to engage the longitudinal edge faces of films and a tag whose width exceeds the width of films would interfere with transport of a web W through the developing machine.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without features which fairly constitute essential characteristics of the generic and specific aspects of our contribution to the art and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the claims.

what is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. The combination of an information carrier for attachment to and separation from a receptacle for a confined exposed first photographic roll film having a predetermined width and for attachment to the neighboring ends of said first film and another photographic roll film upon removal of said first film from its receptacle, said information carrier having a width at least approximating said predetermined width and the information on said carrier being in the form of photoelectrically detectable data; and an adhesive band applied to said carrier so that the band overlies said data, said band consisting of light-transmitting material so that said data can be detected through said band.

2. The combination as defined in claim **1**, wherein the receptacle to which said information carrier is attachable is a cartridge for roll film.

3. The combination as defined in claim **1**, wherein the receptacle to which said information carrier is attachable is a container for a film-containing cartridge.

4. The combination as defined in claim **1**, wherein the information is in the form of perforations.

5. The combination as defined in claim **1**, wherein said information includes encoded and unencoded data.

6. The combination as defined in claim **1**, wherein said information is provided on or in an opaque background.

7. The combination of claim **1**, wherein said information includes data pertaining to a dealer and/or owner of said first photographic roll film, the number of prints to be made from said first film, the account to be charged and/or the nature of shipment desired.

8. The combination as defined in claim **1** wherein said band extends beyond said carrier.

9. The combination as defined in claim **8**, wherein the band is a plastic foil.

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