

[54] APPARATUS FOR STORING
PHOTOGRAPHIC FILMS AND PRINTS

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[58] Field of Search 53/59 R, 23, 123, 53/119, 184; 83/272, 650

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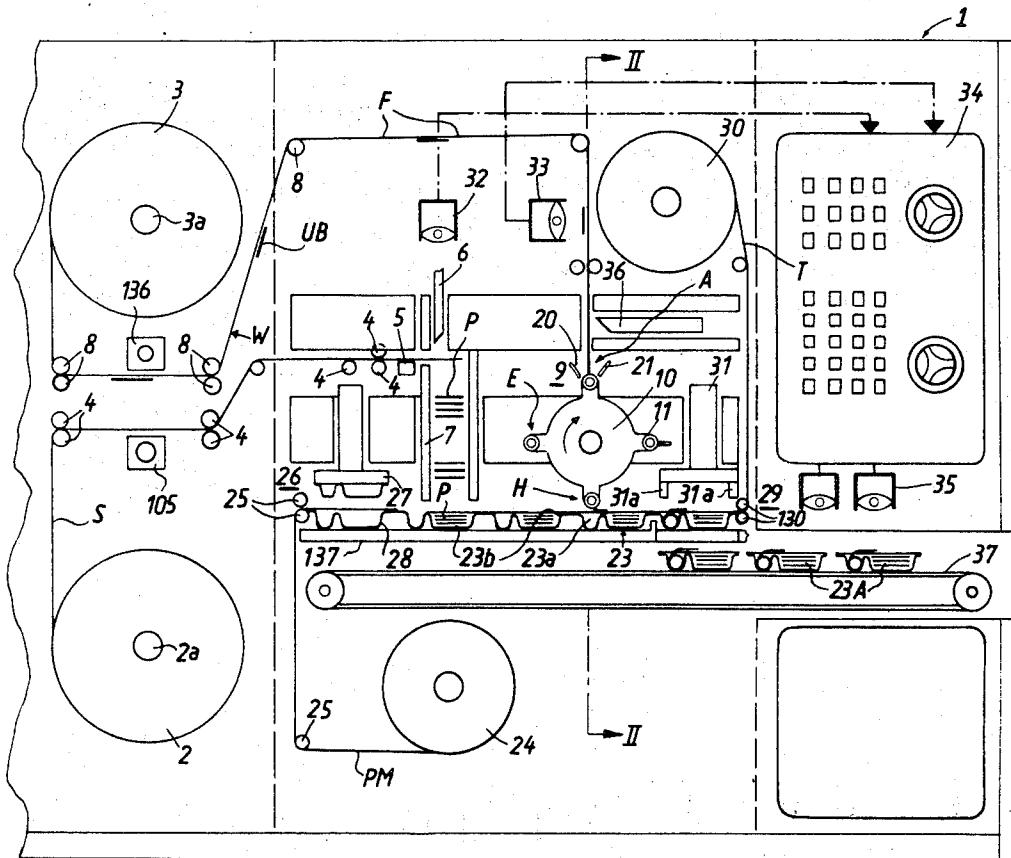
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[57] ABSTRACT

Apparatus for introducing exposed and developed customer films and prints which are reproduced from such films into discrete customer containers employs two transporting devices which advance a web of interconnected films and a strip of prints along separate paths, a first severing device which severs the web to separate therefrom successive films or sections of successive films, a second severing device which subdivides the strip into discrete prints, a container forming device which furnishes containers having first and second compartments to respectively receive films and corresponding prints, a computer which prepares customer invoices on the basis of information furnished by detectors positioned adjacent to the first and second paths and to the path for filled containers and applies shipping labels to filled containers, and a sealing device which covers the open sides of filled containers with foils of transparent synthetic plastic material.

19 Claims, 3 Drawing Figures

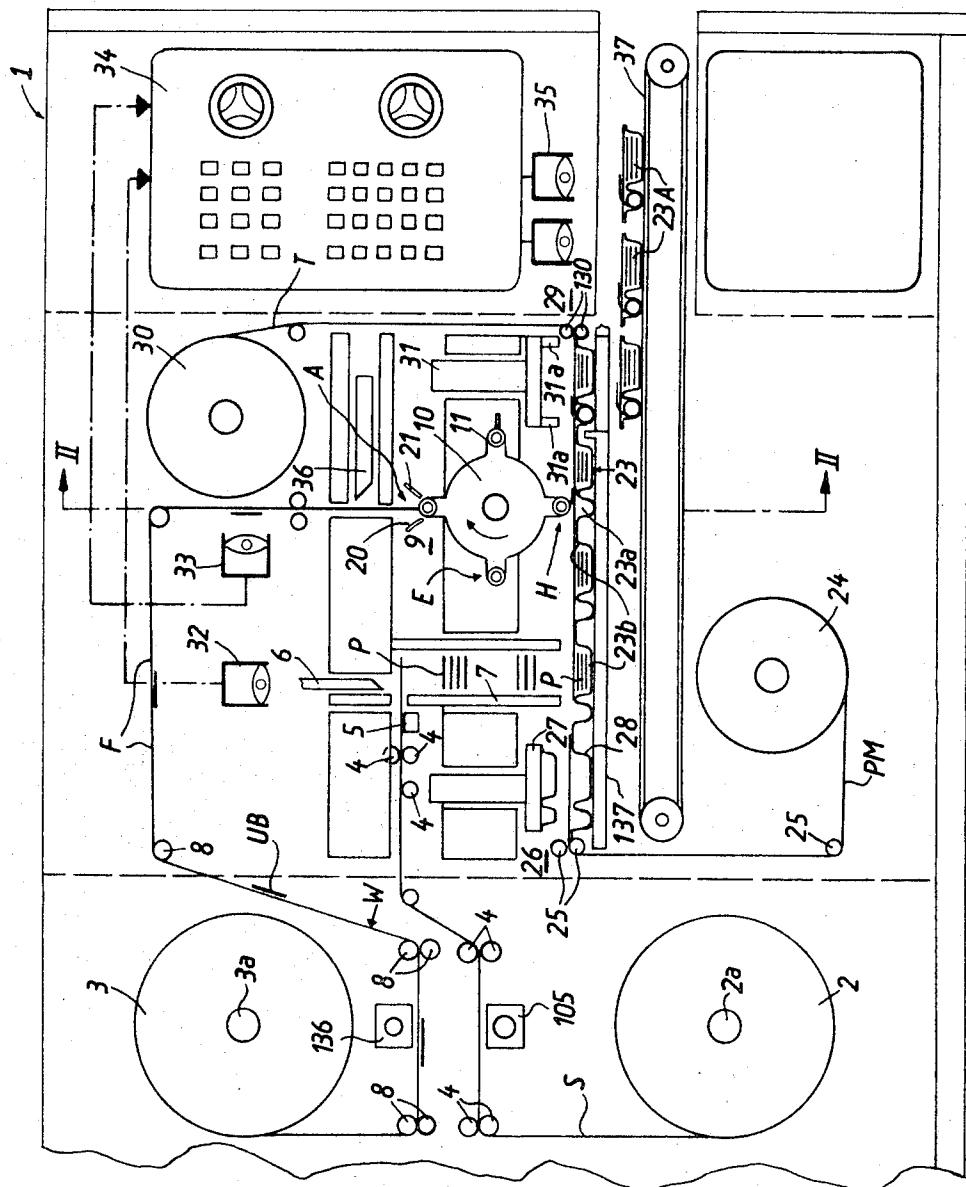


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2 Sheets-Sheet 1

Fig. 1

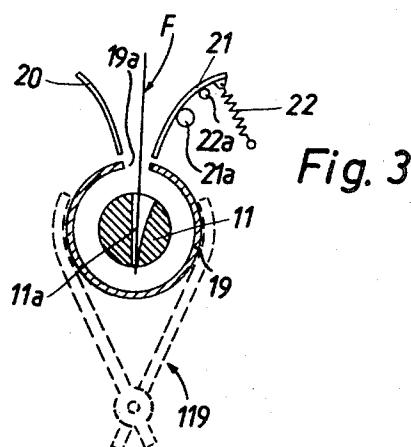
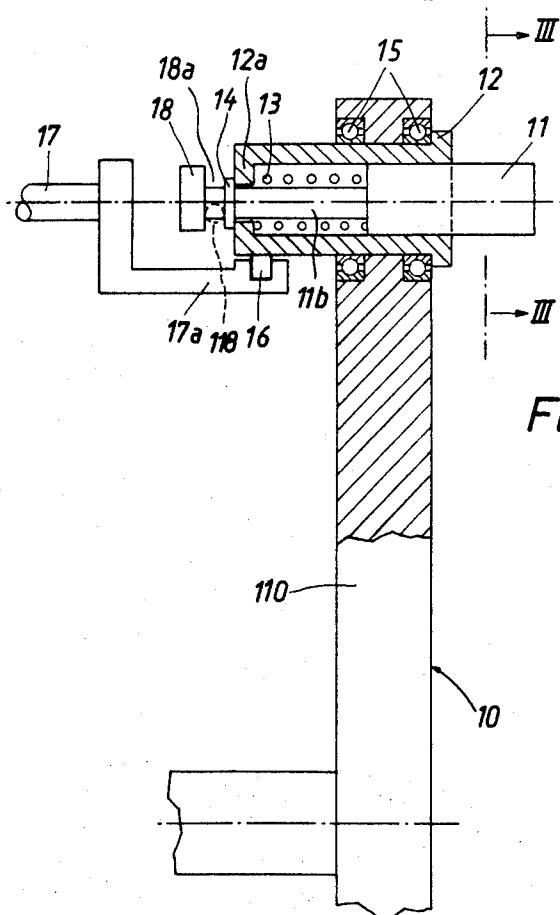


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APPARATUS FOR STORING PHOTOGRAPHIC FILMS AND PRINTS

BACKGROUND OF THE INVENTION

The present invention relates to apparatus for packing or storing photographic films and prints which are obtained from such films. More particularly, the invention relates to apparatus for simultaneous storage of exposed and developed photographic customer films which are processed in the form of a continuous web wherein successive films are spliced to each other end-to-end, and photographic prints which are made from the films and also form a continuous web or strip.

At the present time, exposed photographic films are subdivided into sections of desired length and are inserted into customer envelopes together with the corresponding prints. Such insertion of films and corresponding prints into envelopes is carried out exclusively by hand which contributes significantly to the cost of the packing or storing operation. Moreover, the information pertaining to customers must be stored and processed independently of the films and prints in order to insure that each customer is billed for the development, printing and mailing.

SUMMARY OF THE INVENTION

An object of the invention is to provide an automatic apparatus for introduction of prints and corresponding exposed and developed photographic films into containers which are ready for shipment to customers.

Another object of the invention is to provide a film and print storing or packing apparatus which can be directly coupled with an automatic printing or copying machine serving to make prints from exposed and developed photographic customer films.

A further object of the invention is to provide a packing or storing apparatus wherein the containers for films and corresponding prints can be produced at the same rate at which the apparatus processes the films and corresponding prints.

An object of the invention is to provide a novel method of storing films and corresponding prints in containers in such a way that the information which is stored on films can be read or decoded subsequent to introduction of films into containers.

Still another object of the invention is to provide a storing or packing apparatus wherein the films can be stored with or without subdivision, in flat or convoluted condition, and with minimal space requirements.

A further object of the invention is to provide the apparatus with novel means for automatically computing the information pertaining to customer films and prints and for automatically labelling the containers and printing invoices for the customers.

The apparatus of the present invention is used for storage or packing (in first and second compartments of containers) exposed and developed photographic films which form a web of interconnected films and prints which are reproduced from such films and form a continuous strip of interconnected prints. The apparatus comprises first and second advancing means for respectively transporting a web of interconnected films and a strip of interconnected prints along first and second predetermined paths, first severing means adjacent to the first path for subdividing the web of interconnected films into discrete films (whereby the discrete films may but need not be subdivided into sections of

desired length), inserting means for introducing successively severed films into the first compartments of successive containers, second severing means adjacent to the second path and arranged to subdivide the strip into shorter sections each of which preferably constitutes a discrete print, and second inserting means for introducing the thus obtained shorter sections of the strip into the second compartments of containers for the respective films.

In accordance with a more specific feature of the invention, the first inserting means may comprise winding means which convolutes successive films of the web into rolls which are thereupon introduced into the first compartments of successive containers. The insertion of films into the first compartments may but need not precede the introduction of corresponding prints into the second compartments of the respective containers.

The apparatus preferably further comprises a source of sheet-like synthetic plastic material and a deep-drawing device or other suitable molding means for converting successive lengths of such plastic material into empty containers each of which has a first compartment for a film and a second compartment for the corresponding prints.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved apparatus itself, however, both as to its construction and its mode of operation, 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 diagrammatic side elevational view of a packing or storing apparatus which embodies the invention;

FIG. 2 is an enlarged fragmentary transverse vertical sectional view as seen in the direction of arrows from the line II-II of FIG. 1; and

FIG. 3 is a sectional view as seen in the direction of arrows from the line III-III of FIG. 2, further showing an empty tube which is ready to receive a roll of exposed and developed customer film.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 1, there is shown an apparatus which is utilized for introduction of exposed and developed photographic films F into first pockets or compartments 23a and for introduction of corresponding prints P into second compartments or pockets 23b of synthetic plastic customer containers 23. The apparatus comprises a housing or frame 1 which supports two horizontal shafts 2a, 3a which may but need not be driven by suitable drive means, not shown. The shaft 2a supports a roll 2 of convoluted strip S which consists of a row of prints of images on the frames of associated photographic films F. A continuous web W of such films forms a roll 3 which is stored on the shaft 3a. The web W is formed by splicing the films F end-to-end prior to introduction into a developing machine (not shown) and thereupon into a printing or copying machine (not shown) wherein the images of film frames are reproduced on the strip S. If desired, the shafts 2a, 3a can be omitted and the web W as well as the strip S can be fed into the packing or storing apparatus di-

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rectly from the associated printing or copying machine. The web W and the strip S are fed in such a way that the films F and the corresponding prints P are transported in synchronism through the respective stations of the illustrated apparatus to thus insure that each container 23 receives not only a full length of film F but also all of the corresponding prints P.

The advancing means for transporting the strip S stepwise along a first predetermined path comprises several transporting or advancing rolls 4 which are preferably positioned in such a way that the leader of a freshly introduced roll 2 can be automatically threaded into the first path and is ready to be severed at regular intervals to yield a succession of prints P. The drive for one or more advancing rolls 4 is controlled by a photoelectric or other suitable detector 5 which is adjacent to the path for the strip S and scans the customary information which is encoded on the strip S at the same intervals as the prints P. The detector 5 can scan information which is exposed on the strip S, which is imprinted onto the rear side of the strip by a graphite wheel or the like, or which is punched into the strip S in the printing or copying machine.

A severing device which serves to form discrete prints P and cooperates with an inserting device which introduces such prints into the compartments 23b of successive containers 23 includes a knife or cutter 6 arranged to perform a working stroke during each interval between successive forward movements of the strip S to separate successive prints P at the leading end of the strip. The introducing or inserting device for the prints P comprises a chute or duct 7 wherein the prints P remain in a predetermined orientation and descend by gravity to enter the registering compartment 23b of the corresponding container 23 which is supported on a platform 137 below the lower or discharge end of the chute 7. Each compartment 23b is designed to accommodate a stack containing a predetermined number of prints P, for example, 12 or 20 or 36 prints.

The web W is transported and guided by advancing rolls 8 so as to travel along a second predetermined path and past a second severing device including a reciprocable knife or cutter 36 which, in the embodiment of FIG. 1, is designed to sever the web W at such intervals that it separates therefrom successive films F of full length. The thus severed films F are thereupon coiled or convoluted by a winding device 9 which forms part of a second inserting device serving to introduce successively convoluted films F into the compartments or pockets 23a of those containers 23 whose compartments 23b already accommodate the corresponding prints P.

The winding device 9 is shown in FIG. 1 and in greater detail in FIGS. 2 and 3. This device comprises a star-shaped four-armed carriage 10 which can be indexed at predetermined intervals by a Geneva movement or the like (not shown) and each arm 110 of which carries at its outer end an axially movable mandrel 11. The mandrels 11 are mounted in sleeves 12 which are rotatable in antifriction bearings 15 provided therefor in the respective arms 110. Each mandrel 11 can move axially but cannot rotate with reference to the respective sleeve 12. A helical spring 13 reacts against each sleeve 12 and serves to bias the respective mandrel 11 outwardly, namely, in a direction to the right, as viewed in FIG. 2. The illustrated spring 13 reacts against a transverse bottom wall 12a of the sleeve

12 and surrounds a shank or stem 11b which forms part of the mandrel 11 and extends through and beyond the bottom wall 12a. When the spring 13 is free to expand, a collar 14 on the stem 11b abuts against the outer side of the bottom wall 12a as shown in FIG. 2. A radially outwardly extending torque-transmitting projection or pin 16 is provided on the sleeve 12 in the region of the bottom wall 12a. The means for rotating the sleeve 12 with the mandrel 11 comprises a drive shaft 17 which is coaxial with the sleeve 12 of FIG. 2 and has an eccentric driving arm 17a which can engage the torque-transmitting pin 16. The shaft 17 is coaxial with that sleeve 12 which dwells at the film receiving station A shown in FIG. 1. The stem 11b of the mandrel 11 is further provided with a flange 18 which forms with the collar 14 an annular groove 18a for reception of a shifter 118 serving to move the mandrel 11 axially against the opposition of the spring 13. The shifter 118 can displace the mandrel 11 to such an extent that its right-hand end face (as viewed in FIG. 2) is either flush with the right-hand end face of the sleeve 12 or that the mandrel is withdrawn beyond the open end of the sleeve.

FIG. 3 shows that the mandrel 11 is provided with a substantially wedge-like diametrically extending slot 11a for reception of the leader of a film F. The mandrel 11 assumes the angular position of FIG. 3 when the respective arm 110 of the carriage 10 dwells at the film receiving station A. The mandrel 11 is then in extended position and is surrounded with clearance by a preferably plastic slotted tube 19 which is delivered to the station A by a suitable holding mechanism 119. As shown, the tube 19 is held in such position that its axially parallel slot 19a registers with the slot 11a of the mandrel 11 and with a tapering passage defined by two arcuate baffles 20, 21 which are mounted in the frame 1 at the film receiving station A. The baffles 20, 21 may consist of sheet metal and have convex film guiding surfaces which insure that the leader of a film F finds its way into the slots 19a and 11a so that the film can be convoluted onto the mandrel 11 within the confines of the tube 19 when the respective sleeve 12 is rotated by the drive shaft 17. The baffle 20 is fixed to and the baffle 21 is pivotable on the frame 1 about the axis of a pin 21a. A helical spring 22 normally maintains the baffle 21 in abutment with a fixed stop 22a.

The aforementioned knife 36 of the severing device for the web W is mounted in the frame 1 upstream of the film receiving station A. This knife is controlled by a detector 136 which is adjacent to the path defined by the advancing rolls 8 and scans the web W for the presence of adhesive-coated uniting bands UB which are used to splice the films F of the web W end-to-end. The cutting action of the knife 36 is preferably timed in such a way that the customary data pertaining to the customer who owns the respective film F are separated from the web W together with the corresponding film. Such data may be imprinted onto, exposed onto or punched into the film F and may contain information relating to the name of the customer, his address, his account or order number, the number of copies desired, and/or others. Thus, when the knife 36 performs a working stroke to sever the foremost film F from the web W, such film is separated together with the just discussed data. As a rule, such data will be applied to or held on the films F by the uniting bands UB. The detector 136 also actuates the motor or transmission (not

shown) which rotates the shaft 17 at the film receiving station A; the arrangement is preferably such that the detector 136 or the severing device including the knife 36 arrests the drive shaft 17 at the exact moment or shortly before the entire film F, with the exception of the customer data at its trailing end, is confined in the respective tube 19. Thus, the data will extend from the tube 19 so as to be readable during a further stage of processing.

The illustrated carriage 10 of the winding device 9 has four equidistant arms 110 each of which carries a discrete sleeve 12 and a mandrel 11. As mentioned before, the carriage 10 can be indexed by a Geneva mechanism in such a way that it turns through angles of 90° so as to place successive mandrels 11 into register with the drive shaft 17 at the film receiving station A. The indexing takes place upon completed convolution of a film F onto the mandrel 11 so that the trailing end of the film, with customer data thereon, extends outwardly beyond the slot 19a of the corresponding tube 19. Such indexing always results in the placing of a mandrel 11, sleeve 12 and tube 19 (with a convoluted film F therein) into a discharging position above the platform 137 so that the film F with the tube 19 can be introduced into the adjacent compartment 23a of the container 23 whose compartment 23b already contains the corresponding prints P. As shown in FIG. 1, the mandrel 11 on the lowermost (vertically downwardly extending) arm 110 of the carriage 10 is located at a level slightly above the corresponding compartment 23a.

In accordance with a feature of the invention, the containers 23 are formed directly in the packing or storing apparatus. To this end, the frame 1 supports a source 24 of weldable convoluted synthetic plastic sheet material which is being paid out in stepwise fashion, always by lengths which are necessary for the formation of a container 23. The sheet PM of plastic material is guided and advanced by rolls 25 and is moved into the range of a deep-drawing or molding device 26 which is installed above the left-hand end of the platform 137 and has a vertically movable heated ram 27 which descends at predetermined intervals and cooperates with a suitable matrix 28 to convert the adjacent portion of the sheet PM into a container 23. The matrix 28 can cooperate with a suction generating device (not shown) to insure the formation of accurately defined containers 23 of reproducible shape. As mentioned above, each container 23 has a compartment or pocket 23a for reception of a convoluted film F (in the corresponding tube 19) and a preferably rectangular compartment or pocket 23b for reception of a stack of prints P, namely, of the prints reproduced from that film F which is to be inserted into the adjacent compartment 23a. The exact configuration of the compartments 23a, 23b in successively formed containers 23 can be determined by the shape of the ram 27 and/or matrix 28. If desired (and as shown in FIG. 1), successively formed containers 23 can adhere to each other during travel along the upper side of the platform 137 toward and past a transfer station H between the containers 23 and the carriage 10 of the winding device 9. A suitable tongs or the like (not shown) can be provided in the apparatus of FIG. 1 to advance the chain of interconnected containers 23 in stepwise fashion and to place the connection between the two foremost containers 23 into register with a suitable knife which sev-

ers the foremost container from the next-following container. It is clear that the apparatus of FIG. 1 can be readily modified in such a way that the introduction of rolled films F into the compartments 23a of successive containers 23 will take place prior to introduction of corresponding prints P into the respective compartments 23b.

A container 23 which is already filled with a coiled film F and with a stack of prints P is then caused to advance into the range of a sealing or closing device 29 which is installed to the right of the platform 137 and serves to apply to the open upper sides of successive containers 23 covers or lids preferably consisting of a foil of transparent synthetic plastic material which allows for observation of the contents of the containers. The foil T is stored in convoluted form as a roll 30 and is advanced and guided by rolls 130 so as to move its leader into the space between the foremost filled container 23 and a welding electrode 31 located to the right of the station H. This electrode 31 descends at predetermined intervals to weld the adjacent portion of the foil T to the marginal portions of the registering container 23. Two knives 31a of the electrode 31 can serve to sever the freshly formed covers or lids from the remainder of the foil T as well as to sever the foremost filled and sealed container 23A from the next-following container.

The paths for the web W and strips S are scanned by mechanical counters, photoelectric counters or otherwise constructed detectors (see the detectors 32, 33 which respectively scan the paths for the strip S and web W) which are operatively connected with and transmit signals to an evaluating device here shown as a computer 34. The computer 34 is further connected with preferably photoelectric detector means 35 which can read customer data through the lids of filled and closed containers 23A on an endless conveyor belt 37 shown as extending along the underside of the computer 34. As mentioned before, the films F are coiled in the respective tubes 19 in such a way that the customer data extend outwardly and beyond the respective slots 19a. The conveyor belt 37 extends at a level below the platform 137; the latter can be omitted if the upper stretch of the belt 37 is used to receive successive containers 23 which are formed by the ram 27 and matrix 28 of the molding device 26.

It will be seen that the computer 34 receives information from detectors 32, 33 which scan the prints P and films F as well as from the tags carrying customer data on the films F in the compartments 23a of successively sealed containers 23 (detector 35). The computer 34 serves for automatic printing of invoices for the customers and/or for making mailing labels for attachment to the containers 23A on or downstream of the conveyor belt 37.

If desired, the winding device 9 of the inserting means for films F can be replaced with a modified severing device which can replace the knife 36 and serves to subdivide each film F into strips of desired length, preferably not exceeding 180 millimeters. For example, each strip can carry two, three, four, five or six film frames. The thus obtained strips can be fed into successive compartments 23a by resorting to a device similar to the chute 7. The strips of film may but need not be rolled up prior to introduction into the compartments 23a, depending on the desired dimensions of the containers 23.

The operation:

The shafts 2a and 3a respectively carry a roll 2 of strip S and a roll 3 of web W whereby the rolls are convoluted in such a way that the prints P reproduced from the foremost film F of the web W are located at the front end of the strip S. The apparatus is ready for automatic operation as soon as the leaders of the web W and strip S are respectively advanced to the corresponding severing stations (knives 36 and 6). The compartment 23b of an empty container 23 is assumed to be located below the chute 7 of the inserting device for the prints P; such container 23 was produced by the molding device 26 in response to descent of the heated ram 27 and resulting deformation of the sheet PM in the matrix 28. The rolls 4 advance the strip S in step-wise fashion and the knife 6 severs the strip S at intervals determined by the detector 5 which scans the aforementioned information indicating successive prints on the strip. The freshly severed prints P descend in the chute 7 in such a way that they are properly stacked in the compartment 23b. The severing of strip S by the knife 6 is interrupted when a further detector 105 (which may but need not be similar to or identical with the detector 5) produces a signal in response to detection of the last print P of a series of say 12, 20 or 36 prints. If desired, the detector 105 can be replaced by a detector which scans the web W and produces a signal in response to detection of uniting bands UB between successive films F; such signal is properly delayed to reach the knife 6 at the exact moment when the latter has severed from the strip S the last print P of a complete series. If the detector 105 is used for interrupting the severing of strip S by the knife 6, the strip can be provided with indicia in the form of graphite marks or the like which are applied in the region of the last one of a series of prints P reproduced from the same film F.

The severing of a succession of prints P from the strip S takes place simultaneously with introduction of the leader of the web W into the slots 19a and 11a of that tube 19 and that mandrel 11 which are located at the film receiving station A. Such transport of the web W takes place under the action of the advancing rolls 8. The baffles 20, 21 insure that the leader of the web W can readily find its way into the slot 19a and such leader thereupon automatically enters the slot 11a in spite of its normal tendency to curl; this is insured by the wedge-like configuration of the slot 11a. The carriage 10 of the winding device 9 in the inserting device for films F is assumed to be indexable in a clockwise direction, as viewed in FIG. 1, and a source of empty tubes 19 can be located at a station E which is immediately ahead of the film receiving station A, as considered in the direction of rotation of the carriage. The empty tube 19 can share the angular movement of the adjacent mandrel 11 to the station A. Not later than when it reaches the station A, the tube 19 is held by the mechanism 119 in such angular position that its slot 19a registers with the outlet of the passage between the baffles 20, 21 and with the wider upper end of the diametral slot 11a in the corresponding mandrel 11 which is then held by the spring 13 in the fully extended position shown in FIG. 2. The mandrel 11 is moved to the angular position of FIG. 3 in which the slot 11a registers with the passage between the baffles 20, 21 as well as with the slot 19a of the adjacent tube 19 by the drive shaft 17 which completes one or more revolutions

to turn the sleeve 12 and the mandrel 11 by way of the arm 17a and projection 16.

The winding of foremost film F onto the mandrel 11 takes place as soon as the leader of such film is introduced into the slots 19a and 11a. The winding is completed in response to a signal from the detector 136 which causes the knife 36 to perform a working stroke so as to sever the foremost film F from the next-following film of the web W as well as to arrest the drive for the shaft 17 at the exact moment when the aforementioned customer data are still located without the slot 19a of the tube at the film receiving station A. The arrangement may be such that the forward transport of web W is interrupted during severing of the web by the knife 36 and that the shaft 17 is thereupon caused to complete a full revolution which suffices to confine the freshly severed film F in the tube 19 save for the data at the trailing end of such film.

The chain of interconnected containers 23 is thereupon advanced by the length of a sheet portion which is necessary to form a fresh container 23 between the parts 27, 28 of the molding device 26. That portion of the sheet PM which is then located above the matrix 28 is deformed in response to downward movement of the heated ram 27 to thus produce a fresh empty container 23. The compartment 23b of an empty container 23 dwells below the outlet of the chute 7 and the compartment 23a of a partially filled container 23 dwells below the carriage 10 diametrically opposite the station A. The forward movement of the chain of containers 23 preferably takes place simultaneously with the indexing of carriage 10 through 90°. Since the baffle 21 can yield against the opposition of the spring 22 by pivoting about the axis of the pin 21a, the outwardly extending data at the trailing end of the freshly convoluted film F on a mandrel 11 which leaves the station A can readily bypass the baffle 21 without any damage to or displacement of its trailing end. The next-following mandrel 11 which has entered the station A is ready to receive a fresh film F and such mandrel is held in proper axial alignment with a tube 19 which has been delivered by the holding mechanism 119 from a source at the station E. If desired, the withdrawal of convoluted films F from the respective mandrels 11 can be facilitated by causing the shaft 17 to rotate the mandrel at the station A or at one of the two next-following stations in a direction to unwind the film; this causes the film to expand its convolutions and to urge its outermost convolution against the internal surface of the respective tube 19.

The carriage 10 must be indexed twice, always through 90°, in order to move a mandrel 11 with a convoluted film F and the corresponding tube 19 are transferred into the adjacent empty compartment 23a of that container 23 whose compartment 23b already contains a stack of prints P reproduced from the same film. As stated above, the mandrel 11 can be rotated in a direction to unwind the coiled film F not later than at the station H in order to facilitate convenient retraction of the mandrel into the respective sleeve 12 and to thus transfer the convoluted film F into the tube 19. Such expansion of convolutions of coiled film F on the mandrel 11 prior to retraction of the mandrel 11 into the sleeve 12 may necessitate one, two or more revolutions of the mandrel and sleeve 12. The retraction of the mandrel 11 into the respective sleeve 12 at the station H takes place under the action of the shifter 118

(FIG. 2) which is actuated by the indexing mechanism for the carriage 10 or by a separate actuating device. The mechanism 119 opens and the tube 19a is free to descend into the adjacent empty compartment 23b by gravity as soon as the mandrel 11 is retracted into its sleeve 12. The orientation of the filled tube 19 at the time of gravitational descent into the appropriate compartment 23a is preferably such that the trailing end of the convoluted film F therein (and hence the customer data on such trailing end) extends beyond the slot 19a and is located in a substantially horizontal plane so that the data can be readily decoded by the detector 35 for transmission of appropriate signals to the computer 34. The trailing end of the film F in a tube 19 which is received in a compartment 23a preferably overlies the uppermost print P in the corresponding compartment 23b.

When the chain of containers 23 is thereupon moved again, the foremost container 23 (which is filled because its compartments 23a, 23b respectively accommodate a tube 19 with convoluted film F and a stack of prints P) reaches the sealing device 29 where it is overlapped by the leading end of the foil T. The electrode 31 descends and welds the foil to the foremost filled container 23 to convert such container into a sealed container 23A. The cutters or knives 31a of the electrode 31 sever the forward end of the foil T (which has been converted into a cover for the foremost container 23) and the foremost container 23A from the next-following container so that the thus detached or separated container 23A can descend onto the upper stretch of the conveyor belt 37 for transport past the detector 35 which may be constructed according to German Patent Publication 1185472. The computer 34 computes the charge to the customer who owns the film F in the foremost filled and sealed container 23A and imprints the charge on an adhesive-coated slip or label which is attached to the respective container 23A in a known manner not forming part of the present invention. The computer 34 also stores information concerning the charge to the customer for the printing of an invoice. This completes the processing of a film F and of the corresponding length of the strip S, and the next following films F and sections of the strip S are thereupon processed in the same way as described above. The foremost filled and sealed containers 23A are ready for shipment to the customers or for temporary storage until picked up by the customers.

The novel automatic storing or packing apparatus can be employed with equal advantage for processing of webs W of films F and strips S which are not convoluted to form rolls (such as the rolls 3 and 2 of FIG. 1) but are fed directly from an automatic printing or copying machine or a machine wherein the freshly formed prints are developed and fixed prior to entry into the apparatus of FIG. 1. An advantage of such direct coupling of the packing apparatus with a copying or printing machine is that the web W and the strip S need not be converted into discrete rolls. This reduces the overall time which is required for the processing of a film F and the cost for winding and roll transferring equipment.

The height of containers 23 which are used in the apparatus of the present invention normally somewhat exceeds the height or thickness of conventional envelopes which are used at present for manual insertion therein of films and prints, especially if the films F are stored

in the containers 23 in convoluted condition as shown in FIGS. 1 to 3. However, the advantages of the packing apparatus far outweigh the advantages of manual insertion of films and prints into relatively flat envelopes, especially as concerns the expenditures in time and man hours. Furthermore, the storing of prints P and films F in the respective compartments of the containers 23 can be carried out with a much higher degree of uniformity than if the prints and films were inserted by hand. Moreover, the packing apparatus can process the webs W and strips S in the same condition in which they issue from an automatic printing or copying 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 omitting 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. Apparatus for storing in separate first and second compartments of containers exposed and developed photographic customer films which form a web of interconnected films and prints which are reproduced from such films and form a strip of prints, comprising first severing means for subdividing a web of interconnected films into discrete films; first inserting means for introducing successively severed films into the first compartments of successive containers; second severing means for subdividing a strip of prints into groups of shorter sections; and second inserting means for introducing the thus obtained groups of shorter sections into the second compartments of containers for the respective films.

2. Apparatus as defined in claim 1, further comprising first and second advancing means for respectively transporting said web and said strip along first and second predetermined paths, said first and second severing means being respectively adjacent to said first and second paths.

3. Apparatus as defined in claim 1, wherein said first inserting means comprises winding means for converting successive films of said web into rolls of convoluted film which are thereupon inserted into the first compartments of successive containers.

4. Apparatus as defined in claim 1, further comprising a source of sheet-like synthetic plastic material and molding means for converting successive lengths of such plastic material into empty containers.

5. Apparatus for storing in separate first and second compartments of containers exposed and developed photographic customer films which form a web of interconnected films and prints which are reproduced from such films and or a strip of prints, comprising means for conveying containers along a predetermined path; first severing means for subdividing a web of interconnected films into discrete films; first inserting means for introducing successively severed films into the first compartments of successive containers, said first inserting means comprising winding means for converting successive films of said web into rolls of convoluted film and for inserting the thus obtained rolls into the first compartments of successive containers in

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a predetermined portion of said path, said winding means comprising an indexible carriage having a plurality of rotary winding mandrels movable seriatim between a film receiving station at which the mandrels are connected with the leaders of successive films of said web and a second station, means for rotating the mandrels at said film receiving station so that the respective films are convoluted thereon, and means for transferring the convoluted rolls of film from such mandrels into the first compartments of containers occupying said predetermined portion of said path; second severing means for subdividing a strip of prints into shorter sections; and second inserting means for introducing the thus obtained shorter sections into the second compartments of containers for the respective films.

6. Apparatus as defined in claim 5, wherein said carriage is a star-shaped carriage having a plurality of equidistant arms each of which supports one of said mandrels, said winding means further comprising a sleeve for each of said mandrels, each of said mandrels being movable with reference to the respective sleeve between an extended position at said film receiving station and a retracted position at said second station.

7. Apparatus as defined in claim 6, wherein said mandrels are provided with slots for the leaders of films.

8. Apparatus as defined in claim 6, further comprising slotted film-confining tubes movable into register with the mandrels at said film receiving station and means for directing the leaders of films into the slots of such tubes and thereupon into slots provided therefor in said mandrels.

9. Apparatus as defined in claim 8, wherein said means for directing comprises baffle means defining a substantially funnel-shaped passage for transport of the leaders of films through the slots of tubes and into the slots of mandrels at said film receiving station.

10. Apparatus as defined in claim 9, wherein said winding means further comprises sleeves for said mandrels, each of said mandrels being movable between an extended position at said film receiving station and a retracted position at said second station to thus transfer the respective roll of film into the registering tube, and further comprising holding means for said tubes, said holding means being arranged to open and to thus release a tube with a roll of film therein at said second station.

11. Apparatus as defined in claim 10, wherein said holding means is arranged to open substantially simultaneously with the movement of a mandrel at said second station to the retracted position thereof.

12. Apparatus as defined in claim 8, wherein said means for rotating said mandrels at said film receiving station is arranged to rotate the mandrels at said second station in a direction to unwind the respective film and

to thus facilitate the withdrawal of mandrels from such film whereby the film roll is received only in the respective tube.

13. Apparatus as defined in claim 8, wherein each film of said web is provided with customer data applied to the trailing end thereof and said winding means is arranged to terminate the winding of said rolls of film when the data applied to the trailing end of a convoluted film extends outwardly from the slot of the respective tube at said film receiving station.

14. Apparatus as defined in claim 13, further comprising advancing means for transporting said web along a predetermined path past said first severing means and detector means for scanning the connections between successive films of said web and for producing signals for actuation of said first severing means so that the latter severs the web when a connection between two successive films of the web is in register therewith.

15. Apparatus as defined in claim 14, wherein the films of said web are spliced to each other end-to-end by adhesive-coated uniting bands and the web is provided with information encoded in the region of such uniting bands and being detectable by said detector means.

16. Apparatus as defined in claim 1, further comprising a source of cover material for said containers and means for applying such cover material to successively filled containers to thus at least substantially seal the first and second compartments of such containers.

17. Apparatus as defined in claim 16, wherein said source contains weldable sheet-like light-transmitting synthetic plastic cover material and said means for applying comprises electrode means for welding such weldable material to said containers.

18. Apparatus as defined in claim 1, further comprising first and second advancing means for respectively transporting said web and said strip along first and second predetermined paths, said first and second severing means being respectively adjacent to said first and second paths and further comprising first and second detector means for scanning said first and second paths for the presence of films and prints therein and signal evaluating means operatively connected with said detector means.

19. Apparatus as defined in claim 18, wherein said second detector means comprises counter means for the prints in said second path and means for transmitting signals indicating the number of counted prints to said evaluating means, each film of said web being provided with customer data and further comprising additional detector means for scanning such data on films in the first compartments of filled containers.

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