

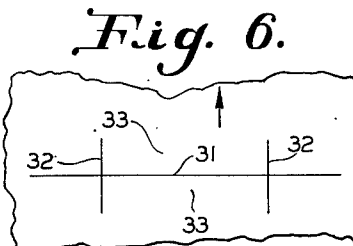
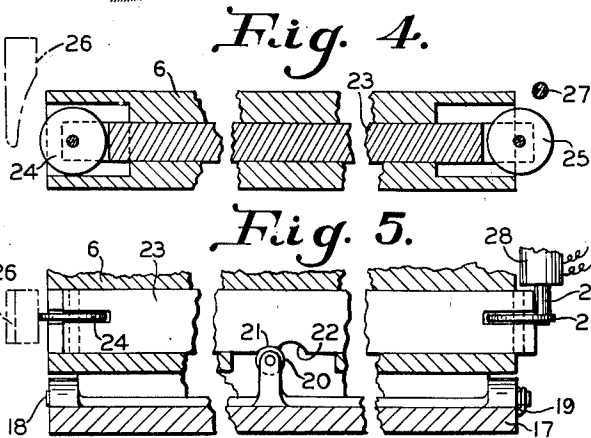
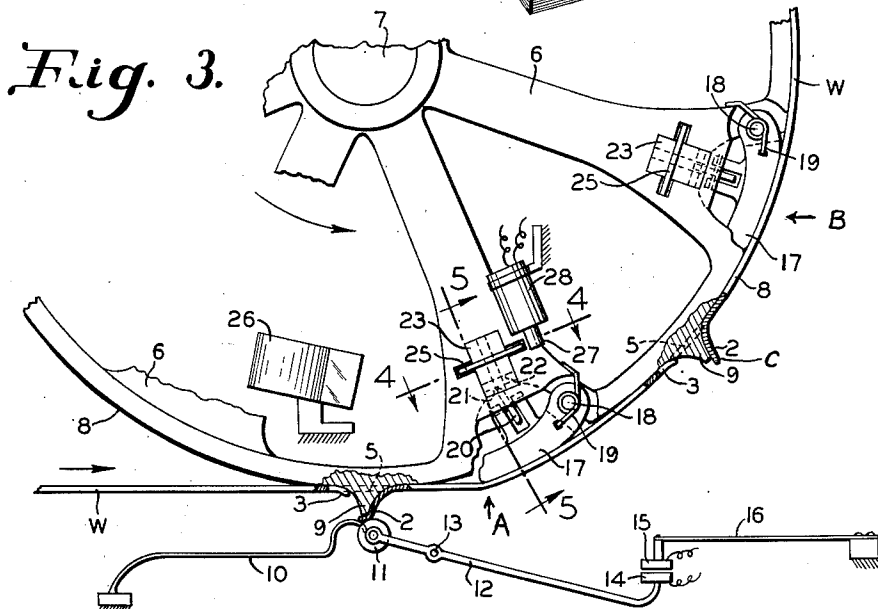
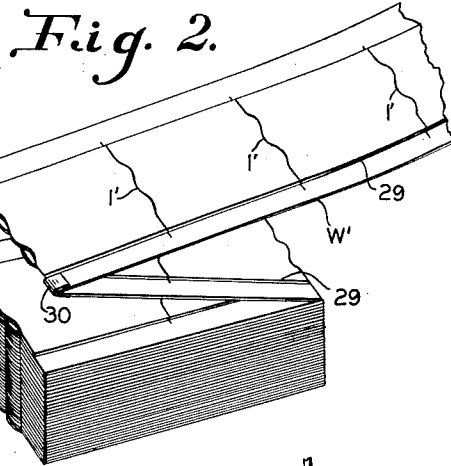
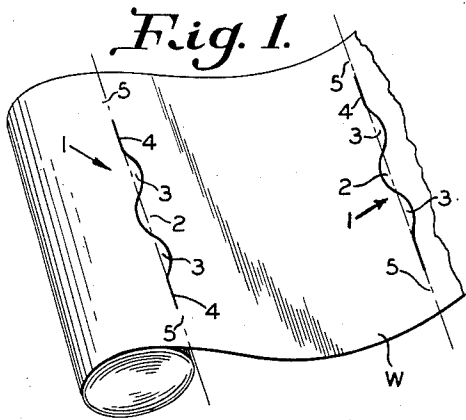
Dec. 2, 1952

C. W. VOGT

2,620,205

SHEET MATERIAL ARTICLES IN SEQUENCE

Filed July 17, 1950



INVENTOR.
CLARENCE W. VOGT
BY *Hubert E. Evans*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,620,205

SHEET MATERIAL ARTICLES IN SEQUENCE

Clarence W. Vogt, Norwalk, Conn.

Application July 17, 1950, Serial No. 174,261

3 Claims. (Cl. 281—5)

1

This invention relates to improved sheet material articles, such as wrappers, labels, bands, overwraps, etc. arranged in sequence to facilitate their feeding and use.

It is an object of the present invention to provide sheet material articles which may be arranged in a sequence in joined end-to-end relation and advanced and accurately positioned to permit their being separated into individuals after being accurately positioned to facilitate properly associating the articles with other objects for use. To illustrate, sheet material articles such as wrappers, labels and the like, having been appropriately imprinted into individual articles, and connected together in sequence may be fed as a web and accurately registered with respect to the feeding mechanism to facilitate removal of the individual articles and application to the objects to be wrapped or labeled or the like with the individual articles being accurately controlled and positioned. This permits the production of accurately labeled objects, or wrapped packages in which the wrappers are registered with respect to the objects and therefore imprinting of the articles will appear at the same location on each of the packages. From a merchandising standpoint this results in packages having increased sales appeal.

In the packaging of many objects or commodities, including plastic masses, such as pound or fractional pound prints of butter or margarine, individual portions of ice cream, cakes or blocks of lard, soap, cheese, etc., it is exceedingly desirable to feed a positive sequence of enwrappings, while at the same time maintaining accurate positioning of the enwrappings during feeding and application to the object. In present day commercial practice, fractional pound units of butter and margarine are enclosed in wrappers fed from a roll or web on which the printed matter has been placed in so called repetitive or hit-or-miss pattern. Variable lengths are severed from the web and enclosed about the object. This practice is followed because it has not been found practicable on a commercial basis to provide wrappers which may have registered printing and may be applied in registry with the object. Registry control mechanisms involving the use of photoelectric cells, which may be useful in other fields, such as the printing of paper, have not been successfully adapted to the feeding of wrappers for plastic objects or commodities. It is believed that this may be due in part to the fact that in packaging dairy products, sanitation requirements prescribe the use of hot water and

2

steam periodically to insure maintenance of sanitation and under the humid conditions encountered, it is exceedingly difficult to maintain photoelectric cell units in continuous trouble-free operation. Further, the maintenance of such units requires highly skilled craftsmen which leads to increased costs since most installations do not have maintenance men available who are skilled in that line. It is therefore another object to provide improved sheet material articles adapted for the wrapping of dairy products and the like which are designed and arranged to facilitate their being accurately fed, accurately separated into uniform article lengths in registry with the printed matter thereon and accurately positioned with the objects to be packaged. I have found that this new arrangement of sheet material articles permits a registry control of the individual wrapper lengths without requiring the use of a registry control mechanism as expensive, delicate and complicated as those which include a photoelectric cell.

A further object is to provide an arrangement of sheet material articles which may be fabricated in advance by available printing mechanism so that individual articles are accurately printed and defined and then may be fed from a web in such a way that the common boundary between adjacent individual articles may be located and properly positioned for severing or completing separation of the individual articles at a predetermined location.

Another object is to provide an arrangement of prefabricated sheet material articles having registered printing and accurate definition of individual article lengths to correspond to the objects with which they are to be associated and adapted to be fed as a positive sequence, without errors or gaps. The importance of this feature may be illustrated in the packaging of plastic material such as butter and margarine. The accuracy of measurement of such materials and the preservation of their components and physical characteristics are facilitated by continuous flow of the materials to and through the apparatus which meters, forms and delivers measured amounts of the commodity for packing. If the sequence of wrappers is not positive, it may be necessary to stop the equipment to prevent depositing the commodity onto the mechanism. Obviously, a positive sequence of individual wrappers will speed up the packaging rate and obviate wastage or spoilage of the commodity, thus increasing efficiency and lowering cost.

A still further object is to provide a plurality

of sheet material articles in joined end-to-end sequence, each article being dimensioned and imprinted in a pattern to correspond to the end use of the article, and such articles being defined or subdivided from each other by a slit which extends generally transversely of the web and partially thereacross, shaped to include a tongue struck from the web at a predetermined location in the region of the common boundary between adjacent articles. The provision of such a slit affords flexibility of an intermediate portion of the web and permits utilization of the flexible portions of the web for measuring and positioning of the web, while appropriate tension for feeding is maintained in other portions of the web.

Other objects and advantages will become apparent from the following detailed description, accompanied by the drawings, in which:

Figure 1 is a perspective view of a web of sheet material articles rolled to provide a supply roll and illustrating a preferred form of the present invention;

Fig. 2 is a perspective view of a modified form of a web of sheet material articles with the web in a zig-zag or ticket-folded arrangement to provide a source of supply from which the web may be advanced;

Fig. 3 is a fragmentary elevational view with parts broken away to illustrate schematically a form of mechanism for advancing and successively positioning the articles forming the web;

Fig. 4 is a fragmentary sectional view taken substantially on line 4—4 of Fig. 3 to show details of operation of the mechanism in Fig. 3;

Fig. 5 is a fragmentary sectional view taken substantially on line 5—5 of Fig. 3; and

Fig. 6 is an enlarged fragmentary plan view of another modified form of web made up of a plurality of sheet material articles and embodying the present invention.

For purposes of illustration, the present invention will be described in connection with improved wrappers and their use for packaging masses of plastic material, such as, for example, quarter-pound sticks of butter and margarine. However, it will be understood that the present invention is much broader in scope and application. Many other objects or commodities having a wide variety of shapes and sizes may be packaged. Furthermore, the invention may be advantageously utilized for operations other than wrapping or packaging. The sheet material articles embodying the invention may, for example, be labels, bands, partial or complete overwraps or other similar items and may be supplied in succession for application to or association with a wide variety of receiving surfaces.

Articles embodying the present invention may be fabricated from sections of sheet material which may comprise any suitable substance, such as many types of paper or plastic films, or metallic foil. The sheet material may be of a desired thickness, having sufficient flexibility and strength to be advanced and handled in accordance with the present invention. Such material may be provided with reinforcement in desired areas or may be reinforced throughout. It is oftentimes advantageous to utilize composite or laminated sheet materials having two or more plies to provide the desired characteristics for the end use to which the article is intended. Further, it is often beneficial to provide the material with appropriate surface coverings useful to increase its imperviousness, provide better folding

characteristics, and rigidity to the sheet, to provide adhesive areas, to improve the printability of the sheet material, or the like. The selection of an appropriate material will be dependent on the particular adaptation of the invention, and a wide variety of materials may be used to advantage. By way of illustration, the sheet material articles embodying the present invention may be wrappers suitable for making packages, such as are disclosed in my copending applications Serial No. 144,088, filed February 14, 1950, entitled Improved Commodity Package; Serial No. 149,672, filed March 15, 1950, entitled Multiple Ply Commodity Package; and Serial No. 165,784, filed June 2, 1950, and entitled Package for Plastic Commodities.

The individual articles are designed and arranged to be fed in a sequence or succession as a web. This web may be rolled to provide a source of supply or may comprise a plurality of multiple length sheets, which may be arranged in a zig-zag or ticket-folded pack or stack from which a continuous web may be withdrawn. The exterior surface of the web may be imprinted with the desired pattern of printed matter, such as, trademarks, advertising, manufacturer's name and address, designs, art work and the like. The web may also be provided with crease lines, cut score lines, slits, adhesive spots, stripes or areas, or other means which will increase the utility of the articles.

In Figure 1 a preferred embodiment of the present invention is illustrated and briefly comprises a web W of suitable sheet material defined for subdivision into individual articles or wrappers. Each wrapper is dimensioned to correspond to the object or commodity to be enclosed thereby, and bears the desired pattern of imprinting, accurately registered with respect to the edges of the wrapper so that the completed package will have its pattern of printed matter located with respect to each panel or face of the package. The individual articles are defined or subdivided from each other by a readily detachable connection so that the articles are disposed in a joined end-to-end sequence. The definition of the individual articles is preferably accomplished by a shaped slit indicated generally by the numeral 1, extending transversely of the web and partially thereacross, intermediate of the side edges of the web.

The configuration of the shaped slit may be varied, the drawings, however, illustrate a particularly desirable form which includes a central tongue or flap 2 struck from the web extending rearwardly of the normal direction of feeding of the web W. Outwardly of or adjacent to the central tongue 2 are a pair of side tongues or flaps 3 which are struck from the surface of the web and extend in an opposite direction from the tongue 2. The shaped slit terminates in straight line portions 4 which are aligned and coincide with the common boundary between adjacent articles. The various portions of the shaped slit merge with one another to provide a smooth sinusoidal slit as indicated in Fig. 1. Further, each slit 1 is accurately located or registered for the desired article lengths and bears a predetermined spaced relation with respect to the imprinting of the web. The length of the slit and dimensions of the tongues are such that intermediate portions of the web will have the desired flexibility for the purposes to be described, without affecting the tension with which the web is fed. However, the slit must be sufficiently short that the remaining integral connecting portions 5 of the

5

web between adjacent articles are sufficiently strong to permit feeding the web under suitable tension without breaking the web.

To clearly illustrate the features and advantages of this arrangement, the drawings illustrate schematically, portions of a mechanism for successively advancing and positioning individual wrappers so that they may be accurately located for subsequent operations of separating and applying individual articles for use. To provide a source of supply, suitably sized rolls of the web may be appropriately supported and the web withdrawn therefrom. This may be done by driving the supply roll so that the desired amounts of the sheet material web are fed under controlled tension, or one or more pairs of driven feed rolls may pull the web from the supply roll. Alternatively, the web may be withdrawn from the supply roll by a rotary feed member on which the operations of positioning, separating and applying may all be accomplished.

It is believed preferable to provide relatively uniform tension during feeding of the web to compensate for any variations in the lineal speed of advancement of the web which might detract from the accuracy of positioning of the articles. A number of mechanisms for controlling the tension of a web within desired limits are available and known in the art, and consequently the drawings do not disclose a particular apparatus for tension control. By way of example, some control mechanisms apply an appropriate braking force to the source of supply or utilize a slack loop with a movable slack roller moving with the loop to actuate the speed of withdrawal of the web from its source of supply.

The web W is accordingly preferably advanced under substantially uniform predetermined tension and may be applied to apparatus where the individual wrappers are successively positioned for application and use. The positioning of the wrappers is required, because although they may have been fabricated to satisfactory specifications, variations arise due to stretching or shrinking of the web under the feeding conditions which vary from the conditions at the time of manufacture and imprinting. For example, changes in the moisture content of the sheet material or the humidity of the surrounding atmosphere or the tension of the sheet material may cause appreciable variations in its dimensions which adversely affect the registry of the wrappers when they are separated and used. If the wrappers are in multiple-length web form, such dimensional changes may cause cumulative errors which will prevent the obtaining of individual wrappers having registered imprinting thereon. Since it is not practicable to duplicate all of the exact conditions at the time of fabrication, a positioning or registry control apparatus is necessary. By the present invention, the desired results can be achieved without the need of expensive or complicated mechanisms, such as photoelectric cell mechanisms, differential gearing corrective units, and the like.

Figs. 3, 4, and 5 illustrate the essentials of a web positioning unit for use in connection with the present invention. The web W is fed under controlled tension to the surface of a member, which in the form illustrated, is a rotary member 6, mounted for rotation on a shaft 7, driven by a suitable source of power (not shown). The member 6 is shown as having a cylindrical or drum-like shape and may comprise a web feeding member driven in timed relation with other por-

6

tions of a machine for completely packaging commodity units. Since a member having a round or flat surface onto which the web is fed for positioning, will permit advancement of the web with a minimum of variation in lineal speed, both of these arrangements are considered beneficial for providing a surface on which adjustment or positioning of the web may be accomplished. However, many other forms of feed members having cross sections, such as square, hexagonal, octagonal, or even some irregular shape may be desirable for other adaptations of the present invention.

Disposed at spaced intervals along the peripheral surface 8 of the members 6 are ribs or finder elements 9 which extend transversely along the peripheral surface 8 for a distance less than the length of the slit 1 and project radially out from the peripheral surface. The elements 9 are spaced apart a distance substantially equal to the desired wrapper lengths and thus as the web is fed to and applied to the member 6, the elements 9 are successively inserted into the slits 1. As shown in Fig. 3, the finder elements 9 have curved side faces which merge into the peripheral surface 8 of the member 6, so that the central tongue 2 may lie against such curved sides.

At approximately the point where the web W is applied to the elements 9, one or more resilient leaf spring members 10 may be mounted in a stationary position adjacent the peripheral surface of the member 6. The members 10 terminate in rounded contact portions which engage and ride along the central portions of the web to smooth it into engagement with the peripheral surface 8 and the surface of the finder elements 9 as may be seen in Fig. 3. It may be noted that due to the presence of the slit 1, the tension of the web will be transmitted through the integral portions 5 at the side edges of the web and since the intermediate portions of the web are more flexible there may be a tendency of the central portion of the web not to conform smoothly with the surface of the member 6, particularly in the region where the finder element 9 is inserted through the flexed web.

Located adjacent the curved end portion of the member or members 10 and disposed centrally of the web in the path of the central portion of the tongue 2, is provided a roller 11, carried by a lever arm 12 which is mounted to oscillate about the pivotal axis indicated by the numeral 13 in Fig. 3. One end of the lever arm 12 carries the roller 11 while its opposite end has mounted thereon a switch contact 14. An opposed contact 15 may be carried on a leaf spring member 16, mounted in a stationary position so that the contacts 14 and 15 are adjacent each other. These parts schematically illustrate a precision switch, which may preferably be a snap acting type so that a relatively small movement of the roller 11 will create engagement of the contacts 14 and 15 to energize a suitable electrical circuit. This switch, in effect comprises a thickness gauge, useful for measuring the presence of sheet material of the web at the location of the roller 11. To accommodate different web thicknesses which may be applied to the member 6, the switch and its roller 11 may be mounted for adjustable movement toward and away from the member 6. Precision switches, having adequate sensitivity for even the thinner sheet materials, are commercially available in types which are protectively enclosed and have great durability and long life.

The roller 11 is disposed so that its periphery is tangent to or slightly spaced from the path of the top edges of the finding elements 9. As a finder moves past the roller, the clearance between these two parts is less than the thickness of the sheet material of the web being fed and therefore, if the web is applied to the member 6, in such a manner that a portion of the central tongue 2 extends onto or overlaps the top edge of the finder element 9, the thickness of the sheet material will depress the roller 11, oscillating the arm 12 about its pivotal axis 13 to close the contacts 14 and 15 and energize an electrical circuit. The top edges of the finder elements extend radially outward farther than other portions of the member 6 in the region of the roller 11 so that the switch will only be actuated in the manner described.

Between each adjacent finder element 9 a suitable means is provided for varying the distance between adjacent finders along the peripheral surface of the member 6. In the form of the invention shown, this comprises a flap or gate 17 pivotally mounted on a shaft 18 journaled in the member 6. To urge the flap or gate 17 into its closed position, where its outer surface is flush with the peripheral surface 8 of the member 6, a suitable torsion spring 19 may be disposed about the shaft 18. One end of the spring 19 is inserted into and bears against a portion of the flap 17 and its other end bears against a portion of the member 6. Each of the flaps 17 is arranged so that it may be located in a position where it is pivoted outwardly a suitable distance, but radially inward of the top edges of the finder elements 9. In its outer position, the flap 17 acts to increase the peripheral distance of the member 6 between adjacent finders. This outward position of the flap 17 is indicated at A in the lower right hand portion of Fig. 3, while the inner position of the flap 17 is indicated by the numeral B at the right hand side of Fig. 3.

To illustrate a form of mechanism for changing the position of the flaps 17 from their inner position, as at B, to their outer position, as at A, and vice versa, each of the flaps 17 is shown as provided on its inner surface with a roller 20 (see Figs. 3 and 5). These rollers 20 are adapted to be positioned either in a shallow recess 21 or a deeper recess 22 formed in a bar 23 which is mounted in the member 6 for sliding movement axially of the shaft 7. When the roller 20 is disposed in its shallower recess 21, the flap 17 is held in its outer position and when the roller 20 is in its recess 22 the flap 17 is retained in its inner position. A small ridge between the recesses and the torsion spring 19 serve to retain the flap 17, in one of its two positions. To shift the position of the flaps 17, each of the slidably mounted bars 23 carries a pair of rollers 24 and 25, one at each end of the bar (Figs. 4 and 5). As the member 6 rotates in a counter clockwise direction when viewing Fig. 3, and prior to the time that a finder reaches the measuring station adjacent the roller 11 and its associated switch, a stationary wedge or cam member 26 is mounted at an appropriate fixed position adjacent an end of the member 6. The wedge 26 is disposed so that it will engage each roller 24 to cause it to move its bar 23 toward the right, when viewing Figs. 4 and 5, positioning each roller 20 of the flap 17 in the recess 21 of the bar so that each flap is in its outer position, unless the flap is already in this outer position.

The flaps 17 may be caused to move to their inner position by a pin or rod 27 mounted at the right hand side of Figs. 4 and 5 adjacent the member 6, in position to engage the periphery of each of the rollers 25 of the bars 23 successively. The pin 23 is actuated for movement by a solenoid 28 mounted in a fixed position adjacent the end face of the member 6 opposite to the end face at which the wedge or cam 26 is mounted. Further, the pin 27 is mounted in the path of the appropriate roller 25 a slight distance ahead of the position of such roller when the finder at the trailing edge of each individual wrapper is to pass adjacent the switch roller 11. Such slight distance will be dependent on the time required to actuate the solenoid 28 and pin 27, and on the peripheral speed of the member 6.

Looking at Fig. 3, the trailing edge of a wrapper has just been applied to the member 6 with the finder at the bottom of the Fig. 3 inserted through the slit at the trailing edge of the wrapper. The tongue 2 of that particular slit has been smoothed by the member 10 and overlaps the top edge of the finder. The finder is about to pass adjacent the periphery of the roller 11 and with the tongue 2 disposed on the top edge of the finder the roller 11 will be depressed, closing the switch contacts 14 and 15 energizing a suitable electric circuit which will energize the solenoid 28, causing the pin 27 to be retracted or withdrawn from the path of the roller 25 which is about to contact the pin. With the pin 27 retracted, the bar 23 will not be moved to the left when viewing Figs. 4 and 5, and the flap 17 for the particular wrapper will not be moved to its flush position but will remain at its outer position. After actuation of the solenoid to retract the pin 27, the pin may be suitably returned to its position intersecting the path of the rollers 25 prior to the time that the trailing edge of the next succeeding wrapper reaches the measuring station. The pin 27 may be returned after sufficient delay to allow the roller 25 to pass or may be spring returned as soon as the leading edge of the roller 25 has passed and in this event the end of the pin may engage and slide over the top surface of the roller without moving it or its associated bar 23.

In the case of the preceding wrapper applied to the periphery of the member 6 and shown at the right in Fig. 3, when the finder was inserted through the shaped slit 1 at the trailing edge of the wrapper, the tongue 2 did not extend over or overlap the top edge of such finder. Accordingly, the switch was not energized to cause the solenoid 28 to withdraw the pin 27, and therefore, the pin 27 contacted the roller 25 of the bar 23 and moved the bar so that roller 20 was positioned in recess 22 freeing the flap 17 from its outer position. The torsion spring 19 plus the tension of the web caused the flap 17 to move to its position flush with the peripheral surface 8 of the member 6, shortening the distance along the peripheral surface of the member 6 between the finders at the leading and trailing edge of the wrapper. The tension of the web caused a slight backward movement of the web with respect to the finder at the trailing edge of the wrapper for a length corresponding to the shortening of the peripheral distance between the adjacent finders. This backward movement of the web caused the tongue 2 at the trailing edge of the wrapper to extend further toward the top edge of the finder, as indicated at C in Fig. 3. It may be seen that the common boundary be-

tween each adjacent wrapper bears a definite relationship to the end of the tongue 2 and accordingly the finder may be used to determine whether the end of the tongue 2 is properly positioned with respect to the finder. That is, measuring at the top edge of the finder gives an indication of the position of the tongue 2 with respect thereto, and therefore measures the location of the common boundary between adjacent wrappers. If an adjustment in the position of the wrapper is indicated at the measuring station, it may be obtained by leaving the pin 27 in position where it will vary the peripheral distance between the finders at the leading and trailing edges of the wrapper.

If the peripheral distance between adjacent finders when the flap 17 is in its outer position is slightly greater than the maximum length of the individual wrappers under the conditions actually encountered at the time of feeding and the peripheral distance between adjacent finders when the flap 17 is flush with the surface 8 is slightly less than minimum length of the individual wrappers actually encountered, the common boundary between adjacent wrappers may be successively positioned with respect to the member 6, within satisfactory close tolerances. It should be noted that if a wrapper is applied so that the tongues 3 at the trailing edge extend over or overlap a portion of the top edge of the finder, they are disposed at each side of the roller 11 and will not actuate the switch or affect the peripheral distance of the member 6 between adjacent finders.

Under the system of positioning or registry control which has been described, each wrapper is applied along a slightly elongated peripheral distance between adjacent finders, and if the tongue 2 of a particular wrapper reaches onto or overlaps the top edge of the finder, this peripheral distance is maintained and the wrapper advanced for gripping, application for use and separation from the web. If the tongue 2 does not extend onto or overlap the top edge of the finder at the measuring station, the peripheral distance between the adjacent finders for that wrapper is shortened and the web tension correspondingly retracts the web to adjust the trailing edge of the wrapper with respect to its finder in a direction tending to cause the tongue 2 to reach or overlap the top edge of the finder. Accordingly, the trailing edge of each wrapper is successively positioned, when conditions at the time of application call for positioning, with respect to its associated finder at the trailing edge of the wrapper within acceptable tolerances.

Then, during further advancement of the web by the member 6, each wrapper may be successively gripped, applied for use and separated from the sequence by any suitable mechanism. The gripping, separation and application of the individual wrappers are not shown in the drawings because it is not considered that they are essential to the present invention. The member 6 may transfer the positioned wrappers to other suitable mechanism for completing the severance and application for use, or these functions may be accomplished by mechanism carried by or associated with the member 6.

It should be noted that the arrangement of a sequence of articles defined or subdivided by a slit which includes a tongue struck from the web at a desired location provides flexibility of a portion of the web and permits insertion of a finder and a spreading of the marginal edges

of the slit to accomplish positioning or registry control in a positive and simple manner as has been described. Further, the mechanism to accomplish the positioning is simple in design and construction, has very few parts which require a minimum of maintenance for efficient operation. A straight transverse slit will not provide the desired effect, since either the leading or trailing marginal edge may overlap the top edge of the finder element and actuation of the switch will not occur at only the desired time. Further a straight slit will not provide suitable flexibility of a portion of the web to permit insertion of a finder element without stressing the ends of the slit and even tearing of the integral connecting portions which permit tensioning and advancing the web.

It is also desired to point out that spreading of the margins of the slit by insertion of a finder and providing flexibility at this point, may be used to advantage to facilitate the completion of the severance of the web into individual articles and without disturbing the registered positions of the web. For example, Fig. 1 shows centerlines indicating the common boundary between adjacent wrappers and it may be seen that they are aligned with the straight line portions 4 at the ends of the slit, in this form of the invention. Pivotaly mounted knives moving transversely of the web may be mounted in the member 6 adjacent the ends of the finder and its predetermined relationship thereto. When the knives are actuated, they may cut outwardly in opposite directions through connecting portions 5 of the web after it has been positioned. The force of the knives on the web is applied in equal and opposite directions and will cause a minimum of disturbance to the position of the web. Also, the spreading of the flexible portions of the web by insertion of the finder permits a substantially aligned cut along the common boundary even though the adjacent wrappers may be slightly misaligned with respect to the cutting edges of the knives at the time of cut.

Other methods may be utilized for measuring and positioning sheet material articles, such as wrappers, embodying the present invention. For example, the member 6 may be arranged so that when the web is applied to its peripheral surface, the flaps 17 are disposed at their innermost or flush position, and the roller 11 at the measuring station will determine whether the tongue 2 of the trailing edge of the applied wrapper reaches or overlaps the top edge of the finder. If the tongue 2 of the trailing edge does reach or overlap the top edge of the finder, the peripheral distance between adjacent finders may be increased by a slight outward movement of the flap 17 to adjust or position the particular wrapper. This form of adjustment, however, requires movement of the flaps 17 to cause an additional feeding or tensioning of the web in order to position the wrappers, and it is generally believed advisable to position the web by movement of the flap inwardly to slightly decrease the web feed and cause a slight backward movement of the web, relative to the member 6, when an adjustment is called for at the measuring station.

In the methods of positioning of the web which have been described, the correction or adjustment has been obtained by varying the peripheral distance between adjacent finders of the member 6 by a fixed adjustment. If the precision switch mechanism and its feeler roller were mounted to travel with the feed member during

a portion of its movement, the positioning mechanism could be made variable whereby the corrective action could be variable and continue until the roller indicated that the positioning of the web was correct. A similar result would be approached if two measuring stations were provided, with each station capable of applying a small fixed correction. Measurement and correction could occur at the first station, and could be repeated at the second measuring station if warranted by the conditions encountered there. For most purposes, however, it is believed that sufficient accuracy can be obtained by making a single fixed correction as has been described in connection with the drawings.

In the modified form of the invention shown in Fig. 2, a plurality of sheet material articles in the form of a web W' are defined or subdivided by a shaped slit I', which is similar in design and arrangement to the shaped slit I of the web W in Fig. 1. The articles, which may comprise wrappers, are illustrated as being of multiple ply construction. For example, they may have a ply of suitable reinforcing material 29 laminated to desired portions of the web. Fig. 2 shows the reinforcing material as a continuous strip extending longitudinally along the web W', but terminating inwardly of the side edges of the web. If desired, the reinforcing material might comprise individual swatches which do not extend continuously, longitudinally of the web but are superposed and adhered to desired areas of each individual article. Such a multiple ply web does not readily lend itself to being rolled to create a source of supply. Accordingly, it is believed preferable that the web be zig-zag or ticket-folded to provide a flat pack or stack of multiple length sheets. Further, it is believed beneficial to form a stack so that two or more articles are disposed between each fold line to include a greater number of articles for the same stack height, although, obviously, this will depend on the size and shape of the individual articles. Whenever it can be done, without impairing the strength of the web necessary for feeding, it is considered advisable that the slits I' extend outwardly slightly beyond the edge of the reinforcing material 29, so that separation of the articles from the web may be more readily accomplished.

The arrangement of the articles in a ticket-folded stack lends itself to supplying the articles on a continuous basis, such as for feeding wrappers to package units of a commodity which is produced on a continuous process apparatus. This may be done by suitably connecting together the last article of one stack of wrappers to the first article of another stack. Fig. 2 shows a pair of folded strips or tapes 39 to secure the two stacks together by adhering the strips or tapes to the webs to be joined at their side edges. Any suitable adhesive may be utilized such as that employed on water activated gummed tape or a pressure sensitive adhesive, or a thermoplastic adhesive, depending upon the strength required and upon the end use of the individual sheet material articles. In the case of a web which may be rolled to provide a source of supply as shown in Fig. 1, continuous feeding of the individual articles may be obtained by the use of suitable mechanism to provide what is known as a flying splice, by which the leading end of a fresh supply roll may be secured to the end portion of a roll which is about to be exhausted.

The configuration of the shaped slits in the web

may also be modified from that illustrated in Figs. 1 and 2. It is advantageous for smooth operation that the slit be dimensioned and shaped so that it will operate in conformity with the size and shape of the finder element. It is desirable that the tongue or tongues defined by the slit be readily movable or slidable with respect to the finder element to facilitate application of the web, insertion of the finder and positioning of the web with respect to the finder.

Fig. 6 illustrates a modified form of web W' in which the shaped slit is formed by a plurality of H cuts in the web in the region of the common boundary between adjacent articles. In Fig. 6, a central transverse slit 31 extends across the web intermediate the side edges thereof. At the desired locations, a pair of longitudinally extending slits 32 intersect the slit 31, providing tongues 33 which extend towards each other from each adjacent article and are movable from the plane of the web to permit measuring and positioning of the web, as has been described. The finder element may in this instance be disposed in line with the transverse slit 31 or slightly ahead or behind thereof, being sufficiently close to be inserted into the slit and cause a deflection of one or both of the tongues 33 to facilitate measuring and positioning of the web. It is also contemplated that the tongues for measuring and positioning of the web at the trailing edges of the articles may have other shapes suitable for co-acting with a finder element to provide the desired results. For example, the tongues may be formed by an angular or rounded U- or V-shaped cut.

A sinuous slit which is symmetrical with the common boundary between adjacent articles as illustrated in Fig. 1 is considered very advantageous because it provides satisfactory flexibility of portions of the web for insertion of a finder element as well as providing at least one flexible tongue for use in measuring and positioning, with a minimum of encroachment on the individual articles. When the articles are wrappers, one edge of the wrapper will bear a central tongue and a sinuous edge while the opposite edge of the wrapper will be sinuous and have a pair of tongues. It is believed that such sinuous edges will not be objectionable in appearance, and when overlapped to provide a seam, the tongues may be used for gripping and opening the wrapped package.

The mechanism for utilizing embodiments of the present invention has been shown schematically in the drawings for purposes of illustration. Many other mechanisms may be used to advantage for the various applications of the present invention, and further, other apparatus may be incorporated. For example it may be desirable to provide a safety control such as a precision switch and feeler roller so that if the web should break or for other reasons no articles are being fed, the switch will be actuated to stop the feed member and other apparatus which operates in conjunction therewith.

It will be understood that in the drawings, proportions have been exaggerated in some instances to provide a greater understanding of the invention.

It will be understood that the foregoing description of preferred embodiments of the invention is for the purpose of explanation and illustration and numerous variations and modifications other than those which have been described may be made without departing from the spirit of the invention.

13

What I claim is:

1. A plurality of sheet material articles disposed in an end-to-end sequence, said articles being formed from an integral web of sheet material and having shaped slits in the region of the common boundary lines between adjacent individual ones of said articles and extending partially across said web inwardly of the side edges thereof, said shaped slits being formed with portions extending at angles to planes at right angles to the longitudinal axis of the web to form elements extending in opposite directions longitudinally of said web in the region of the common boundary lines between adjacent articles, said last named elements forming projections movable from the plane of the web.

2. A plurality of sheet material articles disposed in end-to-end sequence, said articles being formed from an integral web of sheet material and having a sinuous transverse slit extending partially across said web inwardly of the side edges thereof at predetermined individual article lengths, said sinuous transverse slit defining a central tongue struck from said web and extending across the common boundary line between adjacent articles and at least one tongue disposed upon each of the opposite sides transversely of said central tongue and extending in an opposite direction from said central tongue across said common boundary line between adjacent articles.

3. A web of sheet material having a sequence of

14

sheet material articles imprinted thereon, each of said articles being defined into predetermined article lengths by slits extending in a generally transverse direction across said web intermediate of the side edges thereof, each of said slits defining tongues extending in opposite directions longitudinally of the web in the region of the common boundary line between adjacent articles deflectable from said web to facilitate positioning of said common boundary line, and each of said slits having portions lying in alignment with said common boundary line, between adjacent articles to facilitate separation of said articles from said web.

CLARENCE W. VOGT.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,054,976	McCauley	Mar. 4, 1913
1,575,081	Suk	Mar. 2, 1926
2,194,309	Krueger	Mar. 19, 1940
2,360,845	Bronander	Oct. 24, 1944

FOREIGN PATENTS

Number	Country	Date
24,514	Australia	Sept. 21, 1936