This disclosure relates to a pouch construction made of metallic foil and made from elongated substantially flattened tubular wall means having a plurality of integral projection means extending outwardly therefrom wherein the projection means hold surface means of the wall means which comprise the projection means spaced apart from oppositely arranged surface means of the flattened tubular wall means to reduce the interface friction between the surface means and enable easy sliding movement therebetween to enable easy grasping and expanding of the flattened wall means to form such pouch construction.

This invention pertains to container means and more particularly to improved bag-like pouch construction means containing metallic foil, or the like, and having integral easy-open wall means and to an improved apparatus for and method of making such improved pouch construction means.

It has been previously proposed to make an elongated tubular construction of metallic foil in a flattened or collapsed condition which can be sold in roll form in suitable dispensing cartons and dispensed from such cartons by unrolling and cutting to the desired length. In attempting to open or spread apart oppositely arranged flattened wall means of each cut-to-length dispensed portion to form pouch means for packaging food products or other articles where a moisture impervious bag-like container is desired, it has been found that the cutting action forces the terminal ends of such oppositely arranged wall means together making it a comparatively difficult and time consuming task to readily open such forced together wall means. The increased time required to separate such oppositely arranged wall means is particularly undesirable in those commercial applications where the packaging operation is part of a continuous process.

Accordingly, it is a feature of this invention to provide an improved easily opened and inexpensive pouch construction means comprised of metallic foil means, or the like, and made from initially substantially flattened tubular wall means.

Another feature of this invention is to provide such pouch construction means of any desired length by severing from flattened tubular stock having such raised surface means therein which prevents severed terminal end means thereof from adhering together.

Another feature of this invention is to provide such improved pouch construction means made from elongated substantially flattened tubular wall means formed by suitably arranging and fastening sheet means of metallic foil to define such flattened tubular structure.

Another feature of this invention is to provide tubular pouch construction means made from sheet means of metallic foil which may be readily fastened in such flattened tubular form by ultrasonic welding, adhesive bonding, or other rapid fastening techniques.

Another feature of this invention is to provide such elongated flattened tubular wall means for making such improved pouch construction means wherein such tubular wall means can be formed using either one web of metallic foil or a plurality of webs of metallic foil.

Another feature of this invention is to provide an improved apparatus for making elongated substantially flattened tubular stock or wall means having integral raised surface means therein such that upon cutting such wall means to length to define pouch means such integral raised surface means enable easy opening of such pouch means.

Another feature of this invention is to provide an improved method of making such improved bag-like pouch means having integral easy-open means provided in flattened tubular wall means thereof to enable easy opening from an initially flattened condition.

Therefore, it is an object of this invention to provide an improved pouch construction means or pouch means and an improved apparatus for and method of making such pouch means having one or more of the novel features of this invention as set forth above or hereinafter shown or described.

Other objects, uses, and advantages of this invention are apparent from a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a perspective view with parts broken away illustrating an improved apparatus for and method of making elongated flattened tubular wall means used in making improved easy-open pouch construction means of this invention and particularly illustrating such tubular wall means being made by ultrasonically welding together two aligned webs of metal foil along fastening seam means defined by their side edge portions.

FIGURE 2 is a perspective view illustrating a length of the flattened tubular construction formed by the apparatus of FIGURE 1 provided in roll form in a suitable dispensing container and particularly illustrating the manner of unrolling a desired length thereof for use in forming pouch construction means.

FIGURE 3 is a perspective view illustrating such desired length being cut using knife means provided on the dispensing container.

FIGURE 4 is a sectional view on the line 4—4 of FIGURE 1 particularly illustrating integral raised surface means provided in the top web of metallic foil to enable easy grasping and spreading thereof from its flattened condition to form pouch means.

FIGURE 5 is an enlarged fragmentary perspective view illustrating one exemplary technique used to grasp and spread apart oppositely arranged wall means of pouch means comprised of a section of such flattened tubular wall means to enable insertion of a product therewithin.

FIGURES 5A, 5B, 5C, 5D and 5E illustrate a series of steps comprising another technique used to spread apart oppositely arranged wall means of pouch means defined by a section of flattened tubular wall means of this invention, showing the placing of a sandwich, for example, within such pouch means, and also showing such sandwich completely wrapped.

FIGURE 6 is a perspective view with parts broken away illustrating another embodiment of this invention which is similar to FIGURE 1 and particularly illustrating ultrasonic welding means for providing transverse welds in the flattened tubular wall means to define bottom wall means of pouch means and perforating means for perforating across such tubular wall means to aid in tearing of pouch means of predetermined lengths.

FIGURE 7 is a perspective view illustrating a partially...
opened bag-like pouch means formed by severing the flattened tubular construction of FIGURE 6 along associated perforation means.

FIGURE 8 is a perspective view with parts broken away illustrating another embodiment of improved apparatus for and method of making such flattened tubular wall means utilizing a single web of metallic foil which is folded to define an overlapped construction and fastened by ultrasonic welding means along side edge means thereof.

FIGURE 9 is a perspective view illustrating a partially opened bag-like pouch means severed from the tubular wall means formed by the apparatus of FIGURE 8.

FIGURE 10 is a sectional view on the line 10—10 of FIGURE 8.

FIGURE 11 is a perspective view with parts broken away illustrating another exemplary embodiment of this invention.

FIGURE 12 is a perspective view illustrating a partially opened bag-like pouch means severed from the flattened tubular wall means formed by the apparatus of FIGURE 10.

FIGURE 13 is a sectional view on the line 13—13 of FIGURE 11.

While the various features of this invention are herein-after illustrated and described as being particularly adaptable for providing an improved bag-like pouch construction means for packaging food products, such as sandwiches, for example, and to an improved apparatus and method of making such pouch construction means in elongated substantially flattened tubular form, it is to be understood that the various features of this invention can be utilized singly or in any combination thereof to provide improved bag-like pouch means for other uses, such as, packaging cosmetic products of all types, as desired.

Therefore, this invention is not to be limited to only the embodiments illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

In the exemplary embodiment of this invention illustrated in FIGURES 1—5 of the drawings an improved apparatus of this invention indicated generally by the numeral 15 is illustrated. Apparatus 15 is used to form elongated substantially flattened tubular wall means or tubular stock, shown at 16, which is cut to any desired length to form pouch construction means or pouch means 17 as seen partially away from an associated roll means or roll 18 thereof provided in a suitable dispensing container 19 shown in FIGURES 2 and 3 of the drawings.

The substantially flattened tubular wall means 16 of this invention has integral raised surface means therein indicated as a plurality of integral projections, a representative few of which have been each designated by the numeral 20. Projections 20 enable such oppositely arranged surface means to be easily grasped and separated as shown in FIGURE 5 to form pouch construction means enabling easy insertion of a product therewith.

Apparatus 15 suitably supports a pair of sheet means or webs of metallic foil preferably provided in roll form and designated by the numerals 22 and 23. In this example of the invention one of the webs, illustrated as upper web 23 in FIGURE 1, has the integral raised surface means or integral projections 20 provided therein so that they extend or project radially i.e. away from the interior of the tubular wall means. Projections 20 are provided in web 23 by suitable forming means as will be subsequently described.

Web 23 has fastening seam means comprised of a side portion adjoining each side edge and designated by the numeral 25. Each fastening seam means or side portion 25 is preferably kept intact without forming projections 20 therein; nevertheless, such side portion could be easily fastened in position even with projections 20, or the like, provided therein.

Web 22 has fastening seam means comprised of a side portion 26 along each of its side edges. The entire web 22 of this example is formed without projections therein; however, it will be appreciated that web 22 could have projections therein similar to those in web 23 to enable easier separation of the two fastened webs comprising the flattened construction 16.

Webs 22 and 23 are adapted to be arranged with their respective side portions 25 and 26 in adjoining aligned relation and suitably fastened together, as will be subsequently described, to define elongated flattened tubular wall means 16.

Projected 20 are formed in web 23 by suitable forming means preferably comprising forming roll means illustrated in this exemplary embodiment of the invention as a forming roll 30 having a plurality of spaced apart protuberance means or protuberances designated generally by the numeral 31 and provided on the peripheral surface of roll 30. Forming roll 30 cooperates with another roll shown as a back-up roll 32 having peripheral surface means designated by the numeral 33 and adapted to cooperate with protuberances 31 provided on forming roll 30.

The cooperating peripheral surface 33 of this example is shown as a yielding cylindrical surface made of a resilient material such as rubber, or the like. However, in some applications, surface 33 may comprise female recess means corresponding to associated protuberance means 31 provided on roll 30.

Rolls 30 and 32 cooperate with each other to form integral projections 20 in such web. Surface means 31 and 33 are constructed and arranged to assure that metallic foil web 23 is not torn during the process of forming projections 20 therein. In addition the spacing between rolls 30 and 32 is accurately controlled.

Webs 22 and 23 are arranged or positioned in aligned relation by arranging means comprised of combining roll means shown as a pair of combining rolls designated by the numerals 35 and 36. Combining rolls 35 and 36 combine and arrange webs 22 and 23 so that their respective fastening means 26 and 25 are placed in an adjoining relation to enable easy fastening therealong.

In this exemplary embodiment of the invention, the fastening means for fastening webs 22 and 23 along their side edges 26 and 25 respectively comprises an ultrasonic welding means or device designated generally by the numeral 40. Ultrasonic welding device 40 comprises a pair of anvils each designated by the numeral 41 and each arranged beneath an associated side edge portion of webs 22 and 23. Device 40 includes a pair of hammers 42 suitably fixed to an ultrasonically vibrating means 43 for ultrasonically vibrating such hammers.

The adjoining side edge portions 25 and 26 of webs 22 and 23 are thus passed between an associated anvil 41 and hammer 42 along each side while ultrasonically vibrating hammers 42 to thereby weld webs 22 and 23 along their opposite side edges. Thus it is seen that an elongated substantially flattened tubular construction 16 is provided which is easily and rapidly formed in a continuous manner.

The flattened tubular construction 16 is passed through a pair of stabilizing rolls 44 and 45 downstream of ultrasonic fastening device 40 and then subsequently cut in predetermined lengths and suitably rolled to form previously mentioned rolls 18. Each roll 18 of flattened tubular pouch construction means 16 is dispensed from an associated standard type dispensing container 19.

Each dispensing container 19 has integral cutting means which may be of any type such as, a saw tooth cutting edge 50, for example. A desired length of tubular wall means 16 is thus unrolled from roll 18 and severed by pulling such unrolled length against cutting edge 50.

Prior to this invention, unsuccessful attempts had been made to market flattened tubular constructions of metallic foil in roll form. However, due to the physical and
mechanical characteristics of metallic foil it was found that upon cutting such prior constructions to the desired length to form pouch means, the cut or severed edges were generally mechanically compressed together making it very difficult to grasp and spread open the wall means comprising such flattened construction without substantial tearing thereof. The flattened tubular construction 16 with its projection means 20 as taught by this invention eliminates these prior problems and is easily grasped and spread open.

FIGURE 5 of the drawings particularly illustrates the simplicity with which oppositely arranged wall means designated by the numerals 51 and 52 in the severed pouch construction 17 are grasped and spread apart. Each projection 20 holds surface means of its adjoining integral wall means 51 spaced apart from oppositely arranged surface means 52 to enable such easy grasping and expanding of oppositely arranged wall means 51 and 52.

With walls 51 and 52 of pouch means 17 spread outwardly, a tubular construction is defined enabling a product to be easily inserted therewithin. The open ends of such bag-like pouch means 17 are then folded upon themselves to, in effect, define a moisture impervious seal, whereby the pouch means thus defined is particularly adaptable to be used in storing food products, commercial products of all types, and the like.

Recall projections 20 physically hold portions of walls 51 and 52 in spaced apart relation, such walls may be easily grasped and opened, if desired, as previously explained; however, it will be appreciated that the provision of raised integral wall projections 20 in effect results in wall means 51 and 52 only contacting each other at a plurality of spaced apart locations intermediate projections 20 and this enables the use of another technique for separating wall means 51 and 52 which is illustrated in detail in FIGURES 5A-5E of the drawings. Therefore, it is a simple matter to grasp an end portion of a severed pouch means 17, as illustrated in FIGURE 5A, between the thumb and index finger of one hand and push one sheet relative to another in the manner illustrated in FIGURE 5B. In this illustration, wall 51 is pushed inwardly exposing the terminal outer edge or lip of wall 52 enabling it to be easily grasped and with the end portion of sheet 51 pushed inwardly as shown, it too is easily grasped, see FIGURE 5C. The inward pushing of wall 51 is easily achieved because of less interference friction between sheets 51 and 52 as provided by projections 20 holding a comparatively large surface area of one wall apart from wall 52.

FIGURE 5D of the drawings illustrates walls 51 and 52 spread apart and with such walls spread apart one hand is used to hold wall 51 expanded while another hand is used to insert a sandwich, for example, therewithin. With such sandwich inserted within pouch construction 17 as illustrated in FIGURE 5D, the open ends of such pouch construction are then wrapped as shown in FIGURE 5E to provide a completely enclosed moisture impervious pouch for the sandwich.

Thus, it is seen that projections 20 are used in two ways to enable easy opening of pouch construction 17. The spaced apart projections 20 in wall 51 hold such wall away from wall 52 enabling easy grasping of the terminal edges of such walls, and projections 20 inherently assure that considerably less of wall 51 adjoining such projections is in contact with wall 52 and upon grasping of pouch construction 17 and shoving in the manner illustrated in FIGURE 5B the friction enables easier sliding movement of one wall relative to another.

Another embodiment of this invention is illustrated in FIGURES 6 and 7 of the drawings wherein the apparatus used to form elongated substantially flattened tubular wall means is practically identical to the apparatus illustrated in FIGURE 1 and further comprises transverse fastening means and perforating means for such tubular wall means. Therefore, component parts of this latter apparatus which are identical to corresponding parts of the apparatus of FIGURE 1 will be designated by the same numerals as previously followed by the letter designation A and not described again. Each new component part will be designated by a new numeral designation and also followed by the letter designation A.

Apparatus 15A includes fastening means for forming transverse seams extending completely across flattened tubular construction 16A and comprises an ultrasonic fastening means or device 60A. Ultrasonic device 60A has an anvil 61A which extends completely across flattened construction 16A and a cooperating hammer 62A which is ultrasonically driven by an assembly 63A. After forming flattened tubular construction 16A in a manner as previously described in connection with flattened tubular construction 16, tubular construction 16A is passed between anvil 61A and hammer 62A and upon ultrasonically vibrating hammer 62A a transverse seam 64A is provided completely across tubular construction 16A. Each fastening seam 64A thus defined is fluid tight in nature and preferably defines bottom wall means of a pouch construction. Seams 64A are provided along tubular construction 16A at spaced apart intervals as desired and together with perforation means to be subsequently described define pouch means as shown as a plurality of serially interconnected individual pouches each designated by the numeral 65A.

The above mentioned perforation means comprises a series or set of spaced apart rectilinear perforations designated generally by the numeral 66A and provided completely across elongated tubular construction 16A at predetermined intervals therealong by a perforating means or device designated generally by the numeral 67A.

Perforating device 67A is comprised of a pair of cooperating perforating roll means illustrated as a perforating roll 70A cooperating with an oppositely arranged perforating roll 71A. Roll 70A has a plurality of spaced apart perforating projections 72A arranged in a rectilinear manner along its peripheral surface while roll 71A has corresponding recess means arranged in its peripheral surface.

Rolls 70A and 71A are rotated as flattened tubular wall means 16A is moved therebetween so that perforating projections 72A are also simultaneously rotated and a set of perforations 66A is provided at each revolution of rolls 70A and 71A. With the particular arrangement of perforating means illustrated, the diameter of roll 70A determines the spacing between each perforation 66A provided in flattened tubular wall means 16A.

A set of perforations 66A is provided between each adjacent pair of spaced apart transverse fastening seams 64A. Each bag 65A is thus defined by perforations 66A defining its open or top end and fastening seam 64A defining its bottom or closed end.

The elongated tubular construction 16A may be placed in a suitable dispensing container similar to dispensing container 19 illustrated in FIGURE 3 of the drawings to enable easy dispensing of a plurality of bag-like pouches 65A shown in FIGURE 7. The fastening seams 64A and perforations 66A are preferably provided in construction 16A so as to form pouches 65A of equal height. Such pouches may also be suitably folded in an accordion-like manner and dispensed from a suitable package.

Although in this embodiment of the invention penetrations 66A aid in the tearing action, it will be appreciated that projection means 20A provided in web 23A make it possible to easily grasp oppositely arranged side wall means of pouch 65A to enable opening and insertion of a product therewithin.

Another exemplary embodiment of this invention is illustrated in FIGURES 8-10 of the drawings in which an apparatus 75 is provided for making another modification of a substantially flattened tubular wall means adapted for use in making pouch means. Apparatus 75 is comprised of means for forming a single web of metallic foil provided in roll form as indicated at 76 to define flattened tubular wall means or construction 77.
Forming means is provided for providing a plurality of spaced apart projections, as shown at 80, in web 76. Such forming means comprises a pair of forming rolls 81 and 82 which are similarly to rolls 30 and 32.

Roll 81 has a plurality of protuberance means in its peripheral surface as indicated generally at 83 and similar to the protuberance means 31 provided in roll 30. In a similar manner, roll 82 has cooperating surface means as shown generally at 84 similar to cooperating surface means 32 provided in roll 32. The projections 80 as provided by rolls 81 and 82 are provided across practically the full width of web 76 and apparatus 75, in effect, folds web 76 to define a double thickness construction having a pair of fastening means each designated generally by the numeral 85 and each provided along opposite edge portions of web 76. Web 76 is folded so that its fastening means 85 are arranged in adjoining aligned relation while defining one side edge of such double thickness construction.

Arranging means comprised of folding means is provided for form of web 76 in overlapping relation and comprises folding chute means 90 which is arranged on apparatus 75 so that as web 76 is moved therealong it is overlapped upon itself along its full length with its fastening means 85 placed in adjoining relation. Fastening means 113 therein similar to surface means 84 provided in roll 82. Rolls 111 and 112 are arranged with their peripheral surfaces in adjoining relation to define projections 108 in web 107 upon passing such web therebetween. Apparatus 105 has folding means which essentially is fold web 107 so that its opposite side edge portions comprising fastening seam means and each designated by the numeral 114 are placed in adjoining overlapping relation along the center portion of the resulting flattened tubular construction 106. The overlapped portions 114 are folded by arranging or folding means comprising a pair of cooperating surfaces 115 and 116 and such overlapped side edge portions 114 are preferably fastened by an ultrasonic welding device indicated at 117 and similar to the previously described ultrasonic welding devices.

Ultrasonic welding device 117 comprises a hammer 120 which is suitably interconnected to and ultrasonically driven by an ultrasonic vibrating unit 121. Hammer 120 cooperates with an anvil 122 arranged on the opposite side of the overlapped portions 114 so as to provide a continuous high strength welded seam along the full length of flattened tubular construction 106.

Projection means 108 provided in flattened construction 106 extend outwards from such construction and as illustrated in FIGURE 13 of the drawings the spacing indicated at 123 provided between opposed wall means or rolls 124 and 125 of elongated flattened tubular construction 106 is such that such walls may be easily grasped and spread apart for insertion of a product as shown and described in connection with FIGURE 6 of the drawings. Therefore, apparatus for providing such perforations will not be presented again in connection with flattened tubular constructions 77 and 106.

The various flattened tubular constructions 16, 16A, 77, and 106 presented in this disclosure are each preferably fastened together in their respective tubular forms using ultrasonic welding means. Such ultrasonic welding means is preferred in each case because of the speed with which a high quality moisture impervious weld or junction is provided. Nevertheless, it will be appreciated that other welding or fastening techniques may also be used, such as high speed bonding of all types, improved adhesive processes, and the like, as desired.

The improved flattened tubular portion of construction means of this invention may be made using metallic foil of all types. However, metallic foil containing aluminum is preferred and has been successfully used in several applications of the invention.

The several apparatus illustrated and described in this application utilize webs of metallic foil in which projection means are formed therein by forming means provided on the individual apparatus involved. It will be appreciated that the webs may have the desired projection means formed therein and that a simplified apparatus may therefore be employed which does not include such forming means.

The apparatus illustrated and described in the various embodiments of this invention have suitable supporting structure for the various components such as the various webs, arranging means, fastening means, etc. In addition, suitable power drives and controls are provided for the various components of the manner and as desired.

In this disclosure the various flattened tubular constructions have been provided with projection means extending substantially across their full width in each case. It is, of course, to be understood that in many applications only a narrow strip of flattened wall means intermediate the opposite side edges will be provided with projection means and such strip will be adequate in enabling easy grasping and separation of the flattened adjoining wall means.
Terms such as "sides," "upper," "lower," and the like, have been used throughout this disclosure for ease of description and to explain various members as shown in the drawings and such terms should not be considered as limiting the scope of this invention in any way.

FIGURES 5 and 9A-5E of the drawings have been illustrated to show the simplicity with which the projections 20 in one wall, shown as wall 51, of the improved exemplary pouch construction 17 of this invention make it easy to separate wall means 51 and 52 for insertion of a product therewithin. However, it will be appreciated that the techniques illustrated in FIGURES 5 and 9A-5E are fully applicable to all the embodiments of this invention presented in this disclosure and are fully applicable when projection means are provided in merely one wall means of each elongated tubular pouch construction means disclosed herein or in both wall means of each construction.

This is seen that an improved flattened tubular pouch construction means has been provided having integral projection means in its wall means, such projection means enabling easy grasping and opening of severed portions of such flattened tubular construction in forming pouch means.

Furthermore, this invention provides an improved apparatus for and method of making such improved pouch construction means.

While the form of the invention now preferred has been disclosed as required by statute, other forms may be used, all coming within the scope of the claimed subject matter which follows.

What is claimed is:

1. A pouch construction comprised of metallic foil means constructed and arranged to define elongated substantially flattened tubular wall means, said flattened wall means having opposed side edge portions overlapped and fastened together to form a wall means defining a double thickness strip along said middle portion.

5. A pouch construction as set forth in claim 1 comprised of first and second superimposed elongated sheet means of metallic foil having substantially equal widths and having their associated side edge portions fastened together to define said flattened tubular wall means.

6. A pouch construction made of elongated sheet means of metallic foil having a plurality of integral spaced apart projection means formed therein during unwinding thereof from associated supply roll means and being welded adjacent side edge means thereof to define an elongated substantially flattened tubular wall means having said projection means extending outwardly therefrom, and upon severing said elongated substantially flattened tubular wall means generally transverse its elongated axis utilizing an associated cutting means to define any desired length pouch construction having wall means terminating on a common edge a sufficient number of said integral projection means are severed and hold surface means of said wall means which comprise said projection means spaced apart from oppositely arranged surface means of said flattened tubular wall means to reduce the interface friction between said surface means and enable easy sliding movement therebetweent to enable easy grasping of said surface means adjacent common edge and expansion of said flattened wall means to form said desired length pouch construction.

7. A pouch construction as set forth in claim 6 in which said elongated sheet means of metallic foil is defined by a single sheet means of metallic foil folded with its opposite side edge portions overlapped and welded together to define said elongated flattened tubular wall means.

8. A pouch construction as set forth in claim 6 in which said elongated sheet means of metallic foil is defined by a first and second superimposed sheet means of metallic foil each being unwound from an associated supply roll means and at least one of said first and second sheet means having said plurality of spaced apart projection means formed therein, said first and second elongated sheet means having substantially equal widths and having their associated side edge portions fastened together to define said flattened tubular wall means, and said opposite side edge portions defining said side edge means.

9. A pouch construction as set forth in claim 6 wherein said elongated sheet means of metallic foil is ultrasonically welded adjacent side edge means thereof.

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