Aug. 11, 1936. L. A. STRAUBEL 2,050,394

PAPER ROLL AND METHOD OF FORMING SAME

Original Filed Nov. 14, 1934 2 Sheets-Sheet 1

Fig. 1

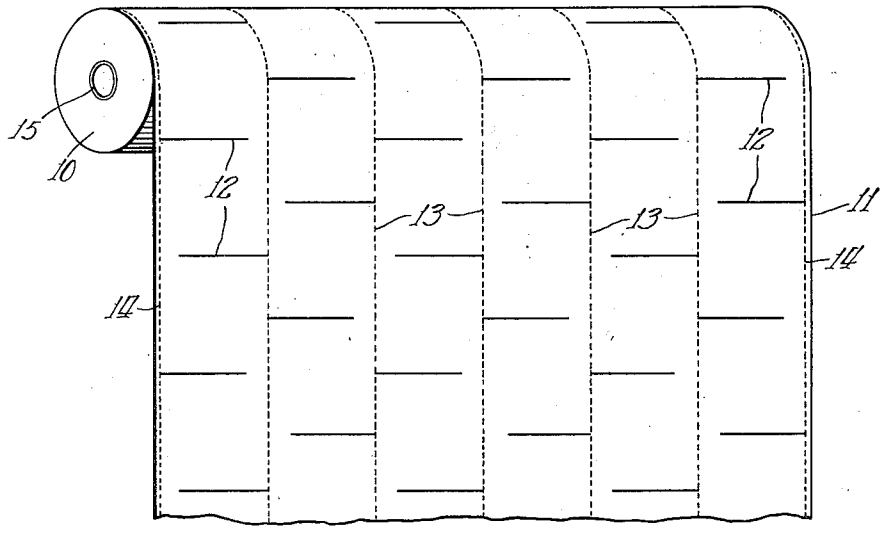

Fig. 2

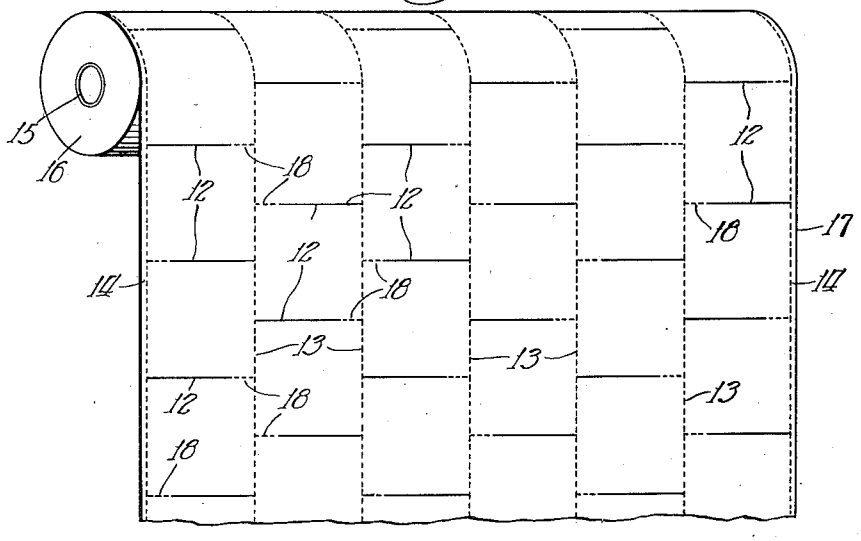

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Fig. 3

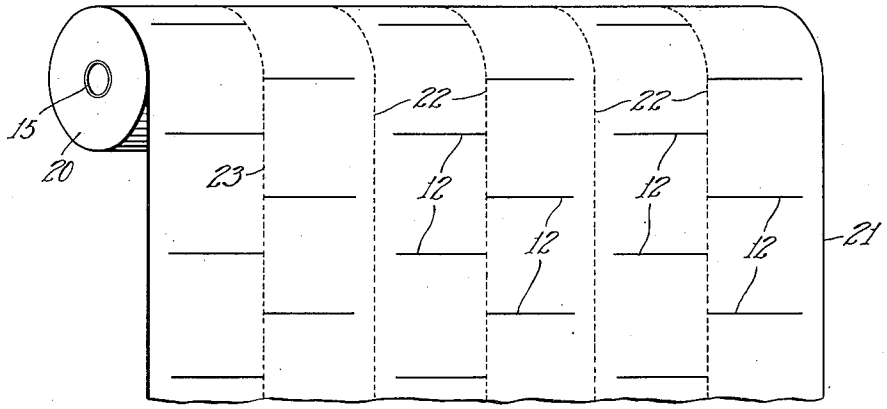

Fig. 4

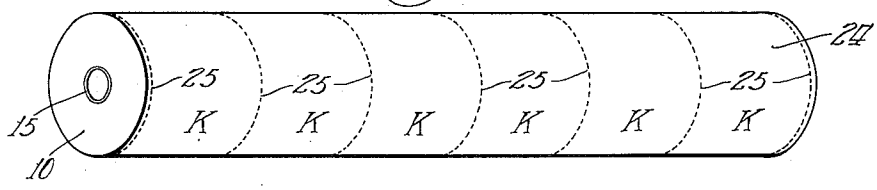

Fig. 5

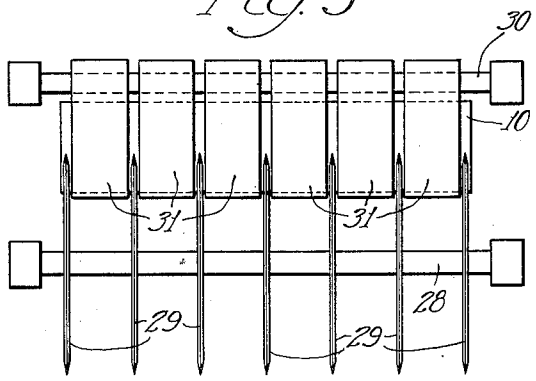

Fig. 6



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UNITED STATES PATENT OFFICE

2,050,394

PAPER ROLL AND METHOD OF FORMING SAME

Louis A. Straubel, Green Bay, Wis.

Original application November 14, 1934, Serial No. 752,971. Divided and this application October 18, 1935, Serial No. 45,621

19 Claims. (Cl. 164—17)

The invention relates to rolls of partially severed paper and an improved method of forming the rolls, this application being a division of my co-pending application, Serial No. 752,971, filed November 14, 1934. More particularly, the invention relates to rolls of relatively long and narrow strips of paper partially severed at a plurality of longitudinally spaced transverse lines, the lines of cut having a length less than the width of the strip whereby the several portions are connected by narrow marginal ties.

An elongated strip of thin, easily torn paper of the quality in general use for toilet paper cannot be wound into a compact roll after it is partially severed as described for the reason that the tension necessarily exerted on the paper to wind it compactly is sufficient to completely sever the paper at the lines of transverse cut and the invention contemplates a novel method of slitting a blank sheet of paper, winding it into a compact multiple roll, and then severing the roll transversely at planes such that the individual rolls so formed are partially severed transversely by the slits previously formed in the blank sheet.

It is one of the objects of the invention to provide individual rolls of paper comprising longitudinal sections of practical length connected, at one marginal edge, by ties which are adapted to be severed by the slight pull normally necessary to unwind the roll.

It is another object of the invention to provide a novel method of wrapping and forming a multiple roll of paper from a single sheet, slit transversely in such a manner that upon cutting the roll at selected sections to form individual rolls, said individual rolls will each comprise a relatively narrow strip of paper partially severed along longitudinally spaced-apart transverse lines in such a manner that the strip comprises a plurality of longitudinally extending sections connected by narrow marginal ties with the next adjacent sections.

Still another object of the invention is the provision of a novel method of slitting, wrapping, and forming a relatively wide sheet of paper into a plurality of individual compact rolls, each comprising a narrow strip of paper having the same length as the blank and completely severed transversely other than by narrow ties at a plurality of longitudinally spaced transverse lines.

Another object of the invention is the provision of a novel method of producing a compact roll comprising a narrow sheet of soft, easily torn paper divided into a plurality of longitudinal sections each connected to the adjacent sections by a narrow tie.

A still further object of the invention is the provision of a novel method of forming toilet paper rolls which results in economy both in the production and use of the rolls.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel method herein described and also in the construction, arrangement and combination of parts herein described and shown and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts:

Fig. 1 is a view of a multiple roll formed from a sheet of paper, slit transversely in accordance with the principles of the invention;

Fig. 2 is a view of another multiple roll formed from a sheet of paper, also slit in accordance with the principles of the invention and wherein the slits are arranged in alternate rows, the sheet having a plurality of perforations arranged in rows respectively forming aligned extensions of the slits;

Fig. 3 is a view of still another multiple roll similar to, but providing a different arrangement of slits than those shown in Figs. 1 and 2;

Fig. 4 is a perspective view of either of the rolls shown in Figs. 1 and 2 with the roll enclosed by a close fitting wrapper.

Fig. 5 is a view of an individual roll resulting from cutting a multiple roll transversely, the individual roll being shown as it appears when partially unwound; and

Fig. 6 is a diagrammatic view of a device operable to cut the multiple rolls transversely into a plurality of individual rolls.

Referring now more particularly to the drawings, the numeral 10 designates a partially unwound multiple roll formed from a sheet of paper 11. The sheet 11, preliminary to winding it into multiple rolls, is provided with a plurality of transversely extending slits 12 formed in any suitable manner such as by a die cutter or the like. The slits 12 are arranged in longitudinally extending rows separated by common imaginary rectilinear parallel boundary lines indicated by dotted lines 13 with the outer edges of each of the border rows of slits bounded by imaginary lines, indicated by dotted lines 14, preferably parallel to the lines 13, and closely spaced to the adjacent marginal edges of the sheet.

The slits 12, comprising each row, are staggered relative to the slits comprising adjacent rows with alternate ones of the slits comprising each row terminating in the same boundary line and the remaining slits terminating in the other boundary line of the row.

A sheet of thin, easily torn paper such as toilet paper having its slits arranged as described, provides sufficient tensile strength to permit it to be wound into a compact multiple roll without tearing.

The multiple roll 10 is formed from the sheet 11 by winding it closely about a relatively rigid tubular paper core 15 which serves as a mandrel and results in the completed roll being compact and substantially unyielding when subjected to transverse pressure. The multiple roll is then enclosed, as shown in Fig. 4, with a close fitting continuous wrapper 24 having marker lines 25 on its outer surface so spaced as to respectively overlie the longitudinal lines 13 and 14 forming the boundary lines of the rows of slits 12. Any suitable indicia, such as a trade-mark or trade-name or manufacturer's name, generally designated by the letter "K", may be provided on the wrapper 24 between the lines 25. The wrapper lines 25 indicate the sections at which the multiple roll should be cut transversely to provide individual rolls comprising strips of paper of the usual width.

Obviously the cutting of the multiple roll, at the sections designated by the lines 25, will sever the sheet 11 along the longitudinal lines 13 and 14 and will thereby cut across and open each of the slits 12 at one end.

A compact roll of soft paper is liable to be distorted in the immediate area surrounding the cutting edge of the knife with the result that the lines of cut in the sheet 11 are more or less sinuous and may, therefore, not coincide exactly with the boundary lines but will curve away from and not intersect the ends of all of the slits. The tubular core 15 prevents such possible distortion and insures the cutting of the sheet in straight longitudinal lines.

The longitudinal strips, formed from the sheet 11 by the described cutting of the multiple roll along true rectilinear lines, each consists of a plurality of short sections connected with the adjacent sections at the lines of slit 12 only by a tie having a width equal to the difference between the length of the slits and the width of the individual rolls. Each individual roll thus consists of a section of the member 15 forming a core and a narrow strip of paper closely wrapped about the core but severed transversely leaving narrow marginal ties at a plurality of points. The ties occur alternately in opposite margins of the strip and have insufficient tensile strength to permit the strip to be wound into a roll.

Fig. 2 illustrates another embodiment of the invention as comprising a multiple roll 16 formed from a sheet of paper 17 wrapped about a core 15 and having transversely extending slits 12 arranged in a plurality of longitudinally extending rows bounded by imaginary lines 13 and 14. The slits comprising each longitudinal row are staggered relative to the slits comprising the next adjacent rows and are also shorter than the spacing of the adjacent boundary lines indicated by dotted lines 13 and 14. Alternate ones of the slits 12 in each row terminate in opposite boundary lines of the row leaving an unsevered portion adjacent each slit in which is formed a row of apertures 18 in alignment with and providing extension of each slit permitting easy severance of the sections and insuring that the sections will tear along the line of apertures. The multiple roll 16 is formed by wrapping the sheet 17, slitted and apertured as described and shown, about a core 15. It is then covered with a wrapper 24 and cut transversely along the lines 25 which are arranged in the same planes as the boundary lines 13 and 14.

Still another embodiment of the invention is shown in Fig. 3 as comprising a multiple roll 20 formed from a sheet 21 and wrapped about a core 15. The sheet 21 is also provided with a plurality of transversely extending slits 12, arranged in longitduinal rows but with the slits in each row all terminating in the same boundary line and staggered relative to the slits in the adjacent rows. The longitudinal rows of slits, except one border row and the next adjoining row, are each separated from the next adjacent row by an imaginary rectilinear line, indicated by dotted line 23 in which said border row and next adjacent row of slits both terminate. The outer ends of the slits comprising the border rows terminate short of the edges of the sheet 21 and have their other ends respectively terminating in the outer line 22 and the line 23. The roll 20 is enclosed with a wrapper 24 in the same manner and for the same purposes as described for the rolls 10 and 16, it being understood that the ends of the wrapper coincide with the marginal edges of the sheet, and that the lines 25 respectively overlie the lines 22 and 23 and that by severing the roll at the lines 25, the sheet 21 will be cut along the lines 22 and 23.

The multiple rolls 10, 16 and 20 may be cut transversely as described by using any suitable tool but because of the soft and yielding qualities of the paper generally used in such rolls, the cutting is most satisfactorily accomplished by positioning the rolls in a close fitting container whereby they are held firmly on both sides of the cutting section.

A typical device adapted for cutting such rolls is shown in Fig. 6 as having a plurality of thin cutting discs 29 fixedly mounted on a shaft 28 in spaced relation corresponding to the spacing of the lines 25 on the wrapper sheets 24. A container for the roll to be cut is shown as comprising a plurality of axially aligned cylindrical members 31 fixedly mounted on a member 30. The member 30 carrying the members 31 is adapted to be moved towards and away from the shaft 28 by any suitable means such as a rack, not shown. The shaft 28 is adapted to be rotated by any suitable means with the discs 29 in operative engagement with the roll positioned in the members 31, the spacing of the members being such as to permit entrance of and to maintain the discs in exact position. The multiple roll is thereby severed by the discs 29 into a plurality of individual rolls having smooth ends and similar wrappers. The core 15 prevents any possibility of distortion of the inner portion of the roll by cutting and insures that the individual rolls will be bounded by smooth plane surfaces intersecting the adjacent ends of the slits provided in the sheets as a preliminary to forming a multiple roll.

Fig. 5 illustrates a typical individual roll, formed from the sheet 11 by severing the roll 20, as it appears with the wrapper section 24 removed and the roll partially unwound. An individual roll, formed from a sheet 17 as shown in Fig. 2, will be similar to that shown in Fig. 5

except that the ties will contain perforations in alignment with the slit portion. An individual roll formed from the sheet 21 will also be similar to that shown in Fig. 5 except that the ties will all be in the same margin.

Thus it will be seen that I have provided compact rolls of toilet paper or the like substantially severed transversely at a plurality of lines to promote economy in use, the severance being sufficiently complete that the roll could not be formed from narrow strips previously so severed and that I have also provided a novel method of forming such rolls with close fitting wrappers.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transversely extending slits in the blank as there are rolls to be formed with adjacent rows having a common rectilinear boundary line, the spacing of said lines being greater than the length of the slits, the slits in each row terminating in one of the longitudinal lines, then forming a roll of said sheet, then enclosing said roll with a close fitting wrapper, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

2. The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transversely extending slits in the blank as there are rolls to be formed, with adjacent rows having a common rectilinear boundary line, the spacing of said lines being greater than the length of the slits with corresponding ends of the slits in each row terminating in the same longitudinal line, then forming a row of apertures in alignment with and extending from the other end of each of said slits to the longitudinal line forming a boundary for the next adjacent row of slits, then forming a roll of said sheet, then enclosing said roll with a close fitting wrapper, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

3. The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transverse slits in the blank as there are rolls to be formed with adjacent rows having a common rectilinear boundary line, the spacing of the boundary lines for each row being greater than the length of the slits comprising the row, certain of said slits in each row terminating in one longitudinal boundary line and others of said slits in each row terminating in the opposite longitudinal boundary line, then forming a roll of said sheet, then enclosing said roll with a close fitting wrapper, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

4. The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transverse slits in the blank as there are rolls to be formed with adjacent rows separated by common rectilinear boundary lines, the spacing of the boundary lines for each row being greater than the length of the slits comprising the row, certain of said slits in each row terminating in one longitudinal boundary line and others of said slits in each row terminating in the opposite longitudinal boundary line, then forming a plurality of rows of apertures in said sheet respectively in alignment with and forming extensions of said slits, then forming a roll of said sheet, then enclosing said roll with a close fitting wrapper, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

5. The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transverse slits in the blank as there are rolls to be formed with adjacent rows having a common rectilinear boundary line, the spacing of said lines being greater than the length of the slits comprising the row, alternate ones of said slits in each row terminating in one longitudinal boundary line and the remainder of said slits in each row terminating in the other longitudinal boundary line, then forming said sheet into a roll, then forming a close fitting wrapper for said roll, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

6. The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transverse slits in the blank as there are rolls to be formed with adjacent rows having a common rectilinear boundary line, the spacing of said lines being greater than the length of the slits comprising the row, alternate ones of said slits in each row terminating in one longitudinal boundary line and the remainder of said slits in each row terminating in the other longitudinal boundary line, then forming a plurality of rows of apertures in said sheet respectively in alignment with and forming extensions of said slits, then forming said sheet into a roll, then forming a close fitting wrapper for said roll, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

7. The method of forming a blank sheet of paper into a plurality of individual rolls which consists in forming as many longitudinal rows of transverse slits in the blank as there are rolls to be formed, the length of said slits being less than the width of the individual rolls to be formed, the slits in each row except one marginal row and the next adjacent row all having one end terminating in a longitudinal line in spaced relation to the adjacent ends of the slits forming the next adjacent row, said marginal and next adjacent rows having their slits terminating in the same longitudinal line, then forming said sheet into a roll, then enclosing said roll in a close fitting wrapper, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

8. The method of forming a blank sheet of paper into a plurality of individual rolls which consists in forming as many longitudinal rows of transverse slits in the blank as there are rolls to be formed, the length of said slits being less than the width of the individual rolls to be formed, the slits in each row except one marginal row and the next adjacent row all having one end terminating in a longitudinal line in spaced relation to the adjacent ends of the slits forming the next adjacent row, said marginal

and next adjacent rows having their slits terminating in the same longitudinal line, then forming a plurality of rows of apertures in said sheet respectively in alignment with and forming extensions of said slits, then forming said sheet into a roll, then enclosing said roll in a close fitting wrapper, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

9. The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transverse slits in the blank as there are rolls to be formed with the slits in each row terminating in a rectilinear longitudinal line, the spacing of said lines being greater than the length of said slits, the slits comprising the marginal rows having their outer ends stopping short of the edge of the sheet, the slits in one marginal row and in the next adjacent row terminating in the same longitudinal line, then forming a roll of said sheet, then enclosing said roll with a close fitting wrapper, and then cutting said wrapper and roll at sections corresponding to said longitudinal lines.

10. The method of forming a blank sheet of paper into a plurality of individual rolls, which consists in forming as many longitudinal rows of transverse slits in the blank as there are rolls to be formed with the slits in each row terminating in a rectilinear longitudinal line, the spacing of said lines being greater than the length of said slits, the slits comprising the marginal rows having their outer ends stopping short of the edge of the sheet, the slits in one marginal row and in the next adjacent row terminating in the same longitudinal line, then forming a plurality of rows of apertures in said sheet respectively in alignment with and forming extensions of said slits, then forming a roll of said sheet, then enclosing said roll with a close fitting wrapper, and then cutting said roll and wrapper at sections corresponding to said longitudinal lines.

11. An article of manufacture comprising a sheet of paper adapted to be formed into a multiple roll and cut transversely at selected sections to form a plurality of individual rolls, said sheet having a plurality of transverse slits arranged in longitudinal rows, the width and number of said rows corresponding to the width and number of individual rolls to be formed from the sheet, said rows of slits being bounded by parallel rectilinear lines with adjacent rows having common boundary lines, the length of the slits comprising each row being less than the spacing of the boundary lines of said row, said slits terminating in one or the other of said boundary lines.

12. An article of manufacture comprising a sheet of paper adapted to be formed into a multiple roll and cut transversely at selected sections to form a plurality of individual rolls, said sheet having a plurality of transverse slits arranged in longitudinal rows, the width and number of said rows corresponding to the width and number of individual rolls to be formed from the sheet, said rows of slits being bounded by parallel rectilinear lines with adjacent rows having common boundary lines, the length of the slits comprising each row being less than the spacing of the boundary lines of said row, said slits terminating in one or the other of said boundary lines, said sheet having a plurality of apertures arranged in rows forming aligned extensions of said slits, each row of apertures lying within said rectilinear lines forming boundaries for the slit of which it is an extension.

13. An article of manufacture comprising a sheet of paper adapted to be formed into a multiple roll and cut transversely at selected sections to form a plurality of individual rolls, said sheet having a pluraliity of transverse slits arranged in longitudinal rows, the width and number of said rows corresponding to the width and number of the individual rolls to be formed from the sheet, said rows of slits being bounded by parallel rectilinear lines with adjacent rows having common boundary lines, the length of the slits comprising each row being less than the spacing of the boundary lines of said row with alternate ones of the slits terminating in opposite boundary lines.

14. An article of manufacture comprising a sheet of paper adapted to be formed into a multiple roll and cut transversely at selected sections to form a plurality of individual rolls, said sheet having a plurality of transverse slits arranged in longitudinal rows, the width and number of said rows corresponding to the width and number of the individual rolls to be formed from the sheet, said rows of slits being bounded by parallel rectilinear lines with adjacent rows having common boundary lines, the length of the slits comprising each row being less than the spacing of the boundary lines of said row with alternate ones of the slits terminating in opposite boundary lines, said sheet having a plurality of apertures arranged in rows forming aligned extensions of said slits, each row of apertures lying within said parallel rectilinear lines forming boundaries for the slits of which it is an extension.

15. A multiple roll formed of a single sheet of paper, a close fitting continuous wrapper enclosing the roll and providing longitudinally spaced-apart indicia locating sections where the multiple roll is to be cut to form a plurality of individual rolls, said sheet having a plurality of transverse slits arranged in longitudinal rows corresponding in number and width to the number and width of the individual rolls to be formed from the multiple roll, said rows of slits being bounded by parallel rectilinear lines positioned to respectively lie in said cutting sections of the multiple roll and wrapper, the length of the slits comprising each row being less than the boundary lines of said row, said slits terminating in one or the other of said boundary lines.

16. A multiple roll comprising a single sheet of paper, a relatively rigid tubular core concentric with said roll and a close fitting continuous wrapper enclosing the roll and providing longitudinally spaced-apart indicia locating sections where the multiple roll is to be cut to form a plurality of individual rolls, said sheet having a plurality of transverse slits arranged in longitudinal rows corresponding in number and width to the number and width of the individual rolls to be formed from the multiple roll, said rows of slits being bounded by parallel rectilinear lines positioned to respectively lie in said cutting sections of the multiple roll and wrapper, the length of the slits comprising each row being less than the boundary lines of said row, said slits terminating in one or the other of said boundary lines.

17. A multiple roll formed of a single sheet of paper, a close fitting continuous wrapper enclosing the roll and providing longitudinally spaced-apart indicia locating sections where the multiple roll is to be cut to form a plurality of individual rolls, said sheet having a plurality of transverse

slits arranged in longitudinal rows corresponding in number and width to the number and width of the individual rolls to be formed from the multiple roll, said rows of slits being bounded by parallel rectilinear lines positioned to respectively lie in said cutting sections of the multiple roll and wrapper, the length of the slits comprising each row being less than the boundary lines of said row, said slits terminating in one or the other of said boundary lines, said sheet having a plurality of apertures arranged in rows forming aligned extensions of said slits, each row of apertures lying within said parallel rectilinear lines forming boundaries for the slits of which it is an extension.

18. A multiple roll formed of a single sheet of paper, a close fitting continuous wrapper enclosing the roll and providing longitudinally spaced-apart indicia locating sections where the multiple roll and wrapper are to be cut to form a plurality of individual rolls, said sheet having a plurality of transverse slits arranged in longitudinal rows corresponding in number and width to the number and width of the individual rolls to be formed from the multiple roll, said rows of slits being bounded by parallel rectilinear lines positioned to respectively lie in said cutting sections of the multiple roll and wrapper, the length of the slits comprising each row being less than the spacing of the boundary lines of said row with alternate ones of the slits terminating in opposite boundary lines.

19. A multiple roll formed of a single sheet of paper, a close fitting continuous wrapper enclosing the roll and providing longitudinally spaced-apart indicia locating sections where the multiple roll and wrapper are to be cut to form a plurality of individual rolls, said sheet having a plurality of transverse slits arranged in longitudinal rows corresponding in number and width to the number and width of the individual rolls to be formed from the multiple roll, said rows of slits being bounded by parallel rectilinear lines positioned to respectively lie in said cutting sections of the multiple roll and wrapper, the length of the slits comprising each row being less than the spacing of the boundary lines of said row with alternate ones of the slits terminating in opposite boundary lines, said sheet having a plurality of apertures arranged in rows forming aligned extensions of said slits, each row of apertures lying within said parallel rectilinear lines forming boundaries for the slit of which it is an extension.

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