

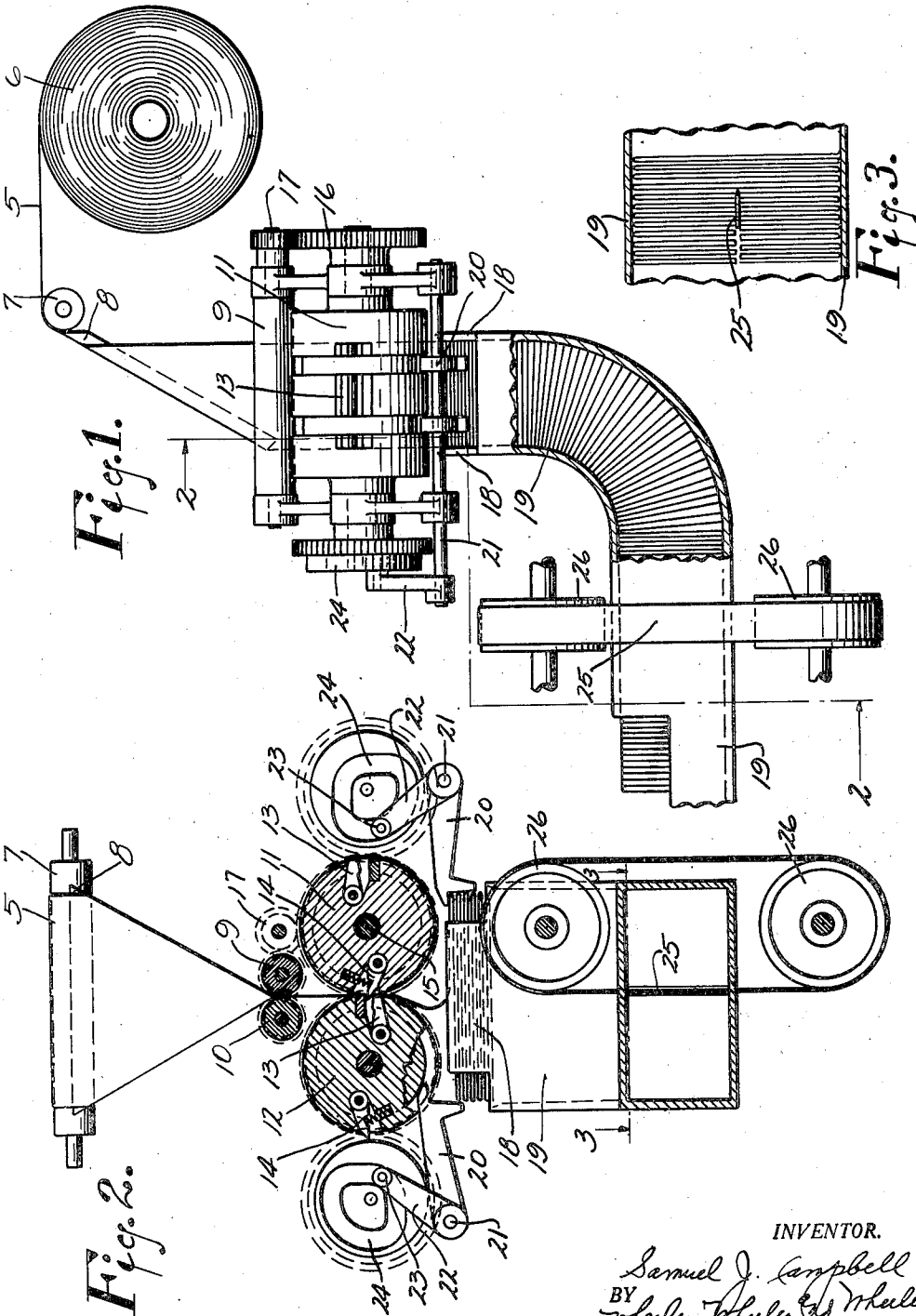
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ART OF MANUFACTURING FOLDED PAPER ARTICLES

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ART OF MANUFACTURING FOLDED PAPER ARTICLES

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7 Claims. (Cl. 270—73)

This invention relates to improvements in the art of manufacturing folded paper articles.

By way of illustrating the process herein disclosed I have shown it applied to the manufacture of quarter folded paper napkins. It is, however, adapted for other folds and for the manufacture of other products, as will be well understood by those skilled in the art.

It has always been common in the manufacture of folded paper articles, to sever a desired blank from the web before completing the fold therein. In fact, the only fold commonly made in the paper before the blanks are severed from the web is the center line fold provided by drawing the paper over a so-called triangle plate.

The present invention has for its object the elimination of difficulties in registration and accuracy of fold heretofore experienced in the manufacture of folded paper articles. More specifically stated, the present invention seeks to carry the folding operation further before the individual units are severed from the web than has heretofore been done, the cutting operation preferably being performed at a predetermined point between two successive series of folds which are accurately positioned by the machine, thereby ensuring a proper relation between such folds and the severed margins of the individual articles.

While the present invention does not require a quarter folding operation nor prohibit further operations on the quarter folded article, it is, nevertheless, recognized that the quarter folded paper product is a complete article of manufacture widely used commercially not only per se, but also as a basis for further folding operations. Hence, I have sought particularly, by the process herein disclosed, to manufacture a quarter folded paper sheet by first longitudinally folding the web, then convoluting the longitudinally folded web back and forth upon itself to provide a series of uniformly spaced laterally disposed folds, and finally severing the superposed convolutions of the web at an intermediate point whereby to separate the oppositely folded portions thereof into individually quarter folded units of uniform size and fold.

Further advantages of the invention herein disclosed will be apparent to those skilled in the art upon study of the following specification and claims.

In the drawing:

Figure 1 is a fragmentary diagrammatic side elevation of apparatus for carrying out the process to which this invention relates, portions of

the delivery chute being broken away to expose the folded web therein.

Figure 2 is a diagrammatic fragmentary detail view in section taken on the line 2—2 of Figure 1.

Figure 3 is a diagrammatic fragmentary detail view taken in section in the plane indicated at 3—3 in Figure 2.

Like parts are identified by the same reference characters throughout the several views.

The web 5 fed from parent roll 6 passes over guide roll 7 and triangle plate 8 to form a longitudinal fold therein which is creased between rolls 9 and 10.

The longitudinally folded web next passes between the folding cylinders 11 and 12 which have mutually coacting vise members 13 and tucking blades 14, the arrangement being such that in the rotation of the rolls the paper will be thrust by the tucking blades 14 of one roll into the vise jaws 13 of the other, whereby the paper will be folded alternately in opposite directions to lie in convolutions as clearly shown in Fig. 2.

The means employed for operating the vise jaws 13 is not herein illustrated, being well known in the art. The rolls 11 and 12 may be inter-gearred in the usual way, roll 11 being mounted on a driving shaft 15 carrying a gear 16 meshing with pinion 17 for the operation of the creasing or feed roll 9.

The longitudinally folded web transversely folded back and forth upon itself in superposed convolutions, is delivered by the folding rolls 11 and 12 between the side portions 18 of a delivery chute 19. Packers 20 are alternately lifted to receive transversely folded portions of the convoluted web and are subsequently oscillated in a direction to compact into the chute the transverse folds of the web which lie therebeneath.

The packers 20 may conveniently be operated by the rock shafts 21 upon which they are mounted, said rock shafts having arms 22 equipped with cam followers 23 engaged by cams 24 gear driven from the respective folding cylinders.

As the compacted and convoluted folded web moves through the chute 19 it is acted on by a band knife 25 operating over suitable pulleys 26 driven from any suitable source of power. It will be obvious that the relation of the knife to the sides of the chute and the convolutions of the compacted and previously folded paper web packed within the chute, will necessarily be fixed, and hence will give very accurately the desired form and shape of folded article. Because the paper is not severed until the web has been

folded to the desired form, difficulties heretofore experienced in registration of the web with the folding apparatus are eliminated, and considerable economies in manufacture and improvement of accuracy are assured.

No claim is made herein to the machine disclosed in the accompanying drawing. The commercial embodiment of the apparatus is to comprise the subject matter of a companion application for patent.

I claim:

1. The method of manufacturing folded sheets, which comprises conducting all of the necessary folding operations on an integral web, confining said web after completing said folding operations, compacting the web at successive fold lines in such a manner as to propel the resulting stack of convolutions from the point of folding to a convenient cutting point and against a cutting knife, and cutting said web while so confined at points to produce the required sheets.

2. The method of converting a web to an article comprising a folded sheet, which method includes folding the web continuously in a manner bringing successive portions of its surface into superposed relation as ultimately desired in the completed article, confining said web after said folding operations, compacting the web at the successive fold lines in a manner to propel the successive convolutions to a point convenient for cutting and against a cutting knife, and severing superposed portions of the web while so confined to separate into folded sheet units the web portions previously formed.

3. The method of manufacturing folded sheet articles from a web of sheet material, which method consists in folding the material in web form to bring web portions into superposed relation in the relative positions ultimately desired in the completed article, the folded web occupying the space required by at least two stacks of completed articles, confining said web after said folding operations, compacting said convolutions and propelling them by said packing pressure into contact with a knife, and thereby severing the web into the respective stacks of completed articles while so confined.

4. The method of making a quarter folded sheet, which comprises longitudinally folding a web, reversely folding the web back and forth upon itself in convolutions equal in length to two adjacent stacks of the desired quarter folded

sheets, confining said folded sheets, compacting said convolutions in the confining means and propelling them therein to a remote point, and cutting superposed portions of said web while so confined in such a manner as to avoid expanding said compacted convolutions and thereby causing them to bind in said confining means, to separate its terminal folded portions into neatly folded and compacted stacks.

5. The method of manufacturing quarter folded sheets which consists in longitudinally folding a web, transversely folding successive portions of said web alternately in opposite directions upon itself whereby to provide a series of web convolutions twice the width of the desired completed article, confining said convolutions against lateral displacement, forcing said series of convolutions against a cutter while so confined, and cutting superposed portions of said web intermediate the folds therein by removing sufficient material to accommodate said cutter to form two stacks of completed articles, the removal of said material avoiding binding of said stacks in the confining means while being cut.

6. The method of producing folded sheets, which consists in folding a web upon itself into a series of successive plies integrally joined by the folded portions of the web, compacting the folded portions of the web to maintain said plies in intimate relation, confining said plies against lateral displacement, and subsequently cutting said plies while so confined intermediate the folded portions of the web in such a manner as to avoid expanding the compacted folded portions, whereby to avoid binding of said plies while being cut, and whereby to provide a plurality of stacks of folded articles.

7. The method of manufacturing quarter folded sheets, which consists in longitudinally folding a web, transversely folding said web to fold successive portions thereof back and forth in superposed relation, compacting the transverse folds of the web, confining said folds against lateral displacement, and subsequently cutting through the superposed web portions intermediate said folds while said folds are so confined and avoiding binding of said folds while being cut, by removing sufficient material to accommodate a cutter whereby to divide the web into a plurality of stacks of superposed quarter folded sheets.

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