July 19, 1932. T. N. DELIGIANES ET AL 1,867,909

FOLDING MACHINE

Filed March 3, 1931

Fig. 1.

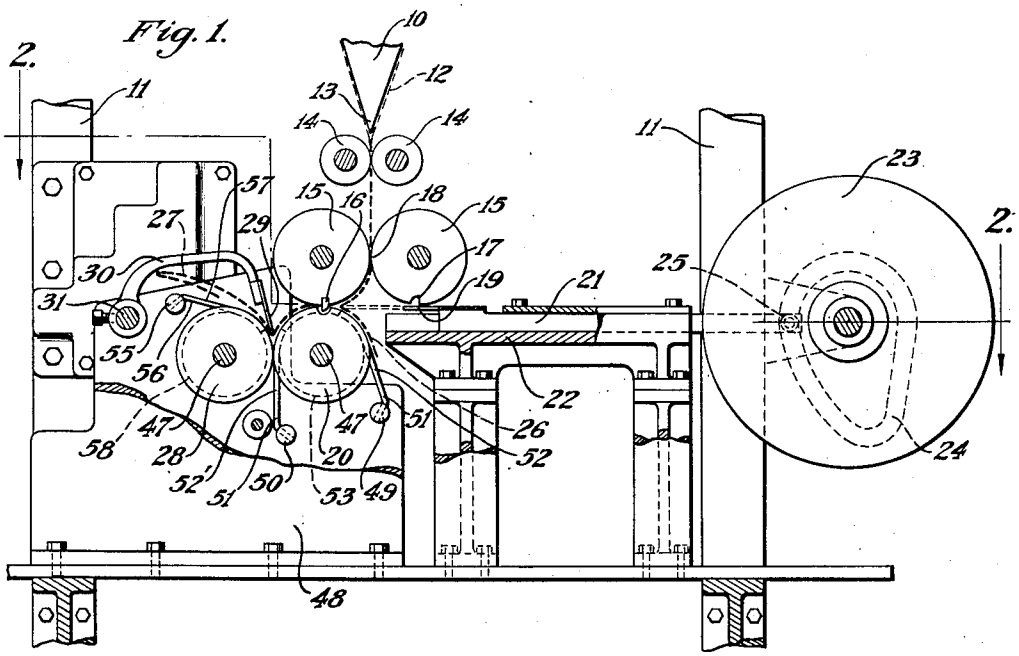


Fig. 2.

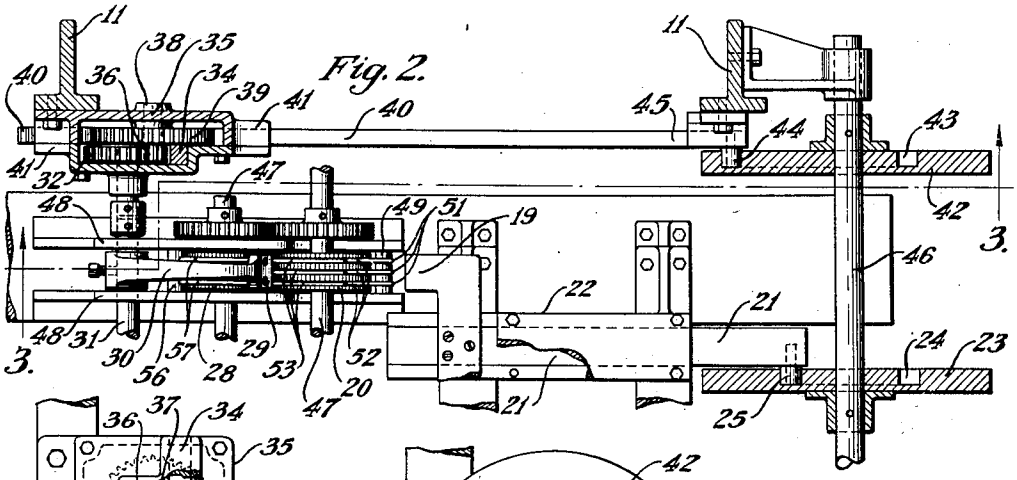
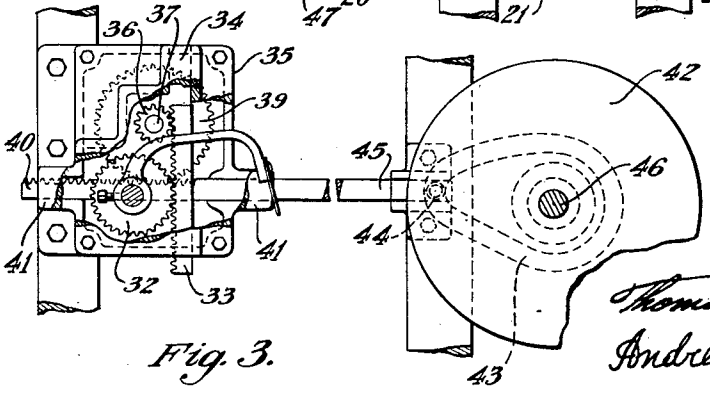


Fig. 3.



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UNITED STATES PATENT OFFICE

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FOLDING MACHINE

Application filed March 3, 1931. Serial No. 519,771.

This invention relates to certain novel improvements in folding machines especially designed and adapted for folding paper napkins to be used in connection with containers from which the napkins are manually dispensed, and has for its principal object the provision of an improved construction of this character which will be highly efficient in use and economical in manufacture.

Among the salient objects of the invention is the provision of a paper folding machine which will cut a folded continuous strip of material into strips of predetermined lengths and fold the end portions of these strips upon themselves in opposite directions whereby to produce a napkin having finger tabs on opposite sides of the intermediate section of the strips and of a length less than the length of the said intermediate section thereof to facilitate dispensing the napkin from a container.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing showing the preferred form of construction, and in which:

Fig. 1 is a fragmentary cross-sectional detail view of our improved napkin folding machine;

Fig. 2 is a fragmentary plan view of the same taken substantially on line 2—2 of Fig. 1; and

Fig. 3 is a fragmentary part sectional detail view of the same taken substantially on line 3—3 of Fig. 2.

Referring more particularly to the drawing, 10 indicates a fold member supported from the framework 11 in any suitable manner. This fold member in the present instance is preferably triangular in formation and is adapted to have passed therethrough a continuous strip of material 12 to be folded longitudinally upon itself. Adjacent the apex 13 of this fold member is a pair of cooperating feed rollers 14 likewise supported from the frame structure 11 in any suitable manner. These rollers 14 while acting as feed rollers also function as creasing rollers whereby to crease the fold of the strip as it leaves the fold member 10.

From the feed rollers 14 the folded strip of material passes between a pair of cutting rollers 15 supported in any suitable manner from the frame structure 11. One of these cutting rollers is provided with a blade member 16 adapted at a predetermined time to enter into a slot 17 formed transversely in the other of the cutting rollers whereby to sever the folded strip at a point indicated at 18. Simultaneously with this severing of the strip of material that portion of the strip below the line of severance is engaged by a feed plate 19 which functions to direct the severed strip of paper between a fold roller 20 which co-operates with the adjacent cutting roller to fold one end portion of the severed strip upon itself. This feed plate is carried by a bar 21 slidably mounted within a guide structure 22 and operable in a reciprocatory manner by means of a rotatable disc 23 having a cam slot 24 formed therein to receive a roller member 25 carried by the bar 21 and operable in this cam slot.

The severed strip of material indicated at 26 is directed between the fold roller 20 and the adjacent cutting roller so as to dispose the folded end portion of the severed strip in the position indicated at 27 disposing the unfolded end portion of the severed strip in a plane above a fold roller 28 which cooperates with the fold roller 20 to fold this end portion back upon itself when forced between the rollers 20 and 28 by means of a feed plate 29 carried by an arm 30 mounted on a shaft 31 for an oscillatory movement. The oscillation of the arm 30 is accomplished by means of a gear 32 mounted on the shaft 31 and operably meshing with a rack bar 33 mounted for longitudinal movement in a guiding structure 34 provided by a housing 35. This rack bar 33 is reciprocated by means of a pinion 36 mounted on a shaft 37 journaled in a suitable bearing 38 provided by the housing 35.

On this shaft 37 is fixedly mounted a gear 39 which meshes with a reciprocatory rack bar 40 supported for reciprocatory movement

in a guiding structure 41 provided by the housing 35. Reciprocation of this rack bar is accomplished by means of a disc 42 having a cam slot 43 formed therein into which is operatively mounted a roller 44 carried by the end 45 of the rack bar 40. The disc 23 and disc 42 are mounted upon a shaft 46 which is operated by power driven mechanism (not shown) of any suitable structure.

The rollers 20 and 28 are mounted upon shafts 47 supported in parallel relation between plates 48 between which these rollers 20 and 28 are arranged. Carried by the plates and extending transversely therebetween are pin members 49 and 50. To the pin members 49 and 50 there are secured the end portions 51 of a plurality of wire members 52 and 52′ substantially circular in cross-section and mounted to extend in grooves 53 formed in the roller 20 in opposed relation.

Also secured to the plates 48 and extending therebetween is a pin 55 having secured thereto the end portions 56 of wire members 57 likewise substantially circular in cross-section and having their outer end portions confined in grooves 58.

As will be obvious, these wire members prevent the severed strip of material from being fed around the fold rollers. It will be apparent that as the severed strip leaves the fold roller 20 and adjacent cutting roller 15, the wire members 57 will deflect the folded end portion of the severed strip into the position illustrated in Fig. 1 at 27.

It is pointed out that the movable parts of our machine are so timed as to perform their respective functions at the proper time.

While we have illustrated and described the preferred form of construction for carrying our invention into effect, this is capable of variation and modification without departing from the spirit of the invention. We, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail ourselves of such variations and modifications as come within the scope of the appended claims.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

1. A folding machine of the class described including a pair of folding rollers, means for feeding a strip of material between said rollers, means associated with one of said rollers for preventing the said strip to wind itself upon said one of the rollers, a folding roller adapted to co-operate with one of said folding rollers for folding said strip upon itself at its opposite end portion, and means for feeding said strip between said folding roller and said one of the folding rollers.

2. A folding machine of the class described including a pair of folding rollers, means for feeding a strip of material between said rollers, means associated with one of said rollers for preventing the said strip to wind itself upon said one of the rollers, a folding roller adapted to co-operate with one of said folding rollers for folding said strip upon itself at its opposite end portion, means for feeding said strip between said folding roller and said one of the folding rollers, and means co-operating with said folding roller to prevent said strip from winding itself upon said folding roller.

3. A folding machine comprising a pair of co-operating folding rollers, said folding rollers each being provided with circumferentially spaced grooves, means for feeding a strip of material to be folded through said rollers, and fingers disposed in said grooves and functioning to prevent said strip from winding itself upon either of said rollers.

4. A machine for the purpose set forth comprising cutting mechanism for cutting a web into strips of predetermined lengths, means for folding the opposite end portions of each strip transversely upon and on opposite sides of the intermediate section thereof to provide finger tabs each of a length less than the length of said intermediate section.

5. A machine for the purpose set forth comprising cutting mechanism for cutting a web into strips of predetermined lengths, and folding mechanism including means for successively and transversely engaging each strip at opposite sides thereof whereby to fold the end portions of the strip upon and on opposite sides of the intermediate portion thereof.

6. A machine of the class described comprising cutting rollers, a folding member operative with one of the cutting rollers, a member for feeding one end portion of a strip cut from a length of material by the cutting rollers in a direction for passage between the folding member and said one of the cutting rollers whereby the end portion of the strip will be folded upon itself by passage between said folding member and said one of the cutting rollers, a second folding member operative with the said first named folding member, and a second member for feeding the opposite end portion of the strip for passage between said first and second named folding members whereby said opposite end portion of the strip will be folded upon itself in an opposite direction by passage between said first and second named folding members.

In testimony whereof, we affix our signatures.

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