Nov. 3, 1931. R. P. MOGAARD 1,830,439

FLASH FOLDING DEVICE FOR KNIFE FOLDING UNITS OF FOLDING MACHINES

Filed April 7, 1931

Fig. 1.

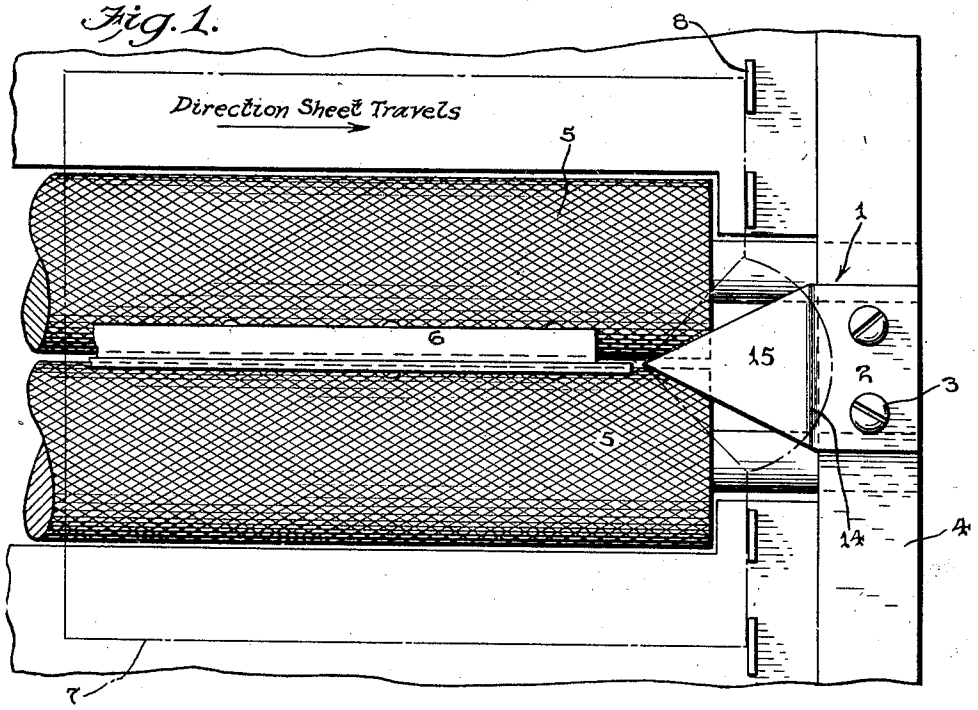


Fig. 2.

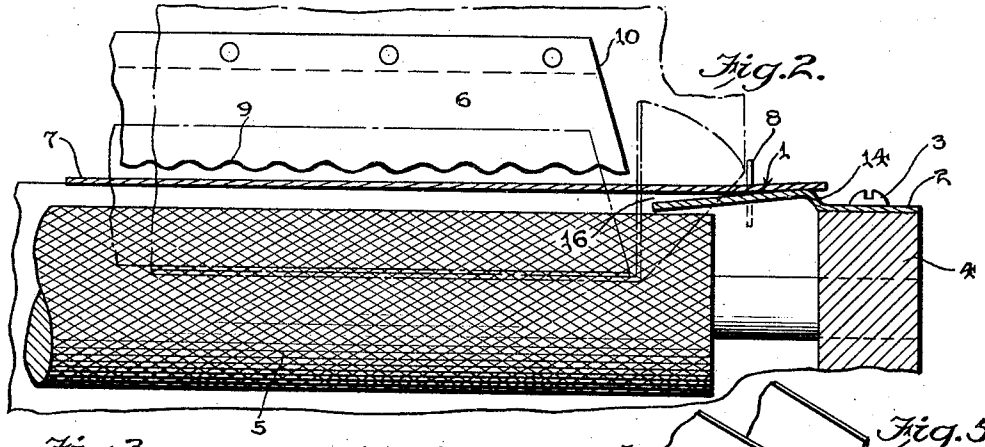


Fig. 3.

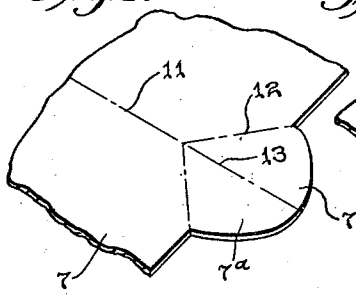


Fig. 4.

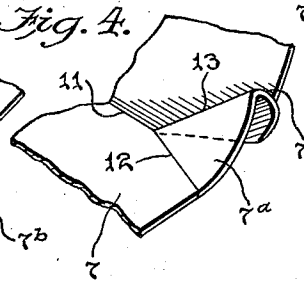
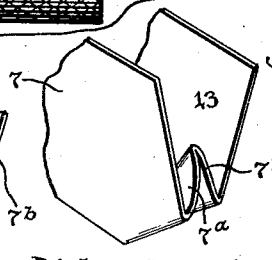


Fig. 5.



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UNITED STATES PATENT OFFICE

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FLASH FOLDING DEVICE FOR KNIFE FOLDING UNITS OF FOLDING MACHINES

Application filed April 7, 1931. Serial No. 528,436.

The invention relates to a flash folding device for knife folding units of folding machines.

The object of the present invention is to provide for knife folding units of folding machines a simple, practical and efficient flash folding means adapted to fold or tuck in the flash portion of a circular or folder simultaneously with the folding of the sheet by the knife folding unit to fold a sheet into a circular or folder.

A further object of the invention is to provide flash folding means of this character adapted to support the flash portion of a sheet while the knife of the knife folding unit starts a longitudinal fold beyond the flash folding means and to enable the flash folding means to fold or tuck in the flash portion of the sheet without tearing or otherwise injuring the sheet or interfering with the speed of the folding machine.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the drawings:—

Figure 1 is a plan view of a portion of the folding machine showing a knife folding unit provided with a flash folding plate constructed in accordance with this invention, a sheet having a flash portion being illustrated in dot and dash lines.

Fig. 2 is a central longitudinal sectional view of the same.

Fig. 3 is a perspective view of a portion of the sheet showing the flash portion and illustrating the lines of scoring to facilitate the folding of the sheet and the flash portion thereof.

Fig. 4 is a similar view showing the sheet and flash portion partially folded.

Fig. 5 is a detail perspective view of a portion of the sheet showing the same and the flash portion nearly completely folded, the parts being slightly opened to facilitate illustration thereof.

In the accompanying drawings, in which is illustrated the preferred embodiment of the invention, 1 designates a pointed tapered forming plate having an outer substantially rectangular attaching portion 2 which is secured by screws 3 or other suitable fastening devices, to a stationary portion 4 of the frame of a folding machine having a knife folding unit. The knife folding unit comprises a pair of knurled rollers 5 and a knife 6. The rollers are arranged horizontally below the knife which moves upwardly and downwardly to force a sheet 7 down into the bite of the two knurled rollers 5. The knife is movable upwardly and downwardly toward and from the knurled rollers by any suitable means and, as the mechanism for moving the knife toward and from the rollers and also the means for feeding the sheet 7 to a position above the rollers does not constitute a portion of the present invention, and as any suitable mechanism may be employed for this purpose, detailed illustration thereof is deemed unnecessary. The sheet travels in the direction of the arrow indicated in Fig. 1 of the drawings as denoted by the legend "Direction sheet travels" on Fig. 1, and suitable stops 8 are provided for limiting the travel of the sheet to position the same properly with relation to the knife folding unit and the flash fold device.

The knife 6 is provided with a corrugated sheet engaging edge 9 and the end 10 adjacent the flash fold device is angled off to clear and avoid interference with the flash portion of the sheet as the fold is formed.

In order to facilitate folding, the angular flash folds and the longitudinal straight fold are all scored at the time the flash portion of the sheet is die cut, as indicated by the dot and dash lines 11, 12 and 13, as clearly indicated in Fig. 3 of the drawings.

The flash portion 7^a of the sheet is tapered inwardly as indicated by the dot and dash lines 12 which define the side edges of the flash portion and the outer edge 7^b which is shown curved for convenience, may be of any configuration, as will be readily understood.

The pointed tapering forming plate 1 which folds and tucks in the flash portion of the sheet simultaneously with the formation of the longitudinal fold thereof, is provided at the juncture of the attaching portion and the tapered folding portion with an offset or bend 14 extending upwardly from the attaching portion and the tapered flash folding portion 15 is set at an angle or inclination to the horizontal so that when the flash portion of the sheet rests upon and is supported by the tapered flash folding portion 15, the point 16 of the tapered portion 15 is spaced from the lower face of the flash portion of the sheet so that when the knife strikes the sheet, the tip or apex of the tapered portion of the plate clears the flash on the underside about one-eighth to three-thirty seconds of an inch. This space or distance will enable the flash portion of the sheet to be successfully folded without tearing or otherwise injuring the sheet and without materially interfering with the speed of operation of the folding machine.

The length and width of the tapered portion of the forming plate depends on the size of the flash and it has been found by experience that the included angle of the side edges of the tapered portion of the forming plate must be considerably less than the included angle of the sides of the flash portion of the sheet in order to work successfully and by constructing the tapered portion of the forming plate of a considerably less width than the flash portion of the sheet, as illustrated in Fig. 1 of the drawings, together with the spacing of the tip or apex of the forming plate from the lower face of the flash portion of the sheet, as illustrated in Fig. 2, sheets provided with flash portions may be rapidly folded. A pointed forming plate supports the flash portion of the sheet while the knife starts the longitudinal fold at a point beyond the flash, but as the knife continues downward, the flash is tucked in to its limit and the sheet passes between the rolls. The angling of the end 10 of the knife enables the flash fold to be made and completed without the flash fold coming in contact with the end of the knife.

The tapered portion of the plate extends over the adjacent ends of the knurled rollers above the bite of the same and the angled end of the knife terminates short of such ends of the rollers so that the folded sheet with the flash portion thereof folded between the sides of the sheet pass between the knurled rollers and are operated on by the same, as indicated in dot and dash lines in Figs. 1 and 2 of the drawings.

What is claimed is:—

1. The combination with a knife folding unit including a pair of rollers and a cooperating knife movable toward and from the rollers, of means located adjacent one end of the knife and arranged to engage a flash portion of a sheet to fold and tuck in the flash portion of the sheet simultaneously with the folding of the same by the knife folding unit.

2. The combination with a knife folding unit including a pair of rollers and a cooperating knife movable toward and from the rollers, of a stationary forming plate arranged to support a flash portion of a sheet while the knife starts the fold beyond the flash portion, said plate operating to tuck in the flash portion simultaneously with the folding of the sheet by the knife and the rollers.

3. The combination with a knife folding unit including a pair of rollers and a cooperating knife movable toward and from the rollers, of a stationary plate arranged to support and tuck in a flash portion of a sheet, said plate being set at an angle so that its terminal portion will be clear of the flash portion of the sheet when the knife strikes the sheet.

4. The combination with a knife folding unit including a pair of rollers and a cooperating knife movable toward and from the rollers, of a tapered forming plate arranged at one end of the knife adapted to support a flash portion of a sheet and set at an angle to the lower face of the same to cause its tip of the plate to clear the said flash portion when the knife strikes the sheet.

5. The combination of a knife folding unit including a pair of rollers and a folding knife movable toward and from the bite of the rollers and having one end cut away to provide a clearance space, and means located adjacent the said clearance space for folding a flash portion of a sheet simultaneously with the folding of the sheet by the knife unit, the said clearance space permitting the folding of the flash portion without contact with the end of the knife.

6. The combination of a knife folding unit including a pair of rollers and a folding knife movable toward and from the bite of the rollers and having one end cut away to provide a clearance space, and a tapered forming plate extending to a point above the rollers and adapted to support a flash portion of the sheet and tuck in the same simul-

taneously with the folding of the sheet by the said knife.

7. The combination with a knife folding unit including a pair of rollers and a knife movable toward and from the rollers, of a tapered forming plate adapted to support a tapered flash portion of a sheet and being of a width less than the tapered flash portion, said forming plate being located adjacent one end of the knife adapted to fold and tuck in the flash portion of the sheet simultaneously with the folding of the same by the knife folding unit.

In testimony whereof I affix my signature.

RICHARD P. MOGAARD.