W. & C. DANIELS.

Paper-Folding Machine.

No. 164,978. Patented June 29, 1875.

Fig. 1.

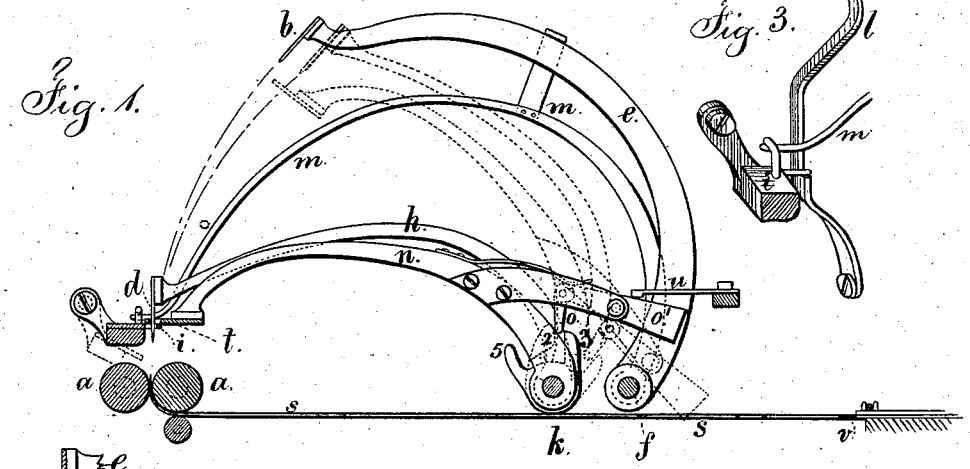


Fig. 3.

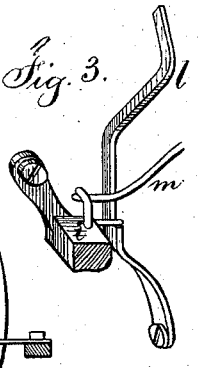


Fig. 4.

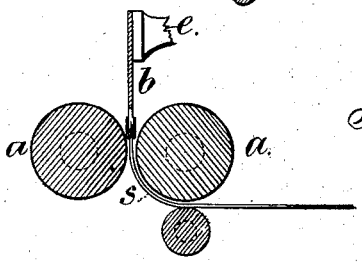
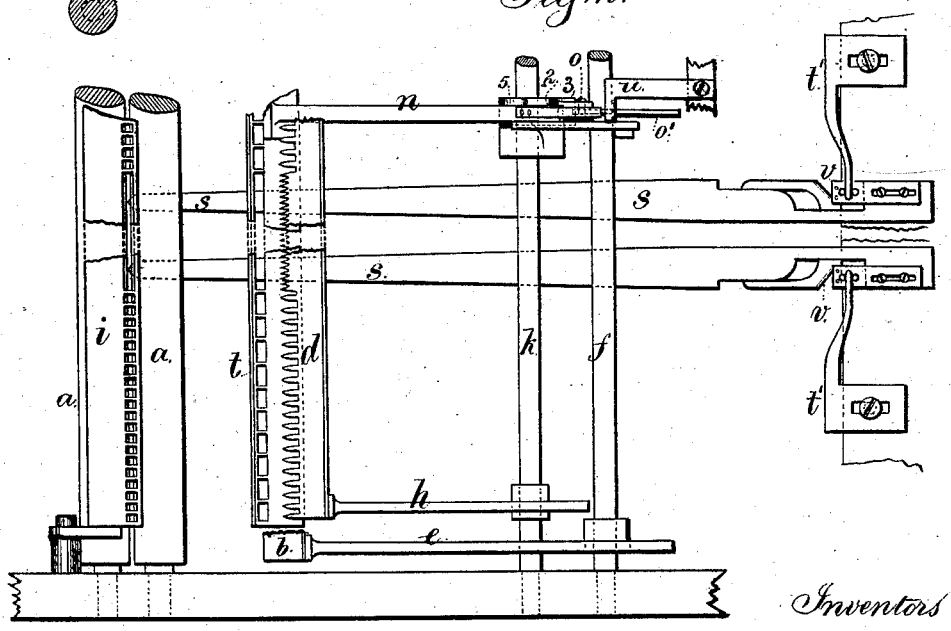


Fig. 2.



Witnesses,
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Harold Sewell

Inventors
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UNITED STATES PATENT OFFICE.

WILLIAM DANIELS AND CHARLES DANIELS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PAPER-FOLDING MACHINES.

Specification forming part of Letters Patent No. **164,978**, dated June 29, 1875; application filed June 18, 1875.

To all whom it may concern:

Be it known that we, WILLIAM DANIELS and CHARLES DANIELS, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Paper-Folding Machines, of which the following is a specification:

In an application of William Daniels for a patent on folding-machine, a perforating-knife and fingers to support the sheet are described as combined with the folding-blade of a folding-machine. Our present invention relates to an improvement upon the same; and consists in a sheet-holder combined with the fingers, and forming a stripper to remove the sheet from the knife, and serving also as a protector to keep the operator from injury by the knife.

We combine with the folding and perforating apparatus one or more tongues with inclined cutters, that enter the sheet at the first fold, and over which the folded sheet travels, and the filaments that have been allowed to remain to guide the two parts of the folded sheet are separated by the tongue and cutter as the sheet is folded the second time and passed away.

In the drawing, Figure 1 is a vertical section transversely of the folding-blade, and Fig. 2 is a plan of the parts that fold and separate the sheet. Fig. 3 is a perspective view of the latch for holding the finger-plate, and Fig. 4 is a section of the rollers and tongue in larger size.

The rollers *a a* and folding-blade *b* are the same as have usually been employed in folding-machines, and the conveying-bands, second and third folding-rollers, and their actuating devices are also well known, and do not need further representation or description. The folding-blade *b* is connected by arms *e* to the shaft *f*, and it is moved at the proper time by a cam to carry the perforated portion of the sheet of paper down between the rollers *a a*. The perforating-knife *d* is upon arms *h*, that connect it with the shaft *k*, and there is a cam that operates this shaft and knife, so that the same is brought down to perforate the sheet of paper in the line of the first fold, and said knife acts against the fingers *i*, as in aforesaid application, and then the knife *d* is raised before the folding-blade descends; and as said folding-blade descends its arm pushes back the latch *l*, that holds up the finger-plate *i*, and allows the same to swing down out of the way of the folding-blade, and as the said blade *b* is raised the arm *e* acts upon the lifter *m*, and restores the finger-plate *i* to its normal position, ready for the next operation.

One of the special features of the present invention consists in the construction of the combined sheet-holder, stripper, and guard *t*, which is made as a plate, having one or more slots in it for the passage of the knife *d*. This plate *t* is upon an arm or arms, *n*, from the shaft *k* of the perforating-knife *d*, so as to swing in the same arc of a circle, and the hub of the arm *n* is loose upon the shaft, and a wedge or block, *o*, is connected by a spring arm or lever, *o'*, and passes into a space provided for it between a projection, 2, upon the arm *n* and a projection, 3, attached to the said shaft. When the key or wedge *o* is in place the arm *n* of the plate *t* is firmly held between the projections 3 and 5 upon the shaft *k*, so as to move with it, and the plate *t* serves the purpose of a shield to prevent the operator being injured by the perforating-knife descending upon his hand, because the plate will first come into contact with the hand and arm, and the cutter be supported.

The plate *t* descends upon the sheet of paper, and holds it at both sides of the line of perforations made by the knife *d*, said knife passing through a slot or slots in this plate *t*. As the plate *t* descends upon the sheet the wedge-block *o* is drawn out by its lever *o'* coming into contact with the fixed stop *u*. Hence the shaft *k* is free to turn and allow the knife *d* to descend and perforate the sheet, after which the shaft *k* is partially rotated, the knife *d* is raised, the sheet is stripped from the knife by the plate *t*, and the knife *d* and plate *t* are raised clear of the folder *b* as it descends, and carries the sheet in between the first pair of rollers *a* and to the conveying-bands, as usual.

The perforating-knife is made of a range of lancet-points, and these separate the paper more or less, and leave filaments that guide the paper as it goes through the folding operation; but, in order to entirely separate the sheets at the line of the first fold, we employ one or more tongues, *s*, each of which is at-

tached at the back end, and projects forward, and is turned up between the rollers *a a*, and the folding-blade is made double where the end of the tongue is located, so that the fold of the sheet is carried down, and the tongue passed between the leaves or folded sheet, as seen in Fig. 4, and the belts of the folding-machine carry the sheet back to the gage *t'* in the folded condition, and with the tongue between the two thicknesses of paper.

An inclined cutting-surface, *v*, is made in the tongue in the line of the edge of the folded sheet, where such sheet is carried away downward between the second pair of folding-rollers. In this operation the filaments that served to connect the sheet at the first fold are severed, and the sheet separated at this line. I remark that it will generally be preferable to employ two of these tongues, with the cutting-edges upon the opposite sides, and that the cutter or knife *v* should be made to entirely separate the sheet at the first fold where the tongues enter, as illustrated in the drawing.

The cutting-edge *v* will generally be movable, and connected with the gage *t'*, against which the edge of the paper stops, so that the cutting-knife will be in the proper position to the fold when the movement of the sheet is arrested.

We claim as our invention—

1. The combination, with the perforating-knife *d* and plate *t*, forming a holder, a guard, and a clearer, of the wedge *o* and its actuating-lever, substantially as and for the purposes set forth.

2. The tongue *s*, provided with a suitable cutting-edge, *v*, combined with the folding mechanism, and applied between the first and second folds to separate the paper, as specified.

Signed by us this 17th day of June, A. D. 1875.

WILLIAM DANIELS.
CHARLES DANIELS.

Witnesses:
CHAS. H. SMITH,
HAROLD SERRELL.