2 Sheets--Sheet 1.

W. DANIELS.

Paper-Folding Machine.

No. 164,977. Patented June 29, 1875.

Fig. 2.

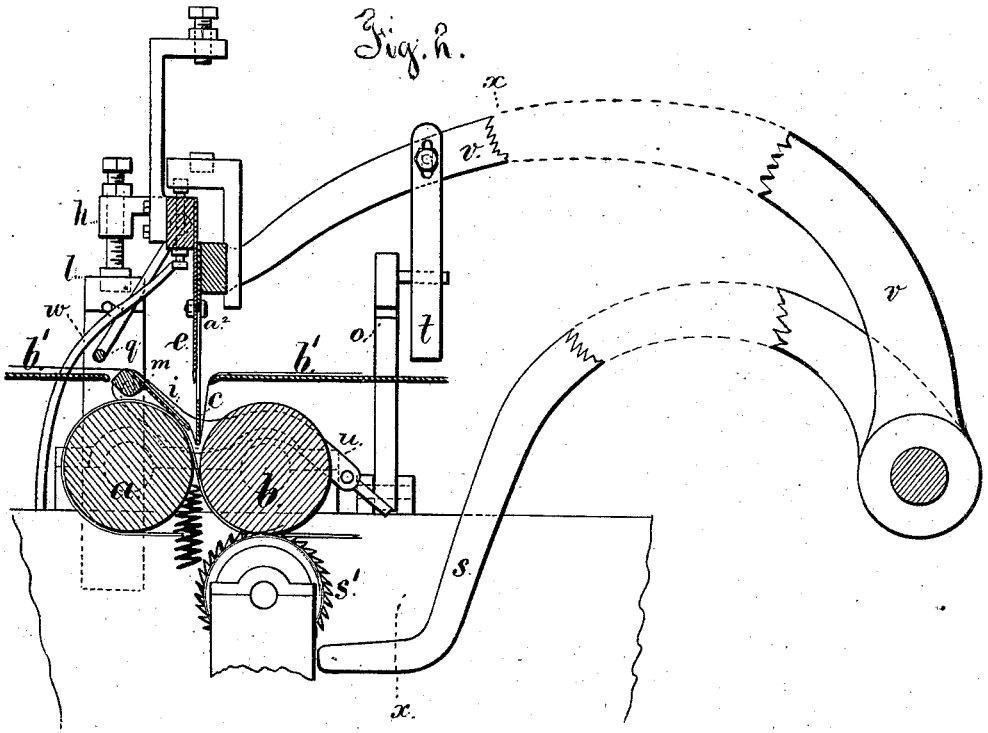
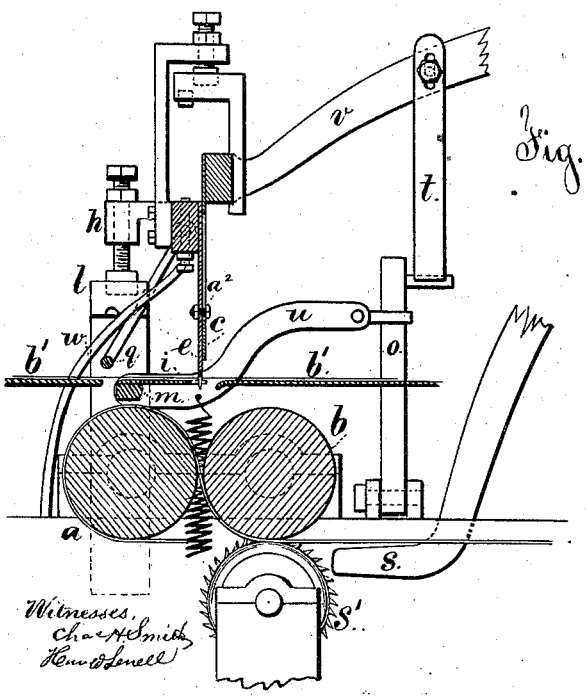


Fig. 1.



Witnesses,
Chas. H. Smith
Hen. O'Sewell

Inventor.
William Daniels.
per Lemuel W. Serrell
Atty.

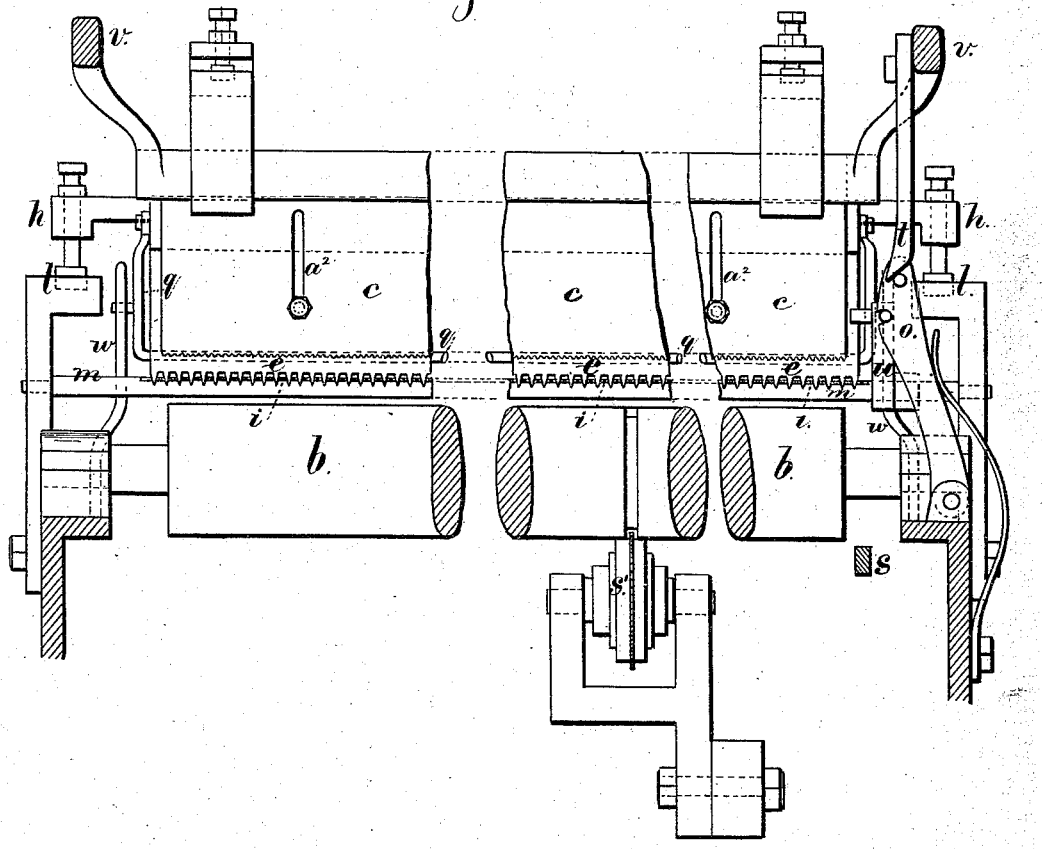
2 Sheets--Sheet 2.

W. DANIELS.

Paper-Folding Machine.

No. 164,977. Patented June 29, 1875.

Fig. 3



Witnesses

Chas A. Smith

Harold Serrell

Inventor.

William Daniels,

per Lemuel W. Serrell

Atty.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

WILLIAM DANIELS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PAPER-FOLDING MACHINES.

Specification forming part of Letters Patent No. **164,977**, dated June 29, 1875; application filed April 19, 1875.

To all whom it may concern:

Be it known that I, WILLIAM 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:

Machines have been made for receiving sheets of printed paper in succession, folding each sheet in the middle, carrying it down through rollers, and then folding the same a second time, and these folding operations are performed as many times as desired to fold the sheet into, two, four, eight, or sixteen leaves, for magazines, periodicals, pamphlets, &c. In some of these folding-machines a cutter has been introduced that separates the sheet entirely where there is a double impression. In some folding-machines the folding-blade has had points upon it for penetrating the paper, but the paper is not properly supported while being cut, and the points passing through the paper are liable to interfere with the rollers in drawing in the sheet.

I make use of a perforating-blade in combination with a folding-blade in a folding-machine, whereby the sheet is perforated at the line of the fold with a row of slits that almost separate the paper, but leave sufficient to retain the parts of the folded sheet in position in the subsequent folding and handling. These slits are made in the sheets of paper at the outer edges of the pages only, so that the back folds are not injured, but the leaves may be separated with facility by running the finger or any small article along the fold. Thus the periodical can be opened for perusal without the use of either a knife or paper-cutter.

In the drawing, Figure 1 is a section of the folding mechanism, with the knife-points in the paper at the line of the fold. Fig. 2 is a similar section of the parts, with the paper folded ready to be taken by the rollers. Fig. 3 is a cross-section at the line *x x*.

The rollers *a b* represent the first pair of rollers in a folding-machine of the ordinary construction, and around such rollers the conveying-bands travel, as heretofore usual. The sheet of paper is laid upon a bed, *b'*, and positioned by pins and marks upon the paper, as usual, and the folding-blade *c* is moved at the proper time to carry the center fold of the sheet down between the rollers *a b*. These parts being well known do not require further description.

My improvement relates to the penetrating-knife *e*, that is placed against one side of the folding-blade, and it is formed with a series of lance-points, and the knife is set in a head that is allowed a limited movement up and down upon the folding-blade *c*, additional to the movement of the folding-blade. For this purpose the penetrating-knife is connected by slots and screws a^2 to the folding-blade, and the knife *e* is weighted sufficiently to cause its points to pass through the sheet that is supported upon the rocking fingers *i*, so that as the folding-blade *c* comes down the penetrating-knife projects below it, and its points pass through the paper; then the weights *h* of the knife *e* rest upon supports *l*, and the further movement of the knife is arrested, while the folding-blade, continuing down, moves the paper down from the lance-points, and delivers the perforated fold between the rollers *a b*, to be carried to the next folding devices in the machine. The rocking fingers *i* project from the shaft *m* in such positions that they support the paper while the lances pass between them, and the shaft is held in position by an arm, *u*, and spring-catch *o*, and this spring-catch is pressed aside by the incline *t* of the arms *v* of the folding-blade, so that the fingers *i* are allowed to drop out of the way or be drawn down by a spring as soon as the lance-points have passed through the paper. The arm *u* is raised by a lifter, *s*, upon the arm *v*, or upon the same shaft as the arm *v*, so as to restore the fingers *i* to position as the blade *e* is raised.

The cutting-blade *e* might accidentally descend upon the hand of the operative while spreading the sheet; therefore, as a protection, I employ the guard-bar *q* that hangs slightly below the ends of the lances, and as the head is brought down this guard-bar is swung back, just before it reaches the surface of the paper, by the action of the stationary cam-bar *w* that acts at one end of the guard-bar.

The cutter *s'* may be used to separate the sheets longitudinally if required.

By the use in the folding-machine of the perforator applied with the first or subsequent

folding-blade, the folded sheet is properly kept together during the folding and stitching operations, but the leaves can be easily separated at their outer edges in consequence of the perforations.

I claim as my invention—

1. In a machine for folding paper, the combination, with the folding-blade, of an independent blade with penetrating-points to perforate the sheet in the line of the fold, but previous to the folding operation, substantially as set forth.

2. The supporting-fingers *i* and perforating-knife *e*, in combination with the folding-blade and actuating mechanism in the paper-folding machine, substantially as set forth.

3. The guard-bar *q* and actuating-cams *w*, in combination with the perforating-knife *e* and the folding-blade, substantially as set forth.

Signed by me this 16th day of April, A. D. 1875.

WILLIAM DANIELS.

Witnesses:

GEO. T. PICKNEY,

CHAS. H. SMITH.