2 Sheets—Sheet 1.

C. CHAMBERS, Jr. & W. MENDHAM.

Paper-Folding Machine.

No. 216,599. Patented June 17, 1879.

Fig 1

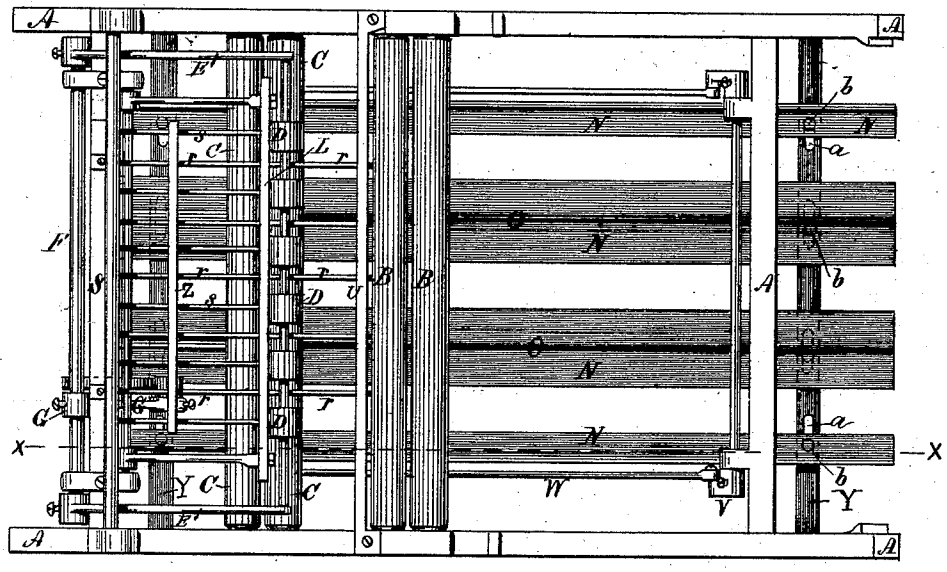
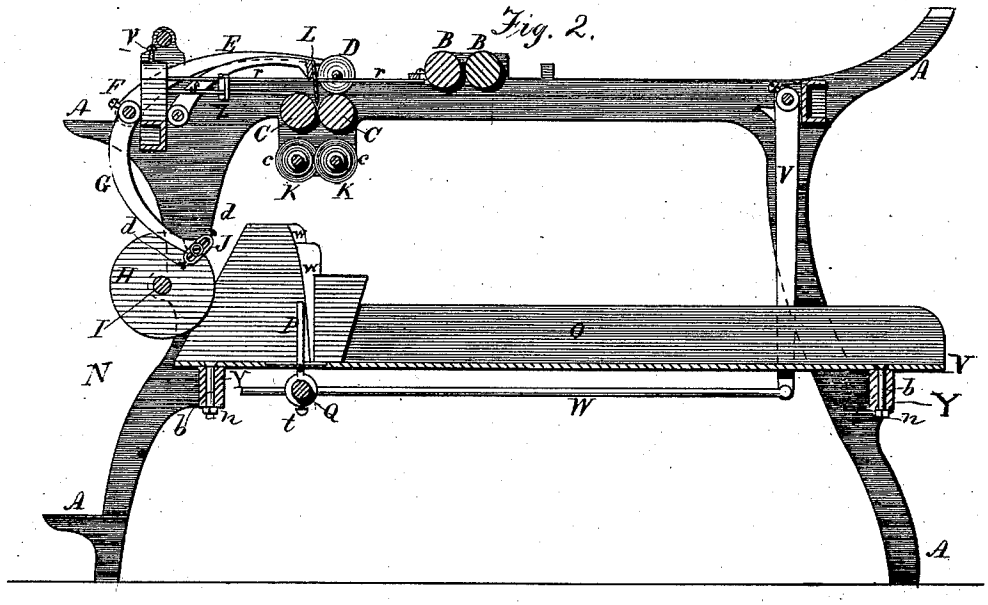


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3

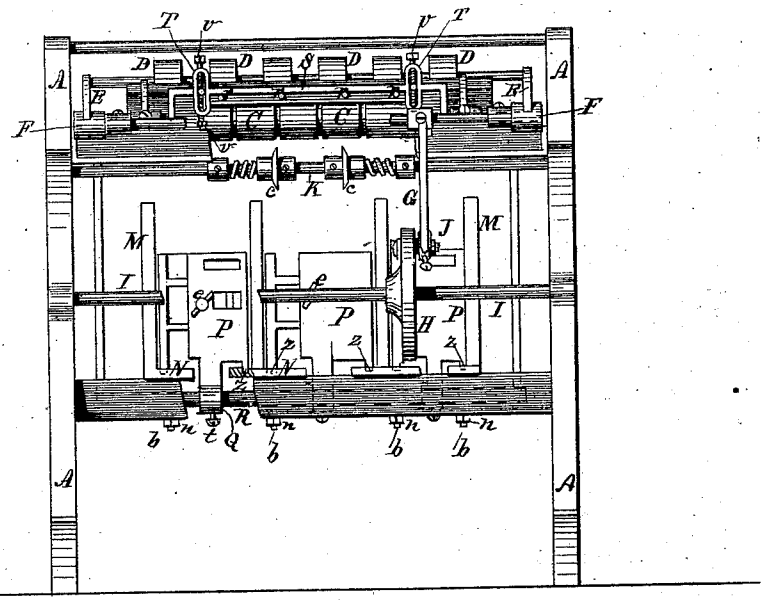


Fig. 4

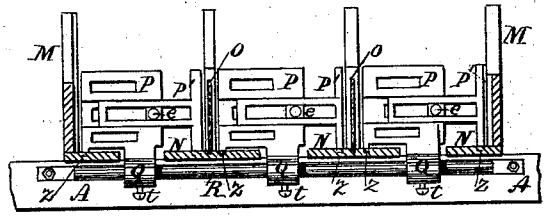


Fig. 5.

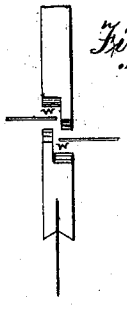
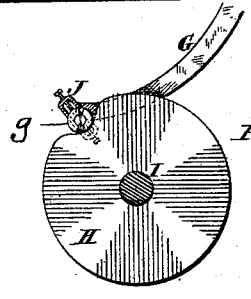


Fig 6.



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UNITED STATES PATENT OFFICE.

CYRUS CHAMBERS, JR., AND WILLIAM MENDHAM, OF PHILADELPHIA, PENNSYLVANIA; SAID MENDHAM ASSIGNOR TO SAID CHAMBERS.

IMPROVEMENT IN PAPER-FOLDING MACHINES.

Specification forming part of Letters Patent No. **216,599**, dated June 17, 1879; application filed April 10, 1876.

To all whom it may concern:

Be it known that we, CYRUS CHAMBERS, Jr., and WILLIAM MENDHAM, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Paper-Folding Machines; and we do hereby declare the following to be a full and correct description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a top view or plan of our improved machine. Fig. 2 is a longitudinal vertical section on line *x x* of Fig. 1. Fig. 3 is an elevation of the delivery end of the machine. Fig. 4 is a detail view on an enlarged scale of the packing-troughs and plungers. Fig. 5 is a detail view on an enlarged scale of the receiving-slits into which the severed divisions of the sheets fall. Fig. 6 is a detail view of the cam-arm and adjustable roller for regulating the movement of the drop-roller.

The same part is indicated by the same letter of reference wherever it occurs.

Our invention consists of improvements in the construction of paper-folding machines in which the sheet is folded in parallel folds and cut into a number of pieces, which are packed in separate packing-troughs. The improvements are designed to give greater range and accuracy of adjustment to the drop-roller, the carrying-rods, the cutters, and the packing devices, rendering the entire machine readily adaptable to the folding, cutting, and packing of sheets of various sizes.

The machine represented in the drawings is adapted to impart two parallel folds to a sheet, to cut it into three pieces of any variety of widths, and pack the several parts in three separate packing-troughs, each trough corresponding in width to that part or division of the sheet which it is designed to receive.

The various moving parts of the machine receive their motion from any proper source of power, and are geared or otherwise connected together in the common way, well known to persons skilled in this branch of machinery, and, forming no part of the present improvements, require no minute description or illustration. The paper is fed, folded, carried, delivered, and packed by devices of the same general character as those heretofore employed in the numerous paper-folding machines invented and patented by one or both of us.

In the drawings, A marks the frame of the machine, in which the working parts are supported; B B, the first pair of folding-rollers; C C, the second pair of folding-rollers, placed parallel to the first pair. In connection with the forward roller of the second pair works the drop-roller D, which is made in sections, as represented in Figs. 1 and 3, and, when in contact with the folding-roller below it, carries the once-folded sheet beyond the second pair of rollers between the rods *r* and *s*, and brings its folded edge against the stop Z. The shaft of drop-roller D is hung in arms E E, adjustably attached to shaft F, which rocks in journals supported by the side framing. To the shaft F is attached a descending arm, G, whose lower end carries a roller, *g*, which runs in contact with the face of cam H, fixed to shaft I. The rotation of the cam H imparts and times the motion of drop-roller D. The roller *g* has a short shaft or axle, which is adjustably fixed in a slotted boss, J, on the lower end of arm G by means of the set-screws *d d*, as clearly shown in Fig. 2. Thus the movements of the drop-roller are made susceptible of the most accurate control.

The cutters *c c*, which sever the folded sheet into the required number of divisions of the desired widths, are fixed upon independent shafts K K (see Figs. 2 and 3) by set-screws, which enable them to be placed at any desired points on their respective shafts.

The folding-blade L, which operates with the folding-rollers C C, is provided with recesses which enable it to pass the carrying-bars *r s*.

The packing-boxes are composed of the side pieces, M M, and the bottom boards, N, provided with the partitions O. Near the head of each box are made the slits *w w*, into which the severed divisions of the sheet fall on their way from the rollers to the packing-trough. These slits are arranged, as shown in Fig. 5, so that their guiding-surfaces shall conduct the alternate divisions of the sheet in slightly different directions to the bottom of the packing-trough, the object being to separate their cut edges and prevent them from interfering with the

free movement of the several sections. The sheet that falls into one pair of slits will have its head inclined toward the front end of the trough, while that which falls into the adjacent pair will have its head inclined toward the back end.

The bottom boards, N N N N, rest upon the cross-framing Y Y, and are adjustably connected to them by the bolts *b* and nuts *n*, (see Figs. 1 and 2,) the bolts passing down through slots *a* in the framing and receiving the set-nuts on their lower threaded ends. By this construction the width of each packing-trough may be varied to any desirable extent.

In the packing-troughs work reciprocating plungers P, which press the sheets back as they fall past detaining-catches and against receding back boards, as in the well-known machines. The plungers and back boards are made adjustable to suit the varying sizes of the packing-troughs in the manner described in Patent No. 141,486, of August 5, 1873. The plungers are also adjustable on the bar R by sleeves Q and screws *t*, and the bar R on the rod W, from which the motion of the plungers is derived. The plungers are carried by tongues or lugs *z* projecting down into grooves made in the bottom boards, N, by which arrangement it is rendered practicable to lubricate said tongues and grooves without soiling the paper, inasmuch as they are below the level of the lower edge of the sheet of paper. The lugs also prevent the lower edge of the paper from turning under the plunger.

Two of the upper carrying bars or rods, *r*, which pass through the stop Z, are projected into vertically-elongated slots T in bar S of the main frame, and are there adjusted by means of the set-screws *v v*, as shown in Fig. 3. By this means the amount of corrugation imparted to the moving sheet by the joint action of the two sets of carrying-bars *r s* can be nicely regulated.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination of the cam H, arm G, with its slotted boss J, screws *d d*, adjustable wheel *g*, shaft F, arms E, and divided drop-roller D, all constructed, arranged, and operating substantially as and for the purpose described.

2. The combination of the carry-rods *r r*, slotted bar S, and adjusting set-screws *v v*, in the manner and for the purpose stated.

3. The adjustable packing-troughs having their sides and bottoms adjustably attached to the slotted cross-framing by bolts and nuts, so that the width of the troughs can be regulated at will, and the plungers shall pass between the bottom boards and be always held in the middle of the trough, as described.

4. The conducting-ways *w w*, having their guiding-surfaces arranged at different inclinations with a vertical plane, so as to separate the edges of the sections of paper as they come from the rolls and cutters, all in the manner indicated.

5. The lugs *z z* on the bottom of the reciprocating plungers P, in combination with the bottom of the trough provided with the grooves in which said lugs slide, as and for the purpose set forth.

The above specification of our said invention signed and witnessed at Philadelphia this 7th day of April, A. D. 1876.

CYRUS CHAMBERS, JR.
WILLIAM MENDHAM.

Witnesses:
S. BERNARD CHAMBERS,
J. H. CHAMBERS.