

No. 668,394.

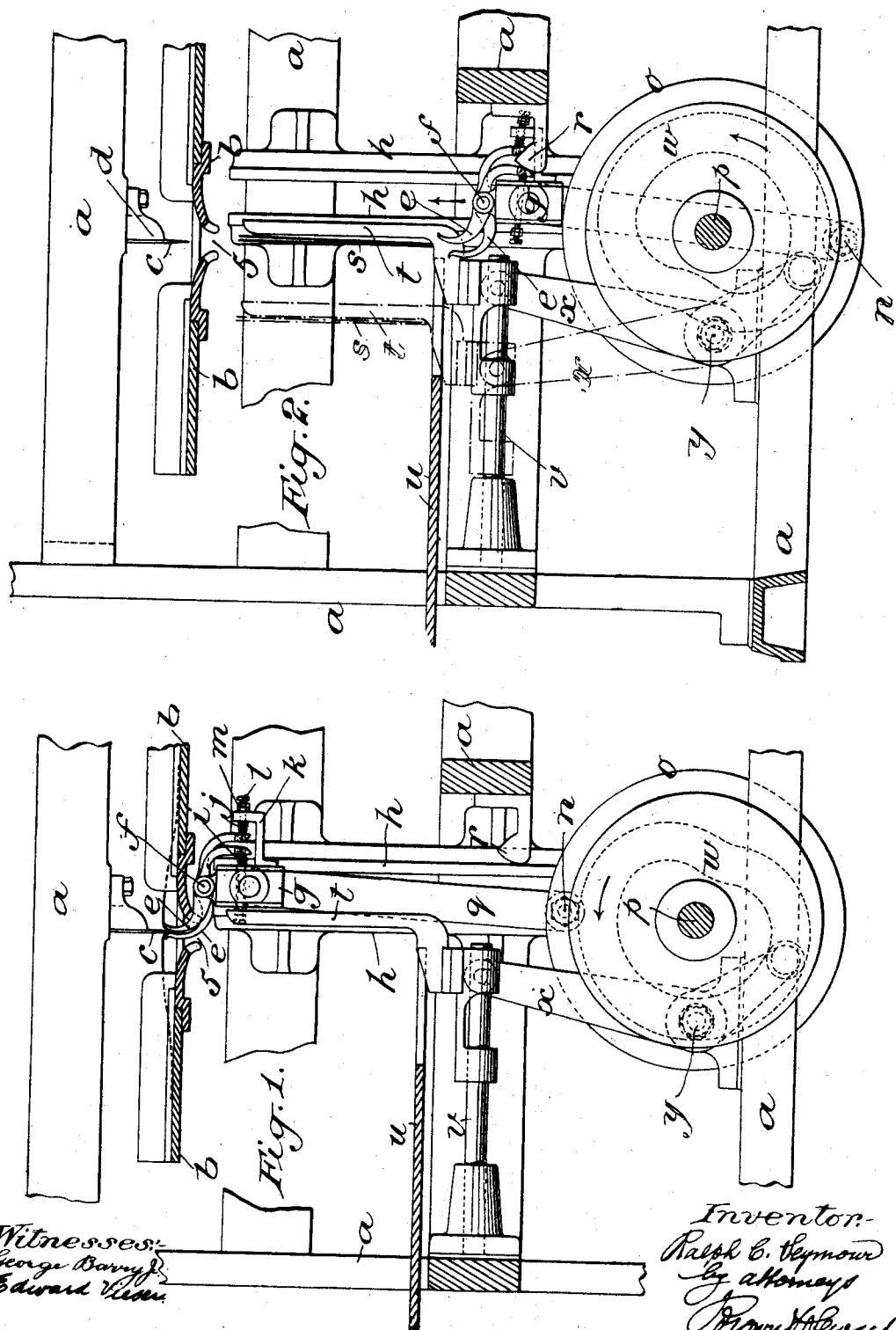
Patented Feb. 19, 1901.

R. C. SEYMOUR.
FOLDING APPARATUS.

(Application filed Sept. 29, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
George Barry
Edward Vane

Inventor:
Ralph C. Seymour
by attorney
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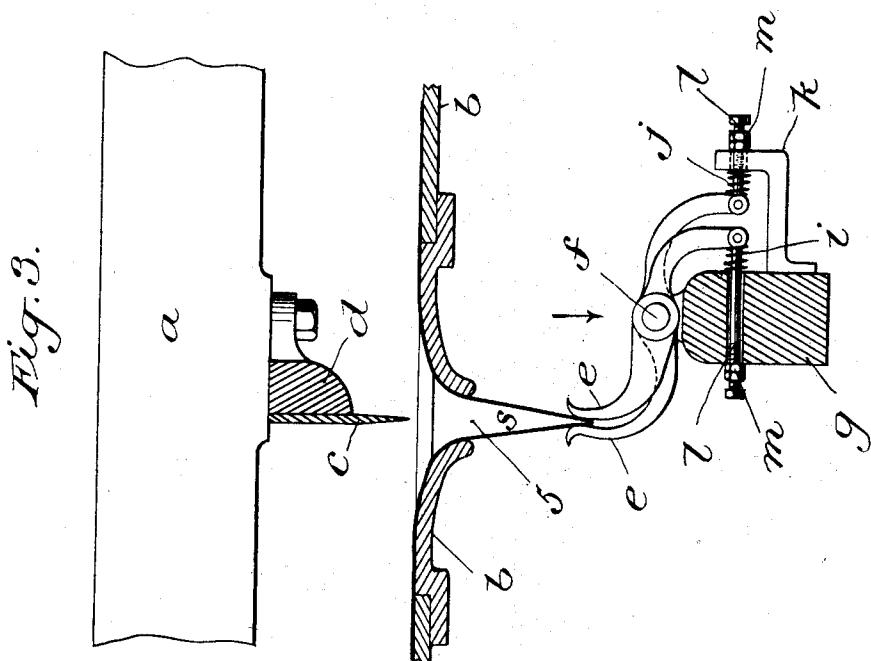
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FOLDING APPARATUS.

(Application filed Sept. 29, 1900.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

RALPH C. SEYMOUR, OF SOUTH ORANGE, NEW JERSEY, ASSIGNOR TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., AND STONINGTON, CONNECTICUT.

FOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 668,394, dated February 19, 1901.

Application filed September 29, 1900. Serial No. 31,490. (No model.)

To all whom it may concern:

Be it known that I, RALPH C. SEYMOUR, a citizen of the United States, and a resident of South Orange, in the county of Essex and 5 State of New Jersey, have invented a new and useful Improvement in Folding Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

The principal elements of a folding apparatus embodying this invention are a support 10 upon which the sheet to be folded is placed and in which is an opening for the passage of the sheet as it is folded, a stationary blade presented endwise opposite said opening, 15 and reciprocating gripping-jaws operating through said opening to first crease the sheet over the edge of said blade in the intended line of fold and to afterward complete the folding of the so-creased sheet by drawing it 20 from said blade and through said opening.

Figures 1 and 2 of the accompanying drawings represent in elevation, partly sectional, such parts of a folding-machine as are necessary to illustrate my invention, Fig. 1 representing the grippers in the act of creasing the sheet over the edge of the stationary blade, and Fig. 2 representing the grippers as having completed the folding and liberated the folded sheet. Fig. 3 is a detail view which 25 will be hereinafter explained.

a designate parts of the stationary framing of the apparatus.

b is the support on which the sheet is deposited by any suitable means to be folded, 30 said support being represented as a stationary slotted table. This table is or may be such as is well known in folding apparatus, and therefore needs no particular description.

c is the stationary blade, which is arranged 35 perpendicularly to the table *b*, with its edge slightly above the face of the latter and opposite to and parallel with the slot 5 therein. The said blade is represented as attached to a stock *d*, which is bolted to the framing *a a*.

40 *e e* are the gripping-jaws or grippers, of which there may be any suitable number of pairs, according to the length of the fold to be made or to other requirements, the two members of each pair being pivoted together

by a pivot *f*, by which they are attached to 50 a reciprocating carrier *g*, (represented as a straight bar *g*,) which is fitted to work in fixed upright guides *h* on the framing below the table *b*. The jaws of these grippers, which are formed at the upper ends of the pivoted 55 members and the lips of which are rounded or tapered, are located opposite to the blade *c* and the slot 5 in the table and are thin enough to pass through said slot 5, as shown in Fig. 1, when closed. The tails or lower 60 ends of said gripper members have applied to them springs *i j*, which exert a constant tendency to close their jaws automatically, as shown in Figs. 1 and 3, the spring *i* having its abutment directly against the carrier 65 *g*, and the spring *j* having its abutment against a light bracket *k*, which is affixed to and virtually a part of said carrier. These 70 springs are best illustrated in Fig. 3, which represents a transverse section of the carrier-bar *g* and a side view of one pair of grippers with said springs and with adjusting-screws *l*, which serve to adjust the jaws of the grippers relatively to the plane in which the blade *c* is located, so that when said jaws are closed 75 their mouth or entrance will be exactly opposite the edge of the blade *c*. The said screws *l* are, as shown in Fig. 3, pivoted one to each of the tails of the gripper members 80 and pass one through the carrier-bar *g* and the other through the bracket *k* on said bar. They also pass through the springs *i j*, so that 85 they do not interfere with the opening of the grippers. The said screws are fitted, outside of the bar *g* and the bracket *k*, with stop-nuts *m m*, by the adjustment of which on the said screws the closing position of each gripper-jaw can be properly adjusted to the blade *c*.

The carrier-bar *g* derives its reciprocating motion in the guides *h* from a crank-wrist *n*, 90 carried by a disk *o* on a shaft *p*, to which rotary motion is given by any suitable means, the said crank-wrist being connected with the bar by a rod *q*. At a suitable distance below the folding-table there is attached to 95 the framing a stationary wedge-shaped cam *r*, against the opposite faces of which the tail-pieces of the gripper members are brought,

as shown in Fig. 2, by the downward movement of the carrier-bar in such manner as to produce the opening of the grippers.

The operation of the folding is as follows:

5 A sheet *s* having been deposited on the table *b* while the grippers in a closed condition have been depressed below the latter, the upward movement of the bar takes the lips of the gripper-jaws through the slot 5 in the table on opposite sides of the blade *c* and causes said jaws to so press the sheet upward against the edge of the knife as to first crease it over said edge and then to be opened automatically by the upward pressure sufficiently to 15 take between themselves and the knife portions of the sheet on opposite sides of the crease, as shown in Fig. 1, wherein the grippers are represented as having terminated their upward movement and just commencing 20 their downward movement, by which as they pass from the blade they are caused to take the creased sheet with them and draw it through the slot 5 of the table, thereby completing the fold. After having thus completed the fold the downward movement is continued far enough to bring the tail ends of the gripper members far enough over the stationary cam *r* to produce the opening of the jaws, as shown in Fig. 2, and the liberation 25 of the folded sheet, which may be removed by any suitable means out of the way of the grippers, which after the liberation of one folded sheet ascend with the bar *g* to crease, take, and fold another sheet, being 30 automatically closed by the springs *i* *j* as soon as their tail ends have been carried upward clear of the cam *r*.

The means for removing the folded sheets after their liberation from the grippers may

40 be of any known or suitable kind—as, for example, a horizontally-moving packer *t*, working through the bottom of a receiving box or table *u*, upon which the sheets drop edge-wise from the grippers. This packer is represented as sliding on a stationary guide-rod *v* and operated by a cam *w* on the shaft *p* through a lever *x*, which works on a fulcrum *y* and is connected with said packer.

45 That the folding-blade *c* is stationary and 50 that in making the crease it is entirely independent of the slotted table or sheet-support are very important features of this folding apparatus, as they not only insure the accuracy of the fold, but permit the folding of 55 freshly-printed sheets without smutting. The stationary blade never descending below the face of the sheet cannot disturb it by drawing it one way or the other and so causing the diversion of the folding-crease from the desired line. Then the grippers in forcing the sheet up around the stationary edge of the folding-blade, as shown in Fig. 1, to produce the crease or commencement of the fold over 60 said edge, raise the under surface of the sheet 65 from the edges of the table-slot and so tend

to prevent such hard rubbing of said surface against the said edges while the sheet is passing between them as to produce smutting. The sheet having been thus raised up from the table by the grippers around the edge of the stationary blade remains more free from the edges of the table-slot during the drawing of the fold through said slot than it does in folding apparatus in which the creasing and folding is performed by the folding-blade 70 driving the paper through the slot and in which the paper is caused to hug or drag on the edges of the slot, and this freedom tends to prevent or reduce the tendency to smut, which is common with such folding apparatus. 80

It is obvious that the folding devices herein described may fold at the same time a plurality of superposed sheets or a sheet which has been previously folded and is presented in two or more thicknesses to such devices. 85

What I claim as my invention is—

1. In folding apparatus, the combination of a stationary blade and reciprocating grippers for creasing the sheet over the edge of said blade preparatory to the folding, substantially as herein described.

2. In folding apparatus, the combination of a stationary blade and reciprocating spring-closed grippers for creasing the sheet over the edge of said blade preparatory to folding, substantially as herein described.

3. The combination of a support for the sheet to be folded having an opening for the passage of the sheet, a blade presented edge-wise opposite said opening in stationary relation to said support, and reciprocating grippers operating through said opening first to crease the sheet upon said blade and afterward to draw it therefrom through said opening in a folded condition, substantially as herein described.

4. In folding apparatus, the combination of a table having a slot therein, a stationary blade presented edgewise opposite said slot at the face of the table and reciprocating grippers operating through said slot to crease and grip the sheet upon said blade and draw it therefrom through said slot in a folded condition, substantially as herein described.

5. In a folding apparatus, the combination of a table having a slot therein, a stationary blade presented edgewise opposite said slot at the face of the table, reciprocating spring-closed grippers operating through said slot to crease and grip the sheet upon said blade and draw it therefrom through said slot in a folded condition, and means for opening said grippers to liberate the folded sheet, substantially as herein described.

6. In folding apparatus, the combination of a stationary blade, a reciprocating gripper-carrier, a pair of gripping members pivoted to each other and to said carrier, and separate springs one for each gripping member applied between said member and the carrier

for closing the jaws of such members, substantially as herein described.

7. In folding apparatus, the combination of a stationary blade, a reciprocating gripper-carrier, a pair of gripping members pivoted to each other and to said carrier, and adjusting-screws one for each gripper member applied to said carrier for separately adjusting the two members of the pair to the plane of the said blade, substantially as herein described.

8. In folding apparatus, the combination of a table having a slot therein, a stationary blade presented edgewise opposite said slot, a carrier and attached spring-closed grippers

the jaws of which are opposite said slot and blade, means for giving said carrier and grippers a reciprocating movement toward and from said blade, and a stationary cam for opening said grippers, substantially as herein described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 27th day of September, 1900.

RALPH C. SEYMOUR.

Witnesses:

FREDK. HAYNES,
HENRY THIEME.