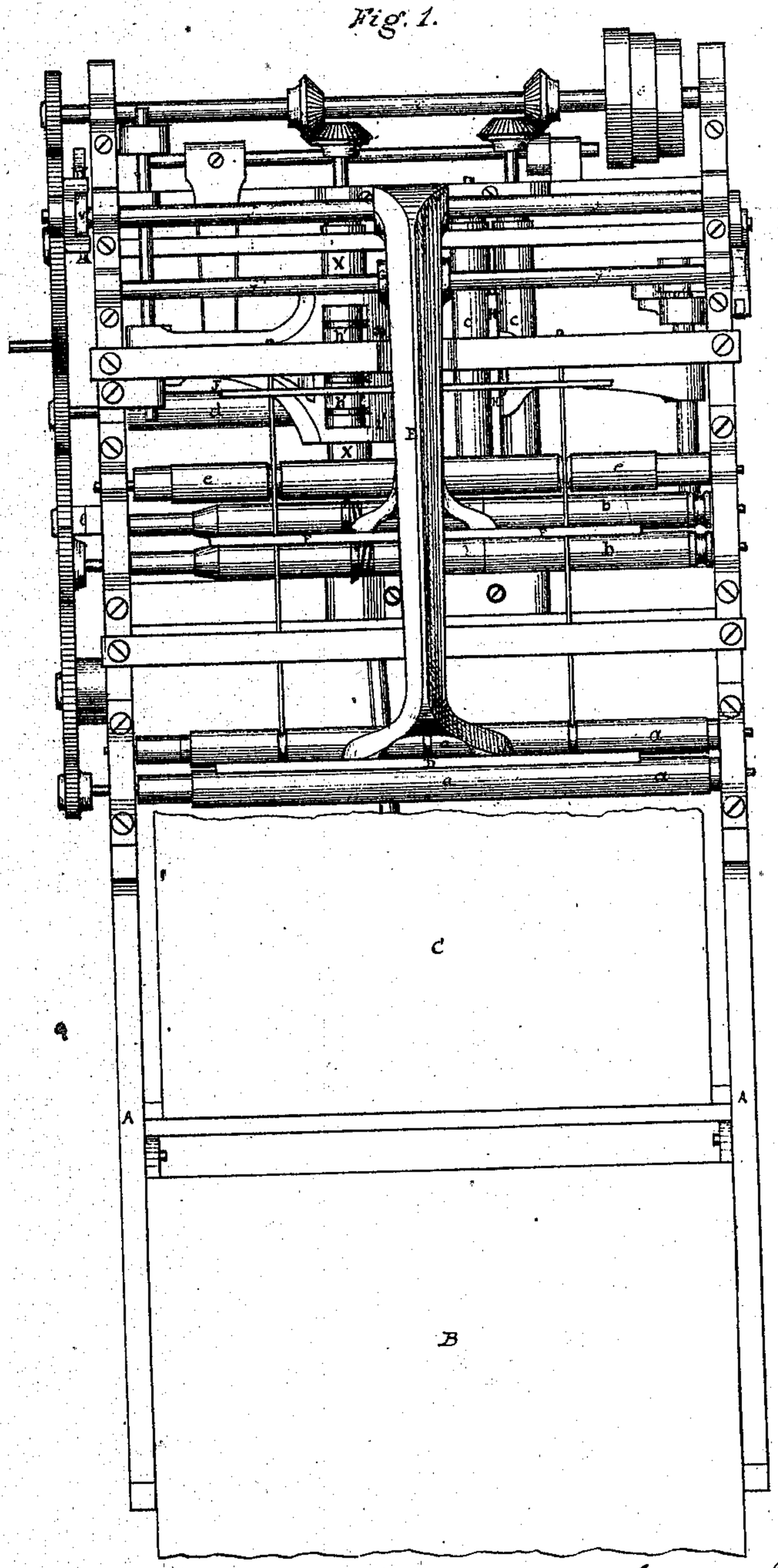
2 Sheets. Sheet. 1.

C. Chambers, Jr.

Paper Folder.

No. 105,424. Patented. July. 19. 1870.

Fig. 1.



Witnesses.
Geo. B. Lambright
P. E. Wilson.

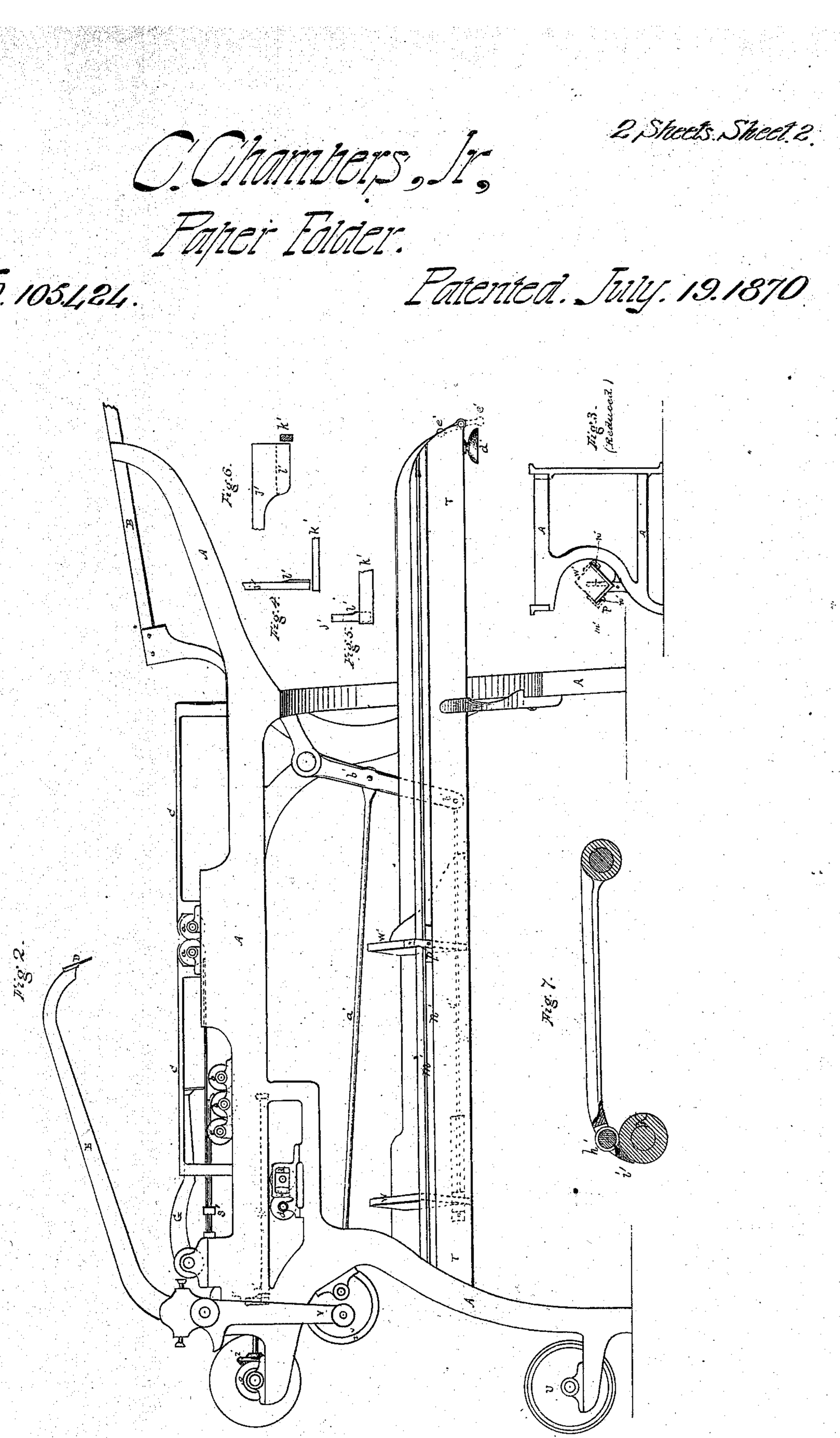
Cyrus Chambers Jr.
By his Attorney
Chas. F. Ransbury

2 Sheets. Sheet 2.

C. Chambers, Jr.

Paper Folder.

No. 105,424. Patented. July. 19. 1870



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Chas. F. Pansbury

UNITED STATES PATENT OFFICE.

CYRUS CHAMBERS, JR., OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN PAPER-FOLDING MACHINES.

Specification forming part of Letters Patent No. **105,424,** dated July 19, 1870.

To all whom it may concern:

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

Figure 1 is a plan or top view of the machine. Fig. 2 is a side elevation of the same. Fig. 3 is an end view of the frame, showing the curvature of the leg for the reception of the packing-trough. Figs. 4, 5, and 6 are details, illustrating the relations of the second and third stops. Fig. 7 is a vertical transverse section of the drop-roller.

The same letter indicates the same part wherever it occurs.

The first improvement consists in adapting the machine known as the "Chambers 12mo folder" to the folding of a forty-eight-page sheet by the addition of a pair of rollers, which impart to such a sheet a preliminary fold prior to its entering the 12mo part of the machine.

The second improvement consists in placing an additional roller alongside of the second pair of folding-rollers, and a little above their level, for the purpose of raising and carrying clear of said rollers the forward end of the once-folded sheet, which must project beyond said rollers when the sheet is in position to be acted upon by the second folding-knife.

The third improvement consists in attaching to the drop-roller *h'*, for starting the inset around the reversing-roller, a concave shield or guide, to guide the inset under the stationary fingers. In my Patent No. 30,719, dated November 27, 1860, for the 12mo folder, the reversing-roller is marked I, and the stationary fingers are marked S on the drawings. Grooves are turned in the drop-roller, into which fingers project, to guide the inset from the bight of the rollers to the shield, and prevent its following around the drop-roller.

The fourth improvement consists in a device for adjusting the sheet on its passage from the third to the fourth pair of rollers, so that every sheet will reach the third stop in precisely the same position.

The fifth improvement consists in a device for preventing the back plunger of the packing-trough from tilting or rising up as it is moved along the trough.

The sixth improvement consists in the arrangement of an alarm to indicate that the packing-trough is filled with folded sheets.

The seventh improvement consists in giving an inward curve to that leg of the frame which is near the rear end of the packing-trough, so that the trough may be received in said curve and be accessible throughout its entire length.

In general construction and mode of operation, after the making of the first fold, the machine is identical with the 12mo folder patented by me November 27, 1860. Those parts and movements, therefore, which are common to that machine and the one now under consideration need not be particularly described.

The principles on which the sheets are folded, propelled, guided, arrested, severed, inset, packed, and delivered, are the same in both. The present improvements extend the capacity of the 12mo machine, and add to the convenience and efficiency of all the folders to which they are applicable.

In the accompanying drawing, A marks the frame of the machine; B, the table on which the sheets to be folded are placed; and C, the metallic table, over which they are passed singly by the operator, each being properly registered in the position to receive the blow of the first folding-knife, D, attached to the end of arm E.

The table C, Fig. 2, has a slot in it, immediately over the line of contact of the first pair of rollers, *a a*. The addition of this pair of rollers and the knife D to the 12mo machine is the first improvement hereinbefore referred to. These rollers receive the bight of the sheet from the knife D, and impart to it the first fold, which is directly across the middle. They deliver it to endless tapes, which run from the rollers *a a* to the second pair of rollers, *b b*, and carry the sheet to the first stop, *s'*, assisted by the roller *e*, placed at the side of the rollers *b b*, and a little above their level, Fig. 2, in order to carry the sheet clear over them.

The stop *s'*, which is adjustable on the wires in the usual way, arrests the paper in the proper position over the rollers *b b* to receive the second fold.

The forty-eight-page sheet, being now once

folded, presents, as to its further folding, the same problem as the twenty-four-page sheet, or double 12mo, and is treated just as though it was a single sheet of twenty-four pages. The further operation is therefore fully shown in my Patent No. 30,719, before referred to, and consists in the severance of the inset by the cutters on rollers *b b*, and the further folding and inseting of the sheet by the rollers *c c* and *d d* and the knives H and J, and the delivery of the sheet completely folded to the packing-trough T, ready for the binder.

The third improvement is clearly illustrated in Fig. 7 of the drawing. Its purpose is to guide the inset positively around the [reversing-roller. It consists in providing the arm or frame of the drop-roller *h'* with a curved or concave shield or guide, curved to fit the periphery of the reversing-roller X. Shall fingers or guides project from the curved part *i'* and enter grooves in the drop-roller *h'*, to prevent the sheet from turning up between the drop-roller and shield.

The fourth improvement is illustrated in Figs. 4, 5, and 6, of which Fig. 4 is a plan, Fig. 5 a side elevation, and Fig. 6 a front elevation, of the second and third stops, *j'* and *k'*, in their proper relative positions. The improvement consists in a projection, *l'*, inclined downward and outward from the second stop, *j*, and in the path of the outset issuing from between the third pair of folding-rollers, *c c*, and the inset issuing from around the reversing-roller X on their way to the third stop, *k'*. This inclined face *l'* stands a little in front of the face of the second stop, *j'*, so that if the outset and inset should vary a little as they approach the third stop, their folded edges will strike the inclined projection, and be thereby moved sidewise, so as always to strike the third stop, *k'*, in the same position relatively to the face of the second stop.

The fifth improvement is shown in Fig. 2, and consists in projecting ribs *m'* on the upper edges of the fillets *n'*, attached to the outer and upper edges of the packing-trough T, on which the springs of the sliding plunger W' bear, so as to allow the wide ends of the springs *p'* to bear on the fillets *n'*, and catch under the ribs *m'*, for the purpose of preventing the plunger from rising or tilting out of the trough. That part of the spring *p'* which catches under the rib *m'* projects backward and forward, as shown.

The sixth improvement, which consists of an alarm to give notice of the fact that the trough is full of folded sheets, is illustrated in Fig. 2. A bell tongue or clapper, *e'*, is pivoted at the end of the trough T, so that when raised up it will incline slightly backward into the trough, as shown, and so stand, in which position it is in the line of motion of the sliding plunger W', which will throw down the clapper when it comes in contact with it. When thrown down, the clapper strikes the bell *d'* and gives the required notice, indicating that the trough is full. When this clapper is down it is out of the way of the plunger, and does not interfere with its removal or that of the folded sheets.

The last improvement is shown in Fig. 3, and consists in giving an inward curve to the leg of the frame near the rear end of the packing trough, so that the trough may be placed under the side of the machine and parallel therewith, and no obstruction be presented to the removal of the folded sheets from the trough when full. The trough is supported at the rear end by an upright rising from the curved leg, as shown.

Having thus fully described my improvements, what I claim, and desire to secure by Letters Patent, is—

1. Placing by the side of a pair of folding-rollers an additional roller, *e*, a little above their level, for the purpose of raising the forward end of the sheet and carrying the paper clear of said rollers, as described.

2. The concave guide *i'*, attached to and operated by the drop-roller frame, as set forth.

3. The projection *l'* on the second stop, *j'*, arranged and operating in the manner stated.

4. The projecting rim *m'* on the packing box or trough, in combination with the sliding spring *p'* on the plunger W', as and for the purpose described.

5. The bell-clapper *e'* and bell *d'*, attached to the trough and operated by the sliding plunger, in the manner and for the purpose stated.

The above specification of my said invention signed and witnessed at Boston this 17th day of August, A. D. 1868.

CYRUS CHAMBERS, JR.

Witnesses:
W. W. SWAN,
CHAS. F. STANSBURY.