R. ASTLEY.

FOLDING DEVICE.

APPLICATION FILED NOV. 22, 1919.

1,346,109.

Patented July 13, 1920.

3 SHEETS—SHEET 1.

FIG. I

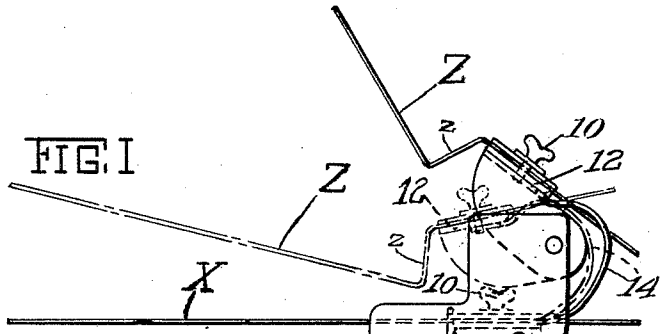


FIG. III

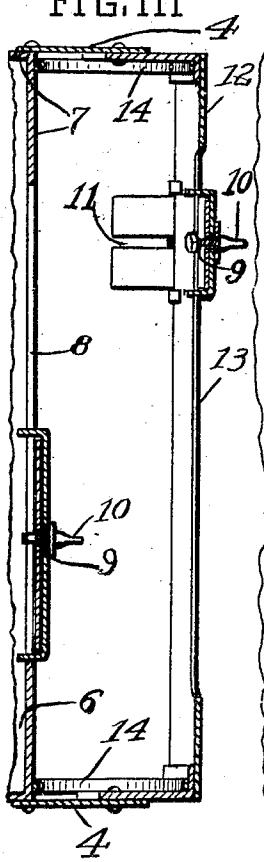
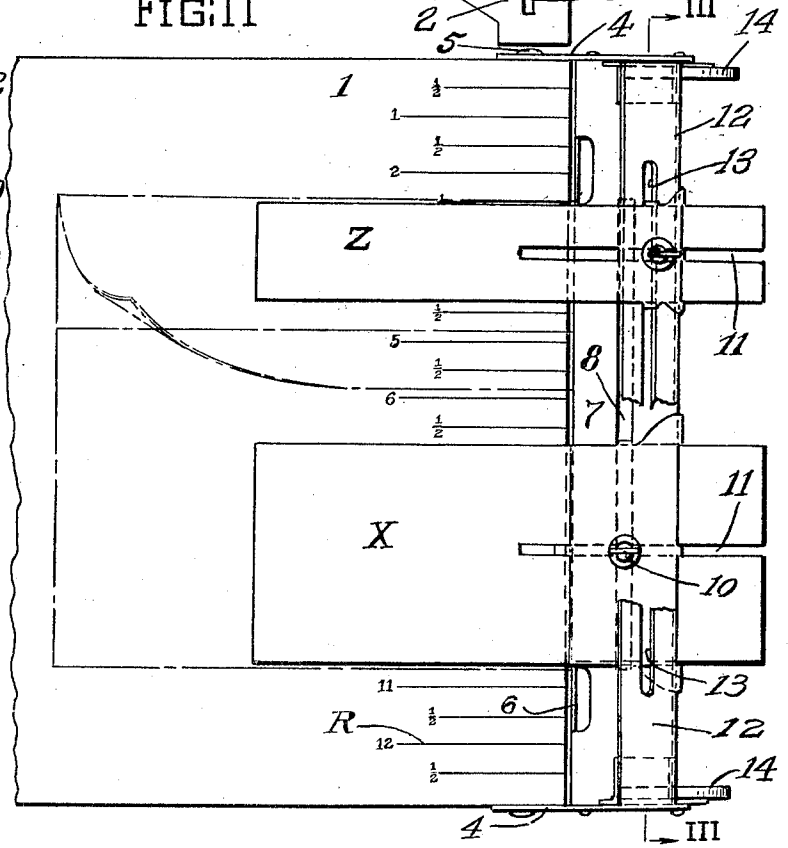


FIG. II



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3 SHEETS—SHEET 2.

FIG. IV

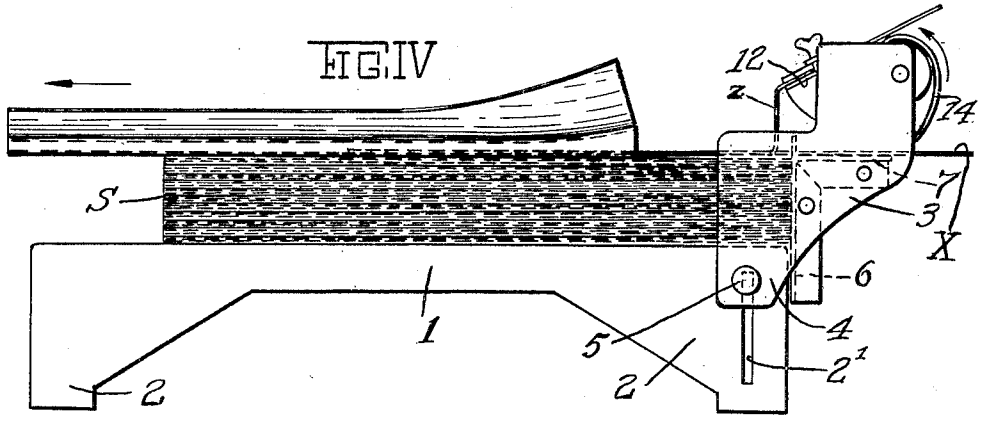


FIG. V

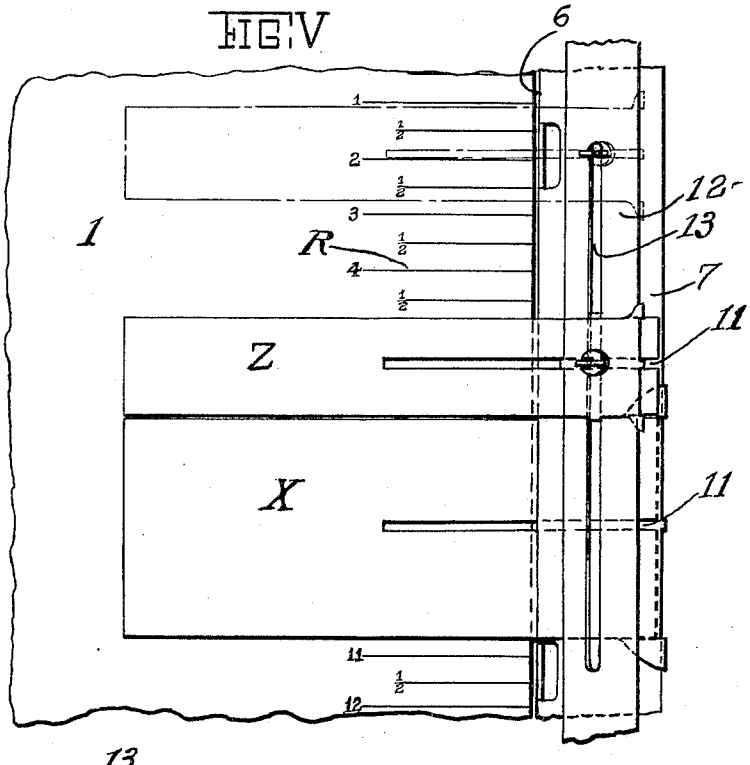
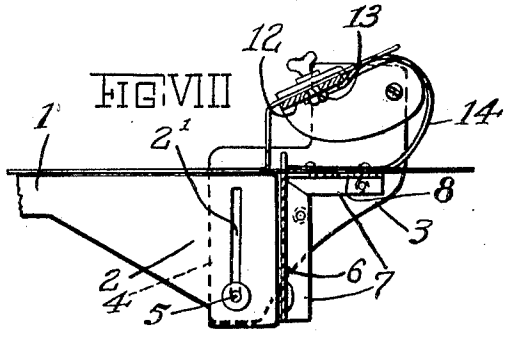


FIG. VI

FIG. VII

FIG. VIII



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3 SHEETS—SHEET 3.

FIG. IX

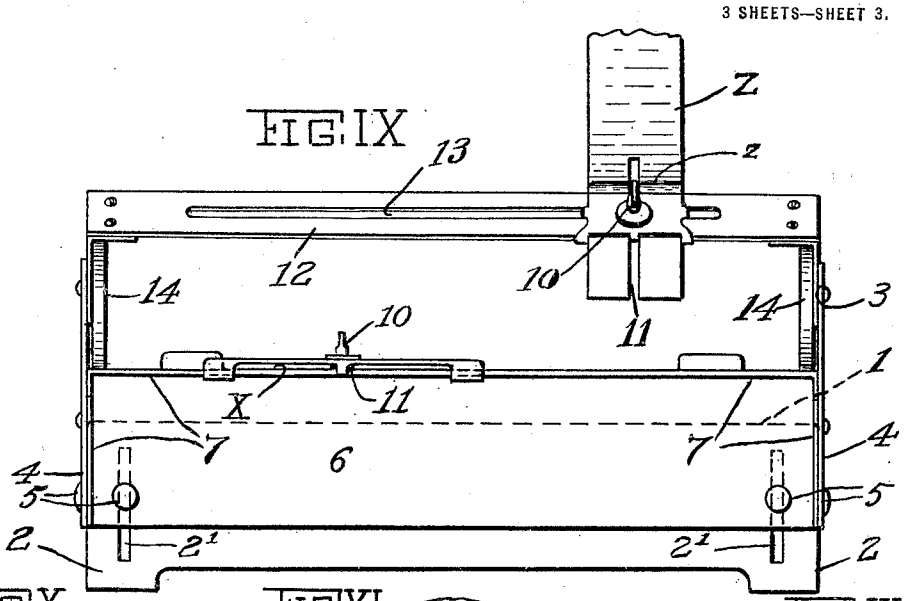


FIG. X

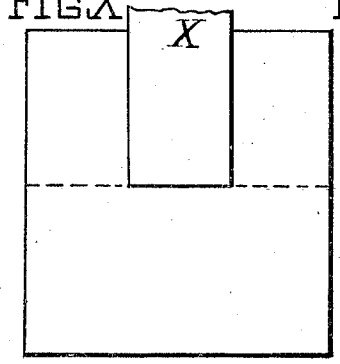


FIG. XI

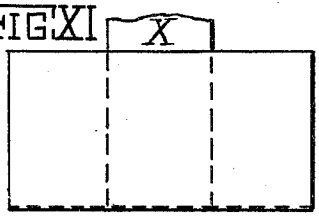


FIG. XII

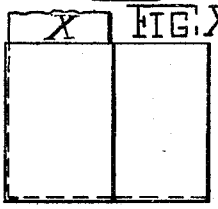


FIG. XIII

FIG. XIV

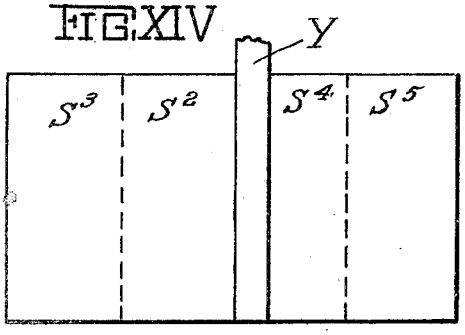


FIG. XV

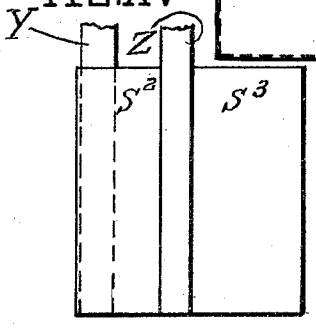
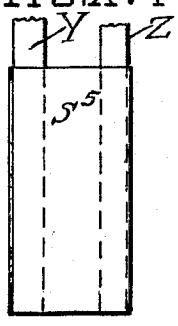


FIG. XVI



Inventor
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By Ellis Spear
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UNITED STATES PATENT OFFICE.

ROBERT ASTLEY, OF BOSTON, MASSACHUSETTS.

FOLDING DEVICE.

1,346,109. Specification of Letters Patent. Patented July 13, 1920.

Application filed November 22, 1919. Serial No. 339,949.

To all whom it may concern:

Be it known that I, ROBERT ASTLEY, a citizen of the United States, residing at Boston, county of Suffolk, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Folding Devices, of which the following is a specification.

This invention relates to folding devices and particularly to a simple type of machine on which letters, circulars or other papers in quantity may be folded as desired with adequate speed, accuracy and saving of labor.

My invention contemplates a machine not of the automatic type in which papers are folded entirely by the machine itself, but rather a folding device of inexpensive and convenient form by which such papers may be given a rapid and uniform fold. The utility of such machine where the initial investment of a large and automatic machine is prohibitive, is very great.

My invention involves therefore an apparatus in which a variety of folds may be effected and as an illustrative embodiment I have shown a simple device well adapted to office use and capable of production in inexpensive form for general availability.

The illustrative embodiment selected for the purposes of the present application is shown in the accompanying drawings. Throughout the specification and drawings like reference characters are employed to indicate corresponding parts, and in the drawings:

Figure I is a side elevation of a machine in accordance with my invention.

Fig. II a partial plan view thereof.

Fig. III a section on the line 3—3, Fig. II.

Fig. IV a side elevation showing the machine adjusted to a pile of letters to be folded.

Fig. V an enlarged plan detail.

Figs. VI and VII are end views of characteristic sheet folds.

Fig. VIII a fragmentary detail of the folding blade mount.

Fig. IX a rear elevation of the machine.

Figs. X, XI, XII and XIII diagrammatic views progressively illustrating a note paper fold, and

Figs. XIV, XV and XVI indicating in a corresponding manner a characteristic legal cap fold.

In a preferred form of my machine I provide a bed or table member 1 preferably formed of sheet metal bent up with suitable legs 2 having a flat upper surface adapted to receive a stack of sheets to be folded.

Mounted on the rear of the bed 1 are transverse and vertically adjustable end frames 3. These frames have lateral flanges 4 inclosing the sides of the rear legs. The rear legs are slotted at 2^1 and the flanges 4 are guided by studs 5 extending through the slots 2^1.

Transversely of the vertically adjustable end frames 3 is a guide or stop wall 6 preferably formed of sheet metal having end flanges 7 riveted to the end pieces 3 as indicated in Fig. VIII. This transverse stop piece 6 makes a face or wall against which the stack S of letters or other papers to be folded may be pushed so that they are held in a uniform position. The whole transverse frame of which the pieces 3 and 6 constitute the principal elements has a free sliding or floating movement vertically, being normally sustained by the folding blade or blades which rest on the top of the stack S. As the stack is reduced by the successive withdrawal of folded sheets this rear frame settles down from its position shown in Fig. IV to its position shown in Fig. VIII.

The transverse member 6 constituting the vertical stop wall is bent rearwardly as indicated at 7^1, Figs. IV and V, and longitudinally slotted as indicated at 8. Guided in the slot 8 are a plurality of clamping members preferably consisting of a threaded stem 9 having a wing nut 10 and adapted to clamp a blade. These blades such as are indicated at X, Y and Z, are preferably thin, slightly resilient blades of sheet metal slotted at one end as indicated at 11. The studs 9 pass through the slots of these blades so that the blade is not only transversely adjustable of the machine, but adjustable longitudinally so as to give the desired length of blade exposed to the table surface. The blades may be of any desired width and length and a variety of blades of interchangeable nature provided.

For example, the blade indicated at X is of the width of the usual letter sheet when folded for the usual small envelop. The blade Y illustrates the type of narrow blade in which the width is not necessarily a determining factor, being merely a straight

edge against one edge of which a fold may be formed without regard to the use of the other edge for the opposing fold. Characteristic folds appear in Figs. X to XIII, Sheet 3, and will be discussed later under operation.

Above the flange 7 which carries the primary folding blade or blades, is pivoted between the end member 3, a rocking blade 12 slotted at 13 in a manner similar to the slotting of the blade 7. The blade 12 is normally maintained in the elevated position shown in Fig. I by a spring 14. Within the slot is disposed the usual stud 9 with wing nut 10 for adjustably mounting a blade such as Z shown in Fig. I. This blade is similar to the primary blades before described, but has an offset portion z so disposed as to bring the main portion of the blade against the top sheet in the stack S in making the secondary fold hereinafter described.

The machine will therefore be seen to consist of a bed on which a stack of paper may be placed and held in predetermined position, a floating blade carrying member preferably abutting one edge of the stack of paper, a primary blade mounting constantly resting on the top sheet of the stack, and a secondary blade mounting normally out of contact with the top sheet, but depressible to contact position when a secondary fold is to be made.

In operating the device, a guide sheet is first carefully folded by hand to ascertain just exactly the fold which is desired for the entire stack. Reference may be had to a scale R on the bed or frame of the machine if desired to measure folds or assure angles of blade set, if for example, the stack consists of letter sheets which are to be given the usual fold for a small envelop. For this purpose there would ordinarily be available a primary blade such as X. This blade would be of a width, determining the width of the lateral folds of the letter sheet, so as to give it when folded the proper dimensions to fit the envelop the transverse plate 7 being given a length of the overlap on the bed 1 to determine the length of the folded letter sheet governed by the upward fold of the sheet. In Figs. X to XIII, I have indicated characteristic successive folds for such a sheet. It will be understood that the order of making any of these folds may be varied and that a great variety of folds may be effected so as to get the desired results, as where a portion of the letter head is desired to be exposed or where some peculiarity of address of envelop or of form or size of paper takes the folding outside of conventional lines. It will also be understood that instead of using a specially proportioned blade such as X, two narrow blades such as Y may be suitably spaced and set to govern the desired width of fold.

In the example shown in Figs. XIV to XVI, it is desired to impart a double fold such as the folding of a sheet of legal cap. Here two simple folds are desired, both in usual conventional form, from the bottom up. In effecting this the stack S of sheets would be placed transversely of the machine as both folds are transversely of the sheet. In this form as the folds are brought merely against one edge, a narrow blade such as Y may be used, the blade being extended across the machine so as to traverse the width of the sheet in its transverse position. In this case, as shown in Fig. XIV, a blade Y is set so that its left hand edge comes at the middle transverse line of the sheet. The sheet is then folded from left to right giving at first a single fold across itself. It is now desired to impart a secondary fold. This is effected by placing down a blade such as Z. This may also be a narrow blade. This blade has been set on the transverse way 12 so that its right hand edge will come on the line of the secondary fold in folding the already once folded sheet the second time. This second fold is made from right to left.

As the blades are all flexible the sheets folded thereon in whatever manner they may be folded, may be readily removed by simply withdrawing them toward the front of the machine as indicated by the arrow Fig. IV. In other words, they are simply pulled off of the thin slightly flexible folding blades. Letters so folded will be found to have exact uniformity. With comparatively little dexterity on the part of the operator, sheets may be folded with great rapidity and neatness and although manipulated by hand and with cheap labor can be turned off at a speed approaching that of an automatic machine.

The machine furthermore provides a wide degree for the application of human intelligence if any mental check is required during the course of the operation of folding. Each sheet is substantially exposed to the glance of the operator and flaws, defects, dirt smooches, errors, etc., may be detected.

The machine being simple, inexpensive and easily operated makes its use available in a great majority of cases where the installation of an automatic machine would be prohibitive. As heretofore pointed out, through the adjustment of blades and the substitution of different kinds of blades, a great variety of folds may be effected.

The machine shown is obviously capable of a considerable degree of modification, the invention involved therein is capable of embodiment in many forms and such machines are adapted to a great variety of uses. The form shown and uses discussed are merely to be considered is illustrative embodiments and modifications and changes thereof to be within the purview of my in-

vention if found within the limits of the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. A folder comprising a bed, a blade carrier mounted for vertical movement relatively thereto, and a folding blade adjustably and detachably mounted on said carrier, and a secondary blade carrier adjustably and detachably mounted on said carrier for movement relative to said bed and normally maintained away therefrom.

2. A folder comprising a bed, a floating blade carrier mounted for vertical movement relatively thereto, and a flexible folding blade adjustably and detachably mounted on said carrier, and a secondary blade carrier adjustably and detachably mounted on said carrier for movement relative to said bed and normally maintained away therefrom.

3. A folder comprising a bed, a floating blade carrier mounted for vertical movement relatively thereto, and a flexible folding blade adjustably and detachably mounted on said carrier.

4. A folder comprising a bed, a floating blade carrier mounted for vertical movement relatively thereto, and a flexible folding blade adjustably and detachably mounted on said carrier, and a secondary blade carrier adjustably and detachably mounted on said carrier for movement relative to said bed and normally maintained away therefrom.

5. In a folder of the class described, a support for a sheet stack, a floating folder supported to rest by gravity on the top of the stack and adjustable thereacross.

6. In a folder of the class described, a support for a sheet stack, a primary folder supported over the top of the stack, and adjustable thereacross, and a secondary folder mounted in normal maintenance away from the said stack top, but movable over the top thereof and adjustable relatively thereto.

7. In a folder of the class described, a support for a sheet stack, a floating folder of substantially the shape to be folded supported to rest by gravity on the top of the stack and adjustable thereacross.

8. In a folder of the class described, a support for a sheet stack, a primary folder supported to rest by gravity on the top of the stack and adjustable thereacross, and a secondary folder mounted in normal maintenance away from said stack top, but movable over the top thereof and adjustable transversely relatively thereto.

9. In a folder, a support for a sheet, a floating carrier mounted for vertical movement relative thereto, and a folder blade of selected fold dimension detachably mounted upon said carrier.

10. In a folder, a support for a sheet, a floating carrier mounted for vertical movement relative thereto, and a flexible folder blade of selected fold dimension adjustably mounted upon said carrier.

11. In a folder, a support for a sheet, a floating carrier mounted for vertical movement relative thereto, and a detachable and adjustable folder blade of selected fold dimension.

12. A folding device comprising a sheet support, a floating folder blade mounting, adapted for vertical movement relative thereto, and a plurality of adjustable, detachable and interchangeable folder blades carried by said mounting.

13. A folding device comprising a sheet support, a floating folder blade mounting, adapted for vertical movement relative thereto, and a plurality of detachable and interchangeable folder blades carried by said mounting.

14. A folding device comprising a sheet support, primary and secondary folder blade mountings selectively movable toward said support, and a plurality of adjustable, detachable and interchangeable folder blades carried by said mountings for variable positioning relative to the sheet support.

15. In a folder, the combination with a bed, adapted to support a sheet stack, of a folder supported over the top of the stack and adjustable relative thereto, and an auxiliary folder mounted in normal maintenance away from said stack and movable toward said stack for adjustment thereover.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT ASTLEY.

Witnesses:
VICTORIA LOWDEN,
MARION F. WEISS.