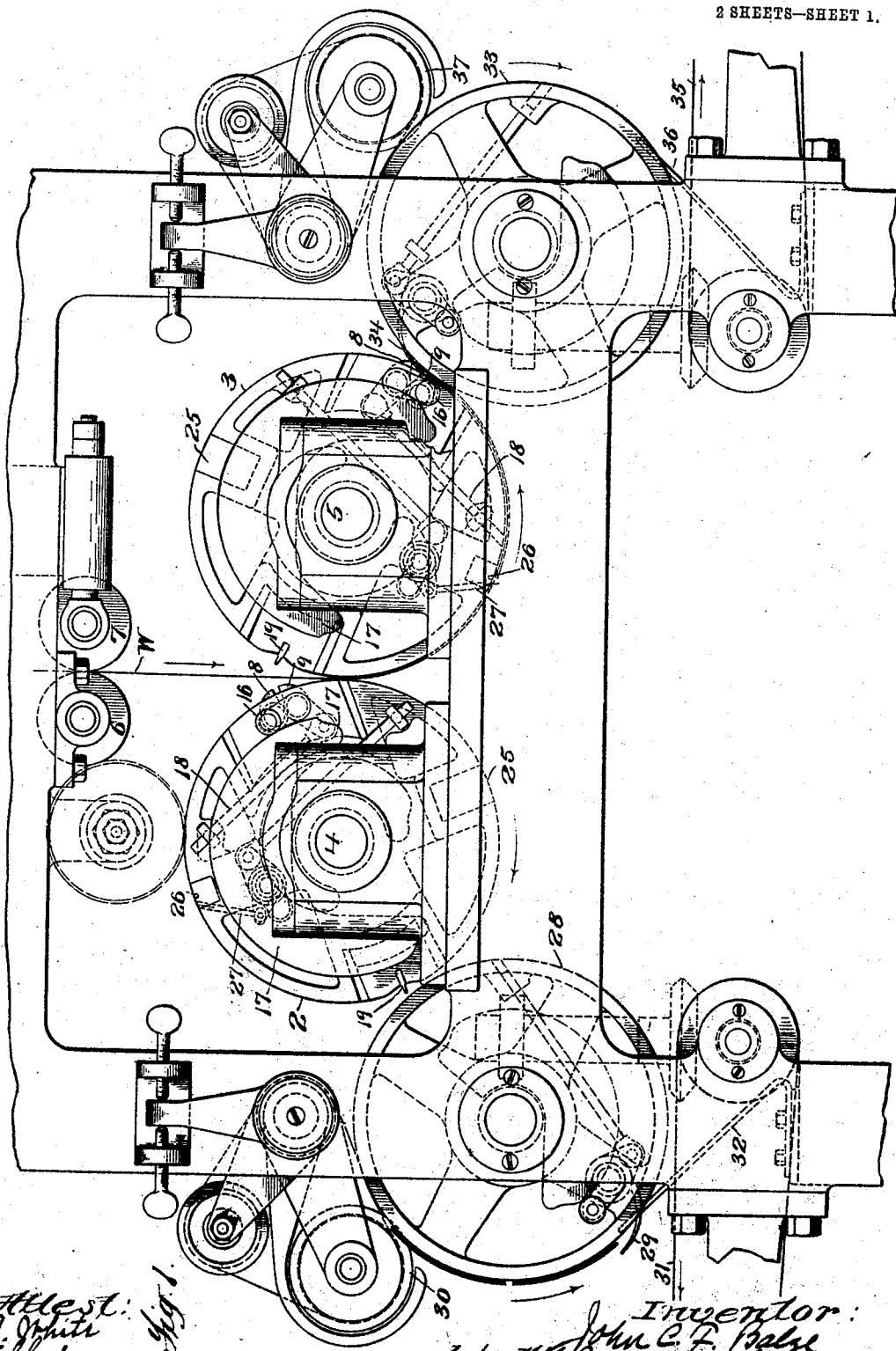


No. 806,094.

PATENTED DEC. 5, 1905.

J. C. F. BALZE.
FOLDING MECHANISM.
APPLICATION FILED FEB. 1, 1904.

2 SHEETS—SHEET 1.



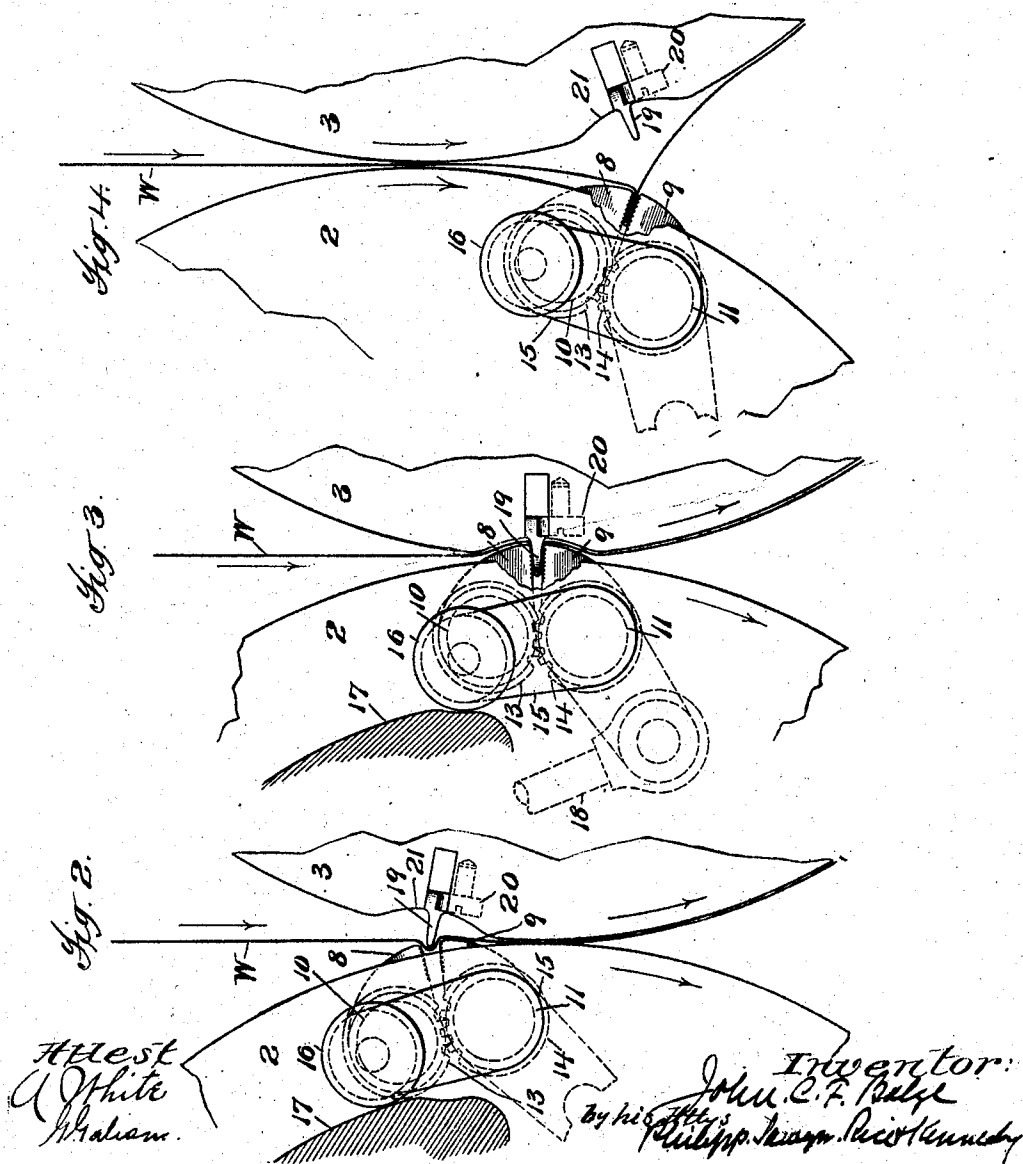
Attest:
A. J. White
P. C. Latham.

Fig. 1.

Inventor:
John C. F. Balze
by his Att. Philip S. Sweeney

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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

JOHN C. F. BALZE, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,
OF NEW YORK, N. Y.

FOLDING MECHANISM.

No. 806,094.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed February 1, 1904. Serial No. 191,471.

To all whom it may concern:

Be it known that I, JOHN C. F. BALZE, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Folding Mechanisms, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in folding mechanisms.

A type of folding mechanism ordinarily employed, more particularly in connection with fast rotary presses, comprises a rotating carrier having a pair of nipping-jaws thereon, and a cooperating rotating carrier having a movable tucking-blade mounted thereon, said tucking-blade operating to tuck a fold of the paper between the nipping-jaws, which are actuated to seize it. In the constructions heretofore usually employed the nipping-jaws are located behind or inside the circumferential line of the carrier, and the tucker-blade, which cooperates with these jaws, is ordinarily mounted behind the circumferential line of its carrier and is protruded from this position at the proper time by suitable actuating mechanism. In the operation of such a folder the tucking-blade tucks the fold of the paper inside the circumferential line of the cylinder in which the nipping-jaws are mounted, or, in other words, the operative part of the tucking-blade during the folding operation extends entirely beyond the circumferential line of its own carrier and lies wholly within the circumferential line of the carrier for the nipping-jaws. It will be understood, of course, that the operative part of the tucking-blade when the blade is protruded is running faster than the circumference of its carrier, because its operative part lies farther from the center of rotation of the carrier than the circumference. As this operative part reaches into the recess between the nipping-jaws it is brought into contact with parts of the nipping-jaws, which lie behind the circumference of their carrier and which are consequently running slower than the circumference of their carrier, because they are nearer the center. It being understood, of course, that the circumferences of the two carriers are moving at the same speed, it will be seen that the operative part of the tucking-blade on account of its higher relative speed is liable to pry open the

nipping-jaws and tend to pry the paper out of the jaws. When the folders are running at high speeds, this tendency on the part of the tucker-blade to pry open the nipping-jaws is such as to seriously interfere with the operation of the mechanism.

The present invention has for its object to produce an improved folding mechanism comprising a tucking-blade and a fold-retainer, the construction being such that the tendency of the tucking-blade to pry the paper out of the retainer is overcome.

With this and other objects not specifically referred to in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then specifically pointed out in the claims hereunto appended.

Referring to the accompanying drawings, Figure 1 is a front elevation of so much of a folding and delivery mechanism of a printing-machine as is necessary to enable the invention to be understood. Figs. 2, 3, and 4 are diagrammatic views illustrating the operation of the folder.

Referring to said drawings, which illustrate a preferred embodiment of the invention, 1 indicates the frame of the machine in which the several parts hereinafter referred to are mounted. The folding mechanism will comprise two folding members, one of which carries a tucking-blade or tucker and the other a fold-retainer—such, for instance, as a pair of nipping-jaws. The construction of these folding members and the means by which they are operated may be widely varied. One of the members, however, must at the time of the folding operation travel in a curved path. In the construction selected to embody this invention two carriers are employed, these carriers consisting of cylinders 2 3, which are mounted on shafts 4 5, suitably supported in the frame and driven by any suitable mechanism. (Not shown.) The web of paper is marked W and is shown as being delivered between the cylinders referred to by a pair of rollers 6 7, these rollers, as shown, being the ordinary drawing-off rollers of a longitudinal folder. In the construction shown part of the sheets which are cut from the web and folded are carried to one delivery and part to another, so that each of the cylinders 2 3 is provided with a tucking-blade and a fold-retainer, the particular

construction of these blades and jaws in the machine selected to illustrate the invention being hereinafter fully set forth.

The fold-retainer will consist of a pair of
5 movable jaws which in their operation nip the fold of paper between them, the paper which forms the fold being by reason of the fact that both jaws are movable drawn in equally from both sides. In the construction
10 illustrated the fold-retainer comprises two movable jaws 8 and 9, these jaws being mounted on shafts 10 and 11, suitably supported in the carrier, these shafts being intergearsed by means of segments 13 14. The
15 operating-faces of these jaws are preferably roughened slightly, as shown, so that they may more reliably nip the fold of the paper. The means by which the jaws are operated may be of any desired character. As shown,
20 the shaft 11 is provided with an arm 15, carrying a roll 16, this roll running on a suitable cam 17, as is usual in such nipping-jaw constructions. The jaws are closed by the usual spring-rod construction, (indicated at
25 18,) though any other means may be substituted for this closing means.

The coöperating tucking-blade or tucker may be of any desired construction and may be either stationary or movable, as desired.
30 In the preferred construction and, as shown, however, this tucker will be a stationary tucker and will consist of a blade 19, held in position in the cylinder by means of a set-screw 20 or in any other suitable manner.

The jaws and tuckers are so arranged that the pitch-line will fall on the blade intermediate its root and outer operative edge and on the jaws inside or below their outer edges. The best results will be attained where the
40 jaws and blades are so related to each other that this line is half-way between the outer operative edge of the blade and its root and half-way between the outer edges of the jaws and the parts opposite the outer edge of the blade when the same has entered between the
45 jaws to its fullest extent. It is to be understood, however, that good results may be obtained with constructions which vary from this arrangement. In the construction illustrated in the drawings the jaws, instead of
50 having their outer edges flush or substantially flush with the surface of the carriers 2 3, as has been the case in prior constructions, are caused to project from the carrier, as is clearly indicated in the various figures of the drawings, the top edges being in the best constructions rounded slightly, as shown. Inasmuch
55 as the cylinders which form the carriers for the jaws and blade run in the construction shown substantially in contact, these cylinders are provided with recesses 21, in which the blades 19 are located, these recesses being concave to readily receive the convex rounded surfaces of the jaws at the time when
65 the folding operation takes place. With this

construction it will be readily understood that the line which has been heretofore termed the "pitch-line," by analogy to gearing of the two carriers, will when the jaws and tucker
are in their engaged position, as is shown in 70 Fig. 3, for instance, cut the jaws between their outer edges and the center around which they move and will cut the tucking-blade midway between its operative edge and its root, so that the tendency of the blade to pry
75 open the jaws because of its moving faster than the jaws will be greatly reduced. In the best constructions, furthermore, the blade of the tucker instead of being made very thin, as heretofore, will be made comparatively
80 thick, and its two sides will be beveled off, as is clearly shown in the drawings. In other words, the tucking-blade is constructed on the same principle as the tooth of a gear, said tooth, as is well known, having its flanks beveled. With this construction, with which the
85 best results will be realized, the tucker-blade rolls into and out of engagement with the jaws of the fold-retainer in the same manner that gear-teeth roll into and out of engagement with each other, and with this construction the tendency of the tucker to pry open
90 the jaws of the retainer is almost entirely obviated.

In the constructions in ordinary use the paper travels on a line which is intermediate the
95 circumference of the two cylinders, and the paper is tucked by the tucker out of this line, the loop made by the tucker being formed inside the circumference of the carrier for the
100 jaws, so that all parts of the loop travel slower than the circumference of the cylinder which carries the jaws. In the construction illustrated, however, the paper is deflected by the outer convex surface of the jaws of the fold-
105 retainer toward the tucker, and the tucker forms the loop or fold in this deflected portion, so that a part of the loop lies outside the circumference of the cylinder which carries the jaws and a part of it lies inside. In the
110 construction shown, the paper, as has been before indicated, comes from the drawing-off rolls of the longitudinal folder and is cut into sheets, the folding-cylinders 2 3 acting, as is usual in such constructions, as cutting-cylinders
115 also, each cylinder being provided with a knife, the recess for which is marked 25, and the corresponding cutting-blocks are marked 26. Each of these cylinders is also provided with the usual pins 27 for receiving the heads
120 of the sheets. The pins are operated by the usual pin-operating mechanism, (indicated in dotted lines in the figures,) said mechanism being of a well-known form which it is unnecessary to describe. In this construction, one
125 sheet is taken by one of the cylinders and is carried off to a delivery, and the other sheet is taken by the other cylinder. The sheet which is taken and folded by the cylinder 2 is delivered to a delivery-cylinder 28, the fold of 130

the sheet being taken by grippers 29 of the usual form. The operating mechanism for these grippers is indicated in dotted lines in Fig. 1, and as it is of usual form it is unnecessary to describe it. The folded sheet is cut by the usual slitter mechanism 30, and is then delivered in any suitable manner—as, for instance, on a running belt 31—the delivery of the sheet being assisted by a stripper 32 of the usual character. The sheet taken and folded by the cylinder 3 is delivered to a delivery-cylinder 33, having grippers 34, and is delivered by it to a belt 35, the delivery being assisted by a stripper 36, and the folded sheet being, as in the case of the other cylinder, cut by a slitter mechanism 37.

Changes and variations may be made in the construction by which this invention is carried into effect. The invention is not, therefore, to be confined to the specific constructions herein shown and described.

What is claimed is—

1. In a folder, a pair of rotating carriers, one of said carriers being provided with a fold-retainer comprising a pair of jaws and the other a tucking-blade, and means for moving the jaws to nip the fold, the retainer and blade during the folding operation being each arranged to lie partly within the pitch-line of the carriers, substantially as described.

2. In a folder, the combination with a rotating carrier having a recess therein extending behind the pitch-line and a tucking-blade mounted within the recess of the carrier and arranged when in operation to project beyond the pitch-line, of a second carrier, a fold-retainer comprising a pair of jaws mounted on the second carrier and projecting beyond the pitch-line, the fold-retainer during the folding operation entering the recess in the tucking-blade cooperating carrier, and means for moving the jaws to nip the fold, substantially as described.

3. In a folder, the combination with a rotating carrier having a fold-retainer compris-

ing a pair of jaws arranged to project beyond the pitch-line, and means for moving the jaws to nip the fold, of a second rotating carrier having a tucker arranged to project beyond the pitch-line, the tucker having beveled faces, said tucker and fold-retainer during the folding operation each partly extending beyond the pitch-line of the carriers, substantially as described.

4. In a folder, the combination with a folding-cylinder having a recess therein extending behind its pitch-line, of a tucker having beveled faces mounted thereon, said tucker extending beyond the pitch-line, a second cylinder having a fold-retainer mounted thereon and extending beyond the pitch-line, said retainer comprising a pair of jaws, and means for moving the jaws to nip the fold, the fold-retainer during the folding operation entering the recess in the cylinder carrying the tucker and the tucker and folder during this operation each lying across the pitch-line of the cylinders, substantially as described.

5. In a folder, the combination with a folding-cylinder having a recess therein extending behind its pitch-line, of a tucker mounted therein and stationary with respect thereto, said tucker having beveled faces and extending beyond the pitch-line, a second cylinder having a fold-retainer mounted thereon and extending beyond the pitch-line, said retainer comprising a pair of jaws, and means for moving the jaws to nip the fold, the fold-retainer during the folding operation entering the recess in the cylinder carrying the tucker and the tucker and folder during this operation each lying across the pitch-line of the cylinders, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN C. F. BALZE.

Witnesses:

F. W. H. CRANE,
EDWARD C. WEISSMAN.