

June 3, 1930.

P. J. CHRISTMAN

1,761,517

FOLDING OR INTERFOLDING MACHINE

Filed June 12, 1929

3 Sheets-Sheet 1

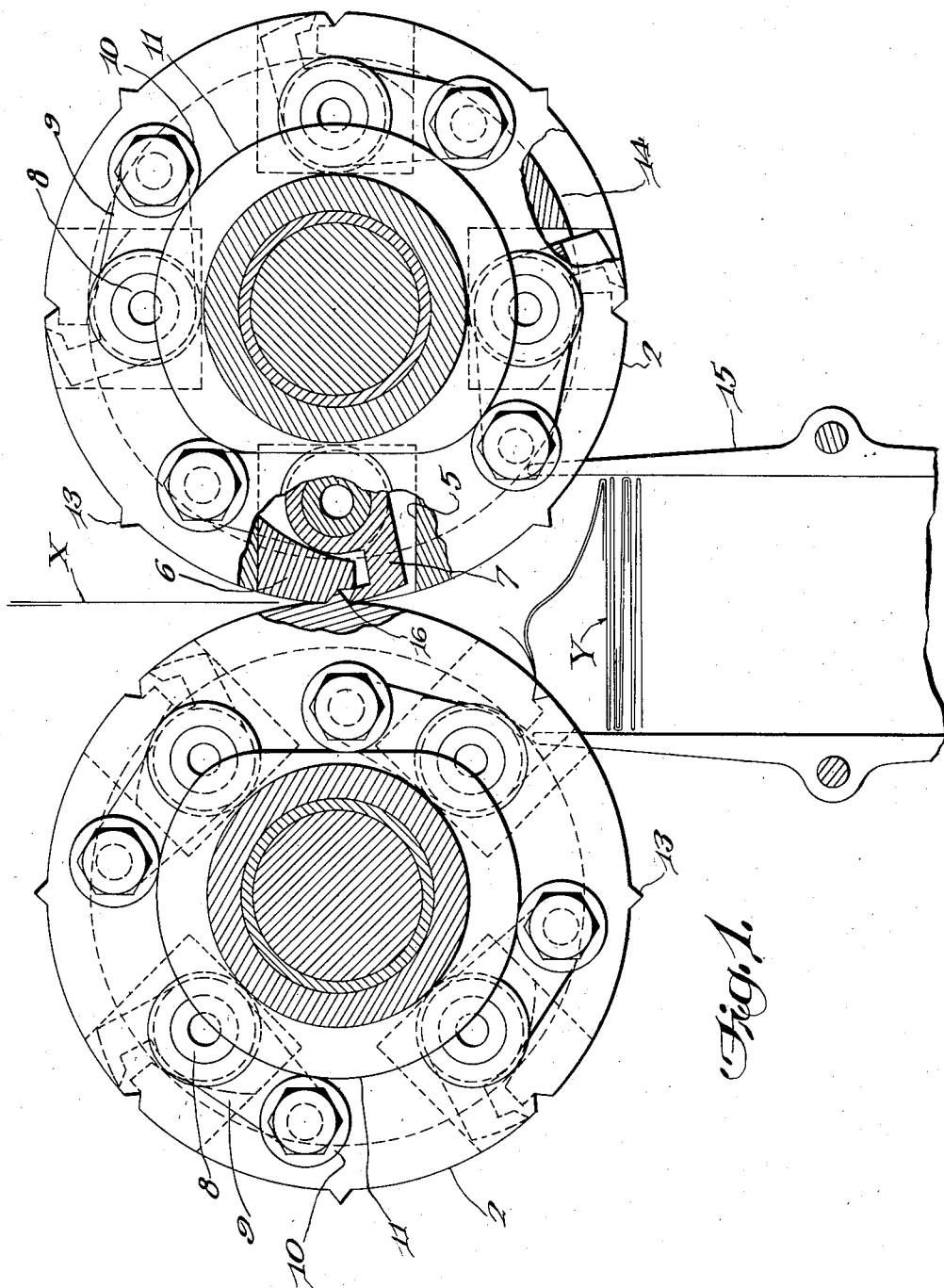


Fig. 1.

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Fig. 2.

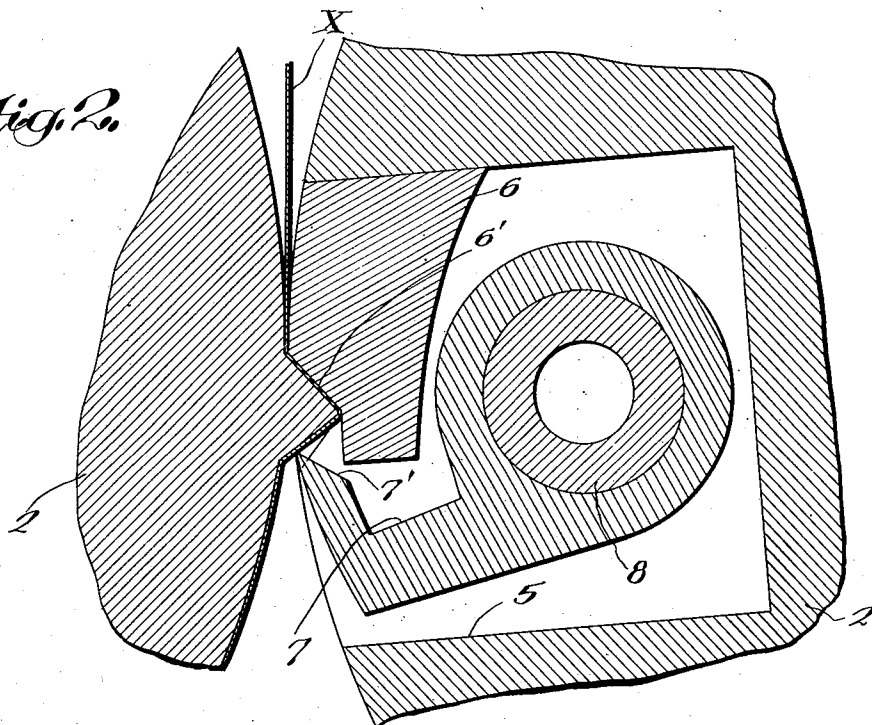
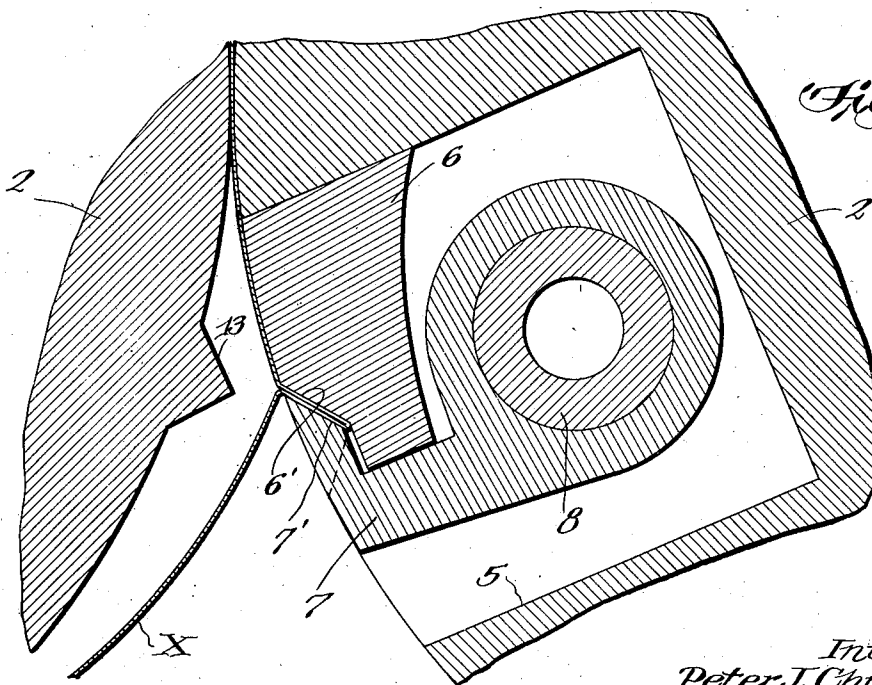


Fig. 3.



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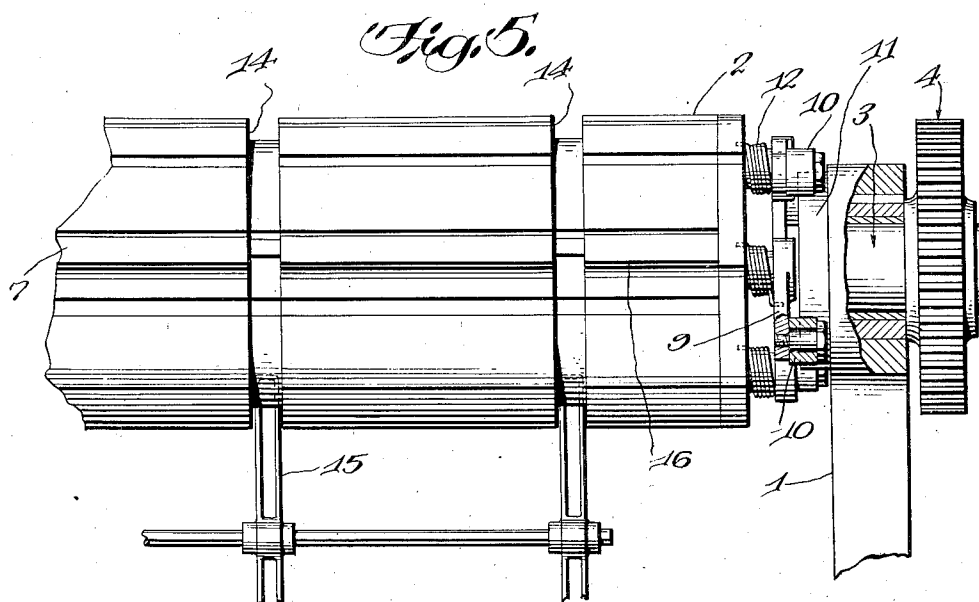
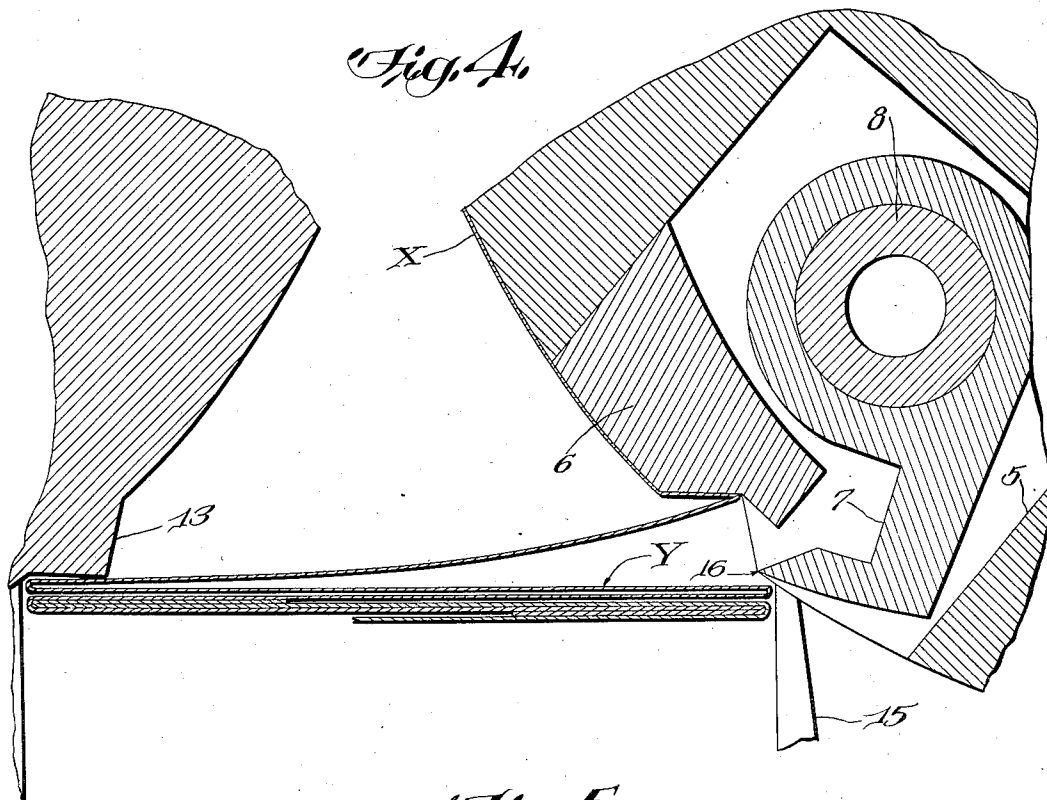
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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FOLDING OR INTERFOLDING MACHINE

Application filed June 12, 1929. Serial No. 370,212.

This invention pertains to folding or interfolding machines of the well known rotary type, in which opposite rotating cylinder rolls alternately grip and fold the sheets of paper fed therebetween.

In machines of the present type, it is common practice to grip and transversely fold the paper upon a line substantially radial to the folding cylinder. Consequently, as the fold is carried to the side of the magazine, the gripped portions are substantially at right angles to the stock in the magazine, which necessitates a secure grip upon the preceding sheet to withdraw the fold from the gripping jaws, and also creates considerable strain upon the sheet, which often results in tearing of the paper.

To overcome the foregoing, it has been necessary to release the fold considerably, prior to delivery of the sheet to the magazine. This is objectionable, in that quite a period of time is required for the fold to reach the stack, which materially reduces capacity of the machine and renders possible crimping of the paper and disorderly stacking.

It is, therefore, the primary object of the present invention to overcome the foregoing objections by the provision of means for gripping and folding the paper in such manner that the fold is withdrawn from the gripping jaws along a line substantially parallel to the plane of the sheet, and tangentially to the cylinder roll, rather than radially thereto and at right angles to the plane of the paper, thus eliminating strain upon the paper and avoiding the necessity of packers, in that the sheet is delivered to the magazine in close proximity to the top of the stack.

Incidental to the foregoing, a more specific object resides in the provision of a folding cylinder with gripping jaws having their engaged faces lying in a plane disposed between the axis and periphery of the cylinder and substantially parallel to the stack at the point of releasing of the fold.

A still further object resides in the provision of tapered or wedge-shaped tuckers adapted to be withdrawn from the gripping

jaws of the adjacent roll in coordination with their clamping action, thus preventing accidental withdrawal of the fold as the tuckers are withdrawn, and insuring a secure gripping of the fold.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination, and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings is illustrated one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawings, Figure 1 is a schematic view of a pair of folding cylinders constructed in accordance with the present invention, parts being broken away and in section to more clearly illustrate the structural features.

Figure 2 is an enlarged fragmentary section through a portion of the cylinders, illustrating the tucking operation;

Figure 3 is a similar view illustrating the clamping action of the gripping jaws;

Figure 4 is a similar view illustrating release of the fold and delivery of the same to the stack;

Figure 5 is a fragmentary elevation of one of the cylinder rolls.

Referring now more particularly to the accompanying drawings, the numeral 1 designates one of the side frames employed in machines of the present type, upon which the cylinder rolls 2 are mounted, the same being provided with stud shaft extensions 3 that carry the gears 4 through which rotary movement is imparted by means of any suitable drive, not shown.

Each cylinder roll is provided with spaced longitudinal recesses 5 in which are mounted stationary jaws 6. Also, pivotally mounted within the recesses 5 are the clamping jaws

7 provided with extension shafts 8 which project beyond the ends of the cylinder and have secured thereon actuating arms 9, each of which carries a roller 10 engaging a stationary cam 11. Springs 12 serve to urge the rollers 10 into engagement with their respective cams, and thus effect a resilient clamping action between the pivotal jaws 7 and the stationary jaws 6.

Intermediate the recesses 5, the peripheries of the cylinder rolls are provided with longitudinal wedge-shaped tuckers 13, each adapted to cooperate with a pair of gripping jaws carried by the adjacent cylinder, it being understood that the tuckers and gripping jaws of adjacent cylinders are alternately arranged.

Positioned immediately below the cylinder rolls 2 and projecting into annular grooves 14 provided in their peripheries are a plurality of spaced strippers 15, which serve to strip the folded sheets of paper from the cylinder rolls and also form a magazine for reception of the folded or interfolded stack Y.

The structure thus far described is more or less conventional and, therefore, no novelty is claimed for the same, the present invention residing in the specific construction of the gripping jaws and corresponding tuckers, whereby the highly novel and advantageous results of the invention are obtained.

The operation of the structure thus far described is well known to those skilled in the art, and consists in feeding sheets of paper X between the cylinders 2 by any suitable mechanism, not shown. As the adjacent cylinders rotate towards the paper fed therebetween, their respective sets of gripping jaws are held in open position by means of the cams 11, thus permitting the corresponding tuckers 13 of the adjacent roll to force the sheets X into the jaw, as best shown in Figure 2.

When the tucking operation has been completed, the cams 11 permit the pivotal jaws 7 to close through action of the springs 12. Thus, as the cylinders continue to rotate, the jaw 7, which is urged to gripping position by the spring 12, will follow the inclined face of the tapered tucker 13 until the same is withdrawn from between the jaws, causing the fold to be securely gripped, as best shown in Figure 3. Further movement of the roll serves to carry the fold to one side of the magazine, at which position it is released and allowed to drop upon the stack Y, as best shown in Figure 4. Obviously, should there be any tendency of the fold to adhere to the cylinder the strippers 15 will effectually release the same.

As best illustrated in Figures 2 to 4 inclusive, it will be noted that the stationary gripping jaws 6 are provided with gripping

faces 6' which when engaged lie in a plane disposed between the axis and periphery of the cylinder roll. The pivotal jaws 7 are provided with corresponding gripping faces 7' which form an acute angle with the end of the jaw 7 to provide a sharp nose 16, and as previously explained, as the tuckers 13 are withdrawn from the corresponding adjacent jaws, the nose 16 will follow the tapered face holding the paper securely and effecting an immediate grip of the fold as the tucker is completely withdrawn. After the fold has been gripped between the faces 6' and 7', the same is carried to one side and closely adjacent the stack, as shown in Figure 4, at which point the gripping faces of the jaws are disposed substantially parallel to the stack. At this point, the pivotal jaw 7 is released by engagement of its corresponding roller 10 with the high side of the cam 11 and the fold is free to drop upon the stack or be withdrawn from engagement with the stationary jaw face 6' as the cylinder continues its rotation.

From the foregoing, it will be readily seen that the arrangement of the gripping faces 6' and 7', in cooperation with the tapered tuckers 13, greatly facilitates gripping and folding the paper, and also provides the most advantageous release and delivery of the folded sheets to the magazine stack, due to the fact that the fold may be carried to a point closely adjacent the stack before being released, after which the same is readily stripped from the stationary jaw along a line substantially parallel with the stack rather than at an abrupt angle thereto.

I claim:

1. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders each provided with cooperating tuckers and grippers for transversely folding a web of paper, the engaged faces of said grippers lying in a plane disposed between the axes and peripheries of said cylinders.

2. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders each provided with cooperating tuckers and grippers for transversely folding a web of paper, the engaged faces of said grippers lying in a plane disposed between the axes and peripheries of said cylinders, and means for releasing said grippers when their faces are disposed substantially parallel to the folded stack.

3. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders each provided with cooperating tuckers and grippers for transversely folding a web of paper, the engaged faces of said grippers lying in a plane disposed between the axes and peripheries of said cylinders, a magazine positioned adjacent said rolls for receiving the folded stock, and

means for releasing said grippers when their faces are disposed substantially parallel and closely adjacent the folded stock.

4. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders, each provided with cooperating tuckers and grippers for transversely folding a web of paper, said grippers each comprising a stationary jaw and a pivotal jaw, the engaged gripping faces of said jaws lying in a plane disposed between the axes and peripheries of the cylinders.

5. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders, each provided with cooperating tuckers and grippers for transversely folding a web of paper, said grippers each comprising a stationary jaw and a pivotal jaw, the engaged gripping faces of said jaws lying in a plane disposed between the axes and peripheries of the cylinders, and means for releasing said pivotal jaws when their gripping faces are disposed substantially parallel to the folded stack.

6. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders, each provided with cooperating tuckers and grippers for transversely folding a web of paper, said grippers each comprising a stationary jaw and a pivotal jaw, the engaged gripping faces of said jaws lying in a plane disposed between the axes and peripheries of the cylinders, a magazine positioned adjacent said rolls for receiving the folded stock, and means for releasing said pivotal jaws when their gripping faces are disposed substantially parallel and closely adjacent the folded stock.

7. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders, each provided with cooperating tuckers and grippers for transversely folding a web of paper, said tuckers having inclined faces, and said grippers each comprising a stationary jaw and a movable jaw, the engaged gripping faces of said jaws lying in a plane disposed between the axes and peripheries of said cylinders.

8. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders, each provided with cooperating tuckers and grippers for transversely folding a web of paper, said tuckers having inclined faces, one of which registers with the face of its cooperating stationary gripping jaw on the central line of contact, and said grippers each comprising a stationary jaw and a movable jaw, the engaged gripping faces of which lie in a plane disposed between the axes and peripheries of said cylinders.

9. In a folding or interfolding machine of the rotary type, a pair of oppositely rotating cylinders, each provided with cooperating tuckers and grippers for transversely

folding a web of paper, said grippers each comprising a stationary jaw and a movable jaw, the engaged gripping faces of said jaws lying in a plane disposed between the axes and peripheries of said cylinders and the face of said movable jaw forming a sharp nose with the end of said jaw, said tuckers having inclined faces, one of which registers with the face of its cooperating stationary gripping jaw on the central line of contact and the opposite face being engaged by the nose of said movable jaw on said line of contact.

In testimony that I claim the foregoing I have hereunto set my hand at Green Bay, in the county of Brown and State of Wisconsin.

PETER J. CHRISTMAN.