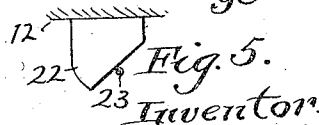
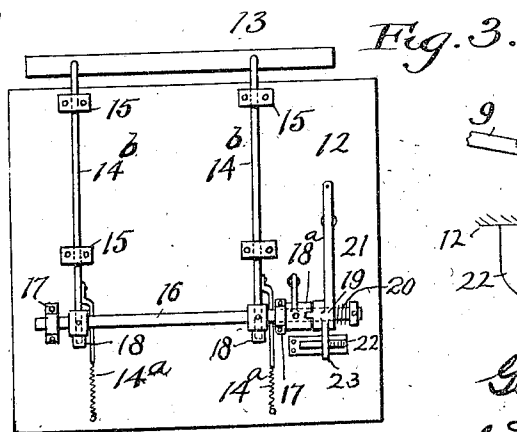
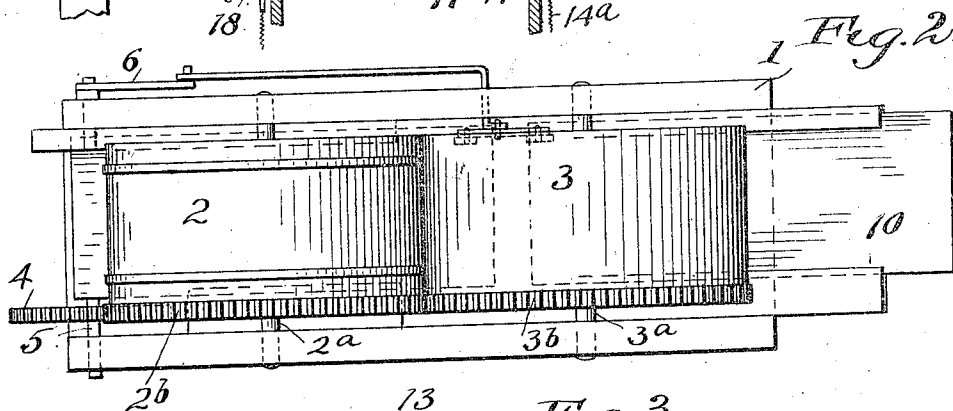
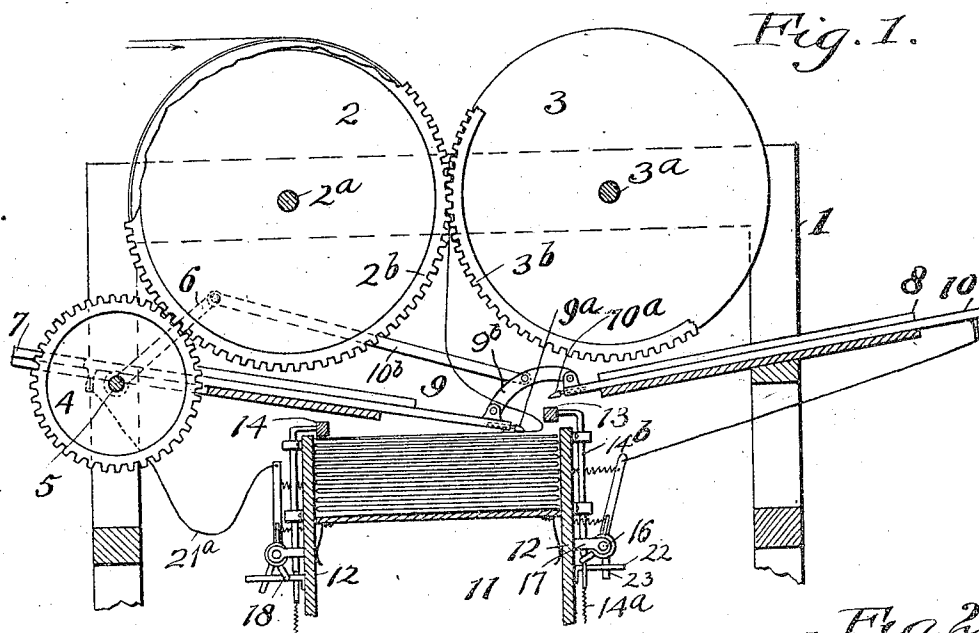


1,203,722.

Patented Nov. 7, 1916.



Witnesses
E. B. Gilchrist
J. J. Hudson

23 Inventor.
George L. Pugh
by Thornton & Son

UNITED STATES PATENT OFFICE.

GEORGE L. FULK, OF CLEVELAND, OHIO, ASSIGNOR TO THE POSTAL SUPPLY AND MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

FOLDING-MACHINE.

1,203,722.

Specification of Letters Patent.

Patented Nov. 7, 1916.

Application filed March 2, 1914. Serial No. 821,934.

To all whom it may concern:

Be it known that I, GEORGE L. FULK, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Folding-Machines, of which the following is a full, clear, and exact description.

This invention relates to a device for folding a web of material which is supplied continuously.

The object of the invention is to provide a device of simple construction which will with certainty and rapidity fold the web of material supplied to it.

Generally speaking, the invention comprises the elements and combinations thereof set forth in the accompanying claims.

Reference should be had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a top plan view of the machine. Fig. 3 is an elevation showing a detail of mechanism for holding the folded material. Fig. 4 is a sectional detail showing a portion of the folding mechanism, and Fig. 5 is a plan view of a detail of construction.

The machine of my invention is primarily intended to impart to a web of material what is known as a fan fold. A fan fold may be described as a folding of the web of material back and forth upon itself in folds of substantially equal length.

In the drawing 1 represents in general a frame which serves to support the various instrumentalities forming parts of the machine.

2 and 3 represent respectively cylindrical members or drums, the axes of which are parallel with respect to each other. These drums are mounted upon shafts 2^a and 3^a which support the respective drums,—the shafts being journaled in portions of the frame 1. The drums 2 and 3 are so mounted with respect to each other that at one point they substantially touch so that material passing between the drums is fed downward by the rotation of the drums. Each of the drums 2 and 3 is provided with a gear band 2^b and 3^b, respectively,—these gear bands having their teeth in mesh so that turning of one of the drums results in the turning of the other drum in the oppo-

site direction. A gear 4 is supported upon a shaft 5, which is journaled in the frame 1. The gear 4 meshes with one of the gear bands 2^b, or 3^b, and drives the same. The shaft 5 may be turned by a crank 6 which may be actuated in any desired manner.

Mounted upon the frame beneath the drums 2 and 3 are supporting members 7 and 8. Upon each of these supporting members there is a slide represented at 9 and 10. The slides 9 and 10 are so mounted as to be easily reciprocable upon the mounting members 7 and 8. These mounting members 7 and 8 are slantingly mounted and the mounting member 7, as shown in the drawing, is mounted slightly below the member 8. This is for the purpose of preventing interference between the slides, as they reciprocate.

The slides 9 and 10 are designed to reciprocate beyond the inner portions of the members 7 and 8 in a manner which will be later described. These slides 9 and 10 are provided with spring pressed heads 9^a and 10^a, so that these heads, when engaging with the web to be folded, will resiliently engage therewith, thus preventing any tearing of the web, and furthermore, accommodating slight inequalities in the feeding of the web. The detail of construction for the spring mounted heads 9^a and 10^a is shown in Fig. 4, wherein the head 9^a is mounted upon rods, one of which is shown at 9^b with a spring 9^c normally urging the head 9^a outward. A pin 9^d which is secured to the rod 9^b occupies a slot formed in the slide 9, so that the movement of the head is limited by the length of the slot.

The slides are connected at their adjacent or head ends by a link 9^f which is flexibly connected to the slides 9 and 10. The link 9^f is connected with the crank 6 by a rod 10^b, so that as the crank 6 is turned the rod 10^b is moved and the slides 9 and 10 are reciprocated. The slides are driven by the mechanism indicated in such a manner that they will not interfere with each other's movement, for one slide must retreat as the other advances.

Beneath the slide mounts 7 and 8 there is what may be termed a chute generally designated at 11. This chute is provided with side members 12 and these side members are adapted to cooperate with the slides 9 and 10. These side members are so posi-

tioned that each slide as it reaches the end of its forward reciprocation will come substantially to the side member 12, so that the length of the fold imparted to the web is governed by the distance between the side pieces 12, which, of course, in turn is dependent upon the length of reciprocation of the slides 9 and 10.

For the purpose of engaging and holding the folded edges of the material, after it has been folded in the chute 11, I provide fingers or clamps 13 and 14. These fingers act in exactly the same manner and I will describe the mounting of the finger 13, together with the mechanism which operates it, which description will suffice for the finger 14,—it being understood that these fingers act at alternate times and not together.

As shown in Fig. 3, the finger 13 is mounted upon two rods 14^b which, at their upper end are turned into a substantially horizontal position. The rods 14^b are mounted in straps 15 which permit the rods to slide under the action of certain mechanism to be described. Transversely of the side piece 12 there extends a shaft 16 which is mounted in suitable bearings 17 which shaft is provided with fingers 18 that are situated adjacent opposite ends of the shaft and are so positioned that as the shaft 16 is turned, the fingers 18 will engage the lower ends of the rods 14^b and raise them. The shaft 16 normally has the fingers 18 out of engagement with the rods 14^b. Near one end of the shaft 16 there is a clutch jaw 18^a secured to the shaft, and loose upon the shaft there is another clutch jaw 19, which jaw may have a limited movement along the shaft,—these clutch jaws being pressed toward each other by a spring 20. On the clutch 19 there is an arm 21 which by means of a flexible cord 21^a is connected with the slide 9, and the similar arm upon the other side member 12 is connected by a flexible cord with the slide 10. It will thus be apparent that as the slides 9 and 10 reciprocate, they will, upon their rearward excursion, actuate the mechanism controlling the finger 13, which is adjacent the slide in question, and under such conditions, the opposite slide will be folding the web beneath the finger 13 which is elevated.

Carried by the side 12 is a cam shaped piece 22 which is shown in plan in Fig. 5, and cooperating with this cam is a finger 23 which extends downwardly from the clutch jaw 19. When the lever 21 is drawn backward, the finger 23 will travel along the slanting face of the cam 22 and will result in moving the jaw 19 away from the jaw 18. The engagement between the cam face and the finger 23 is so timed with respect to the movement of the slides 9 and 10, that immediately after a slide begins its backward reciprocation, the clutch jaws 18 and

19 become disengaged and the finger 13 which has been raised is suddenly drawn back to its lower position under the action of springs, which are represented at 14^a. It will thus be seen that the operation of each finger 13 is to engage and hold the fold in the web of material immediately after a slide has completed the fold, and before the companion slide will have commenced to make the next fold.

At the beginning of the operation of folding I may use a spring held bottom piece. This bottom piece will be pushed down as the web is folded above it and when at the bottom the machine may be stopped to remove the contents of the chute, or the folded web may be continuously fed through the chute 11.

It will be obvious that various modifications may be made in the device herein shown without departing from the spirit of the invention.

The device here shown is more particularly intended for the folding of a paper strip upon which printed matter is arranged, and the strip when thus folded is very conveniently arranged for the insertion of carbon paper to make manifold copies. However, I do not limit the machine to this particular use, in that its use may be much more varied than that just described.

Having thus described my invention, I claim:

1. A folding machine comprising a feeding device adapted to feed a continuous web of material, a pair of oppositely disposed slides, yieldable heads carried by said slides, and a receiving means into which the web is folded.

2. A folding machine comprising a feeding device adapted to feed a continuous web of material, a pair of oppositely disposed slides, yielding heads carried by the slides, means for alternately reciprocating said slides, and receiving means into which the web of material is folded by the slides.

3. A folding machine comprising a feeding means adapted to feed a continuous web of material, a pair of oppositely disposed slides, yielding heads carried by said slides, means for alternately reciprocating said slides, a receiving means having a pair of oppositely disposed walls, said slides folding the web against said walls.

4. A folding machine, comprising a feeding means adapted to feed a continuous web of material, a pair of oppositely disposed slides, a link flexibly connecting adjacent portions of said slides, and means for moving said link to cause the slides to reciprocate.

5. A folding machine, comprising a feeding device adapted to feed a continuous web of material, a receiving chute 11 beneath the feeding means, a pair of reciprocating slides which move across the said chute, a link piv-

otally connected at its opposite ends to the adjacent or head ends of the slides, a rod pivotally connected to said link, and means for reciprocating said rod.

5 6. A folding machine, comprising a feeding device adapted to feed a continuous web of material, a pair of oppositely disposed slides, yielding heads carried by said slides, a link pivotally connected at its opposite
10 ends to adjacent ends of the slides, a rod pivotally connected with said link, and means for moving said rod.

7. A folding machine, comprising a feeding device adapted to feed a continuous web
15 of material, a pair of oppositely disposed slides, means for alternately reciprocating said slides, a pair of retaining fingers adapted to engage and hold the material after it is folded, each finger being mounted upon reciprocating rods, means for raising said
20 rods, including a lever, a flexible connection between the end of said lever and the slide to which said lever is adjacent.

8. A folding machine, comprising a feed-

ing device adapted to feed a continuous web 25 of material, a pair of oppositely disposed slides, means for alternately reciprocating said slides, a pair of fingers adapted to retain the material after it is folded, each finger being mounted upon rods which are
30 adapted to reciprocate, a shaft, means carried by the shaft for raising the said rods, resilient means connected with the rods for normally retaining the rods in their lowermost position, a lever, a clutch between the
35 lever and the said shaft, cam means operating the said lever to disconnect the clutch, when the shaft has been turned by the lever a predetermined amount, and a flexible connection between the lever and the end of
40 the slide to which the lever is adjacent.

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

GEORGE L. FULK.

Witnesses:

A. J. HUDSON,

L. E. PORTER.