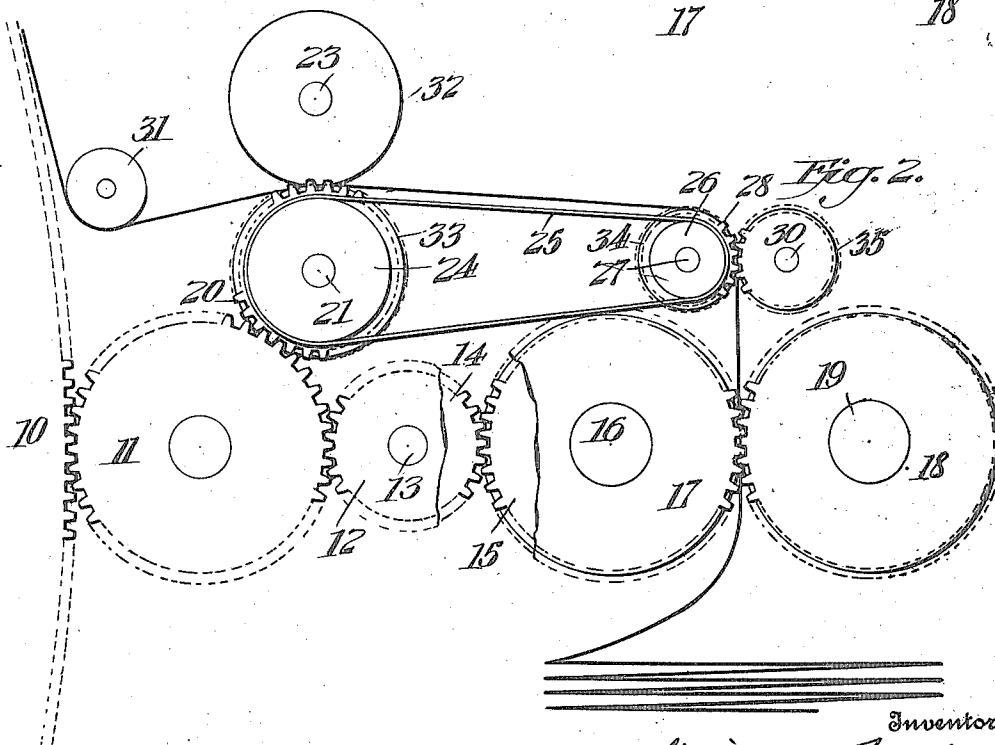
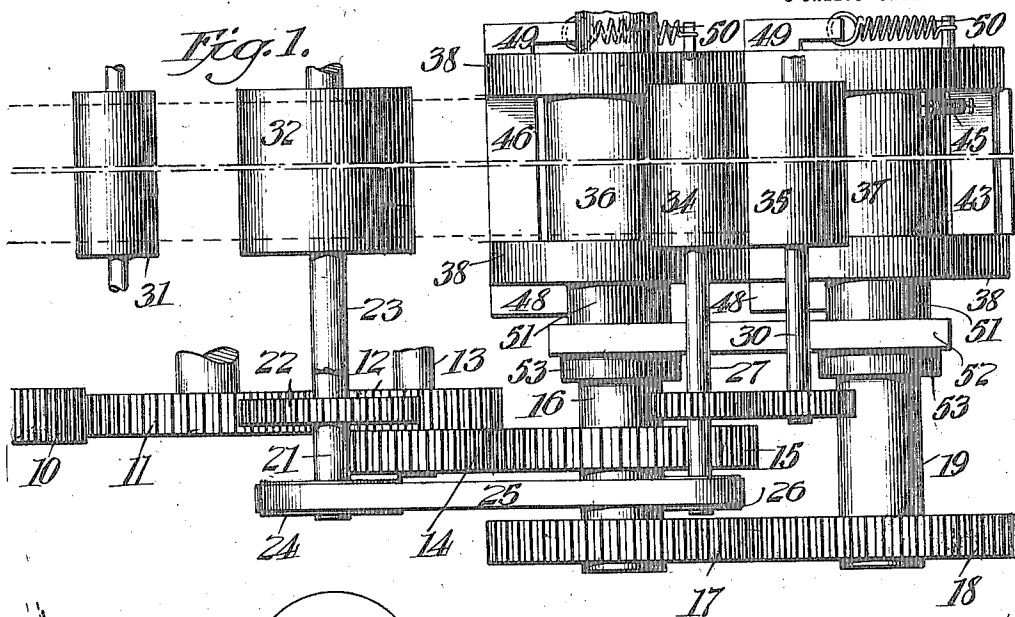


W. FLETT.
FOLDING MACHINE.
APPLICATION FILED JULY 14, 1915.

Patented Dec. 11, 1917.

3 SHEETS—SHEET 1.

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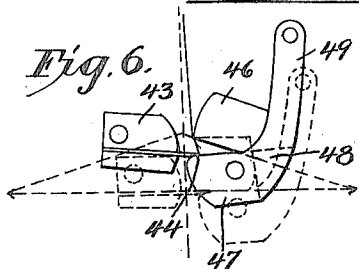
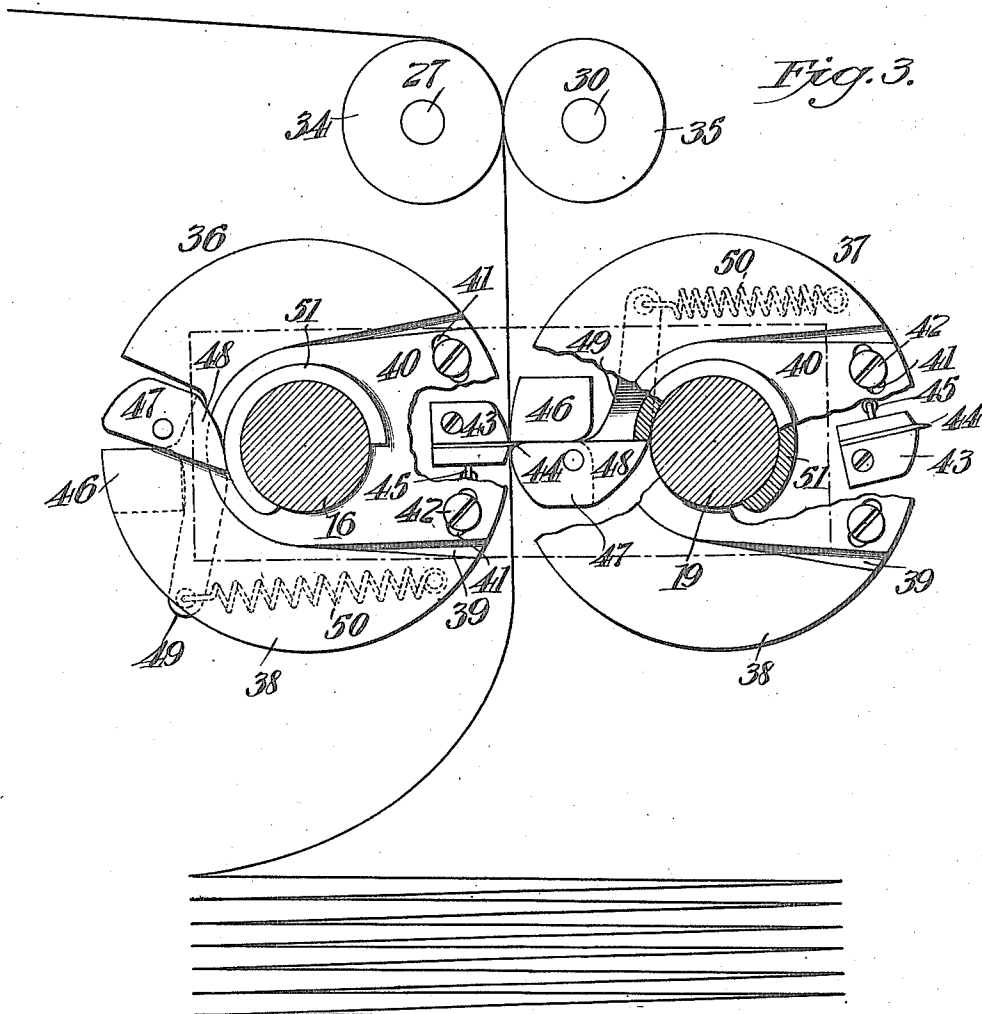
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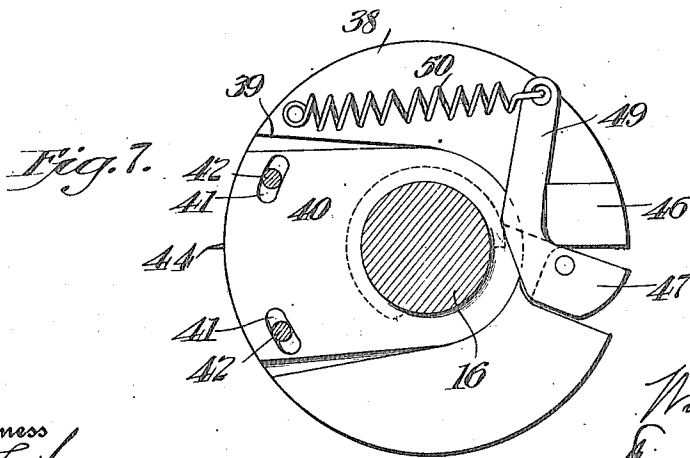
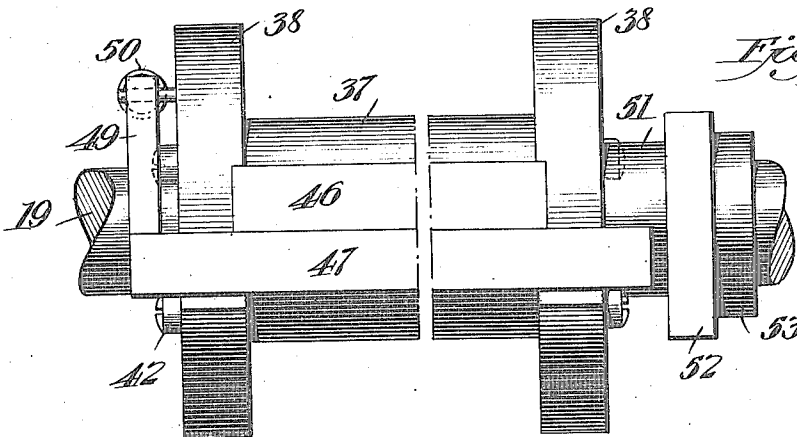
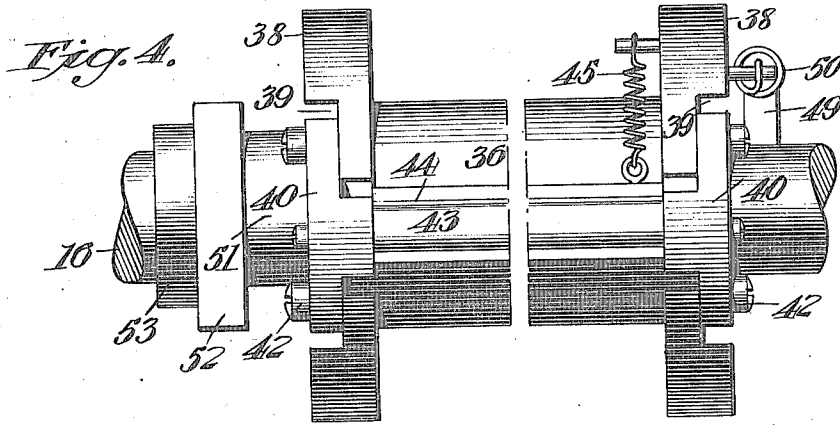
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3 SHEETS—SHEET 3.

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UNITED STATES PATENT OFFICE.

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FOLDING-MACHINE.

1,249,367.

Specification of Letters Patent. Patented Dec. 11, 1917.

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To all whom it may concern:

Be it known that I, WILLIAM FLETT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Folding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a machine for folding paper and especially delicate papers, such as the perforated strips which are used in mileage books. Its objects are to provide a machine which will permit the strips or sheets of paper to be drawn tightly over and through the feeding device to the folding device and then will take up the tuck or crease in the sheet or strip from the free suspended part of the sheet or strip lying beyond the folding device; to provide an arrangement of gearing which may be readily changed to vary the number of folds to be made in the sheet or strip; to provide tucking blades and creasing jaws which will handle the material without injury; to relatively gage the parts and their speed; and to secure a rapid and certain folding.

To these ends the invention comprises the combinations set forth in the appended claims.

In the accompanying drawings, Figure 1, is a plan view;

Fig. 2, is a side elevation to illustrate the gearing and feeding devices;

Fig. 3, is a central, vertical section through the folding cylinders;

Fig. 4, is a side elevation looking into what may be called the tucking side of a cylinder;

Fig. 5, is a side elevation looking into the opposite or creasing side of a cylinder;

That is to say, Figs. 4 and 5 present views from opposite directions of the two cylinders as they meet or register in the illustration of Fig. 3;

Fig. 6 is a detail of the tucker and creaser device in successive stages showing the fold as the tucker presses in between the jaws of the creasing device;

Fig. 7, is an end view of the folding cylinder.

It will be understood that a strip, for example the perforated or indented strip of

a mileage book, is printed on a cylinder and that this cylinder bears at one side about its circumference a gear-wheel partly illustrated and indicated by the numeral 10. The gear-wheel 10 meshes with an idler 11 through which a rotary movement is imparted to a gear-wheel 12 carried on a shaft 13 to which is also secured a controlling gear-wheel 14, whose function will be more particularly described hereafter. The gear-wheel 14 is keyed to the gear-wheel 12 and meshes with a gear-wheel 15 borne by a shaft 16, which also carries at its outer end a gear-wheel 17 meshing with a gear-wheel 18, carried by a shaft 19. The idler 11 engages also a gear-wheel 20 carried by a shaft 21. The shaft 21 carries at its outer end a pulley 24 which, under the effect of the rotary power imparted through the described gears, drives a belt 25, which passes over a pulley 26 carried by a shaft 27 and serves to rotate a gear-wheel 28, meshing with a gear 29 to rotate a shaft 30. The feed shafts 27 and 30 are driven by belt to avoid trouble due to paper variations, it being practically impossible to make two sets of positively driven cylinders operate on one sheet of paper at the same time. The cylinders 34 and 35 are speeded slightly faster than the paper is traveling and the contact with the paper is very delicate. This keeps the paper tight and at the same time will permit slipping for any extra speed.

31 represents a guide-roller beneath which the paper passes. On the inner end of the shaft 23 is a cylinder 32. Below the cylinder 32 is a cylinder 33, the paper passing between these cylinders. On the inner end of the shaft 27 is a direct feed roller 34 and on the inner end of the shaft 30 is a similar feed roller 35. The paper passes between these two cylinders and immediately to the folding devices. On the inner end of the shaft 16 is a folding or tucking and creasing cylinder 36 and on the inner end of the shaft 19, is a similar cylinder 37.

A description of one of these cylinders will answer for the description of both.

Each cylinder bears at each end a disk 38, recessed at 39 to receive a plate 40 which may be adjusted by means of slots 41 and set-screws 42. The plate 40 is bored so that it may embrace the shaft or axle of the cylinder, and carries a pivoted block 43, bearing a tucking blade 44. The tucking blade 44 is

spring-drawn, as indicated at 45. On the side opposite to the tucking block and blade are the creasing jaws. One of these, 46, is stationary. The other, 47, is pivoted and carries a projecting beveled end 48. Standing up from the creasing jaw 47 is an arm 49, drawn by a spring 50, secured to a pin on the folding cylinder. These jaws being closed by the spring 50 are not affected by different thicknesses of paper which may be held between the jaws. On each shaft or axle, 16 and 19, is secured a cam ring 51 which lies in the path of the beveled end 48 of the pivoted creasing jaw. A spacing and bracing plate 52 receives the shafts 16 and 19 and a collar 53 is placed on each shaft and bears against the plate 52 to hold in place the cam ring 51.

In operation the paper as it is printed passes beneath the idler or guideroller 31 and thence between the cylinders 32, 33 passing from them to the direct feed rollers 34 and 35. The paper then running between these rollers is fed in between the folding cylinders, 36 and 37, the parts having been previously set for the desired fold. As the two cylinders rotate the pivoted creasing jaw 47 is held open in the position illustrated in Fig. 3 on the left-hand side until the jaw 47 has passed entirely about the cam ring 51. In the meanwhile the tucking blade operating at a slight angle pushes in a fold of the paper between the creasing jaws, finally placing it as shown in Fig. 6, whereupon, as illustrated in Fig. 3, the beveled part 48 of the creasing jaw 47 having passed over the cam ring 51 the spring 50 snaps the jaw 47 into place against the stationary jaw 46. In doing this the paper which is taken up against the bottom of the tucking blade is drawn from the depending free section so that no strain is placed upon the taut section coming down from the feed rollers. As the two folding cylinders continue to rotate the tucking blade and block are drawn down by the spring, while at the same time the rotation tends to draw the tucking blade from between the creasing jaws, and the jaws as they rotate tend to withdraw from the tucking blade. They hold the tucked part tightly, carrying it out until the beveled end 48 of the creasing block 47 strikes the projecting end of the cam 51, when the jaws are opened and the folded section drops into place, immediately preceding the time when a second section is taken between the succeeding blade and creasing jaws.

The pivoting of the tucking blade enables the paper to be taken from the slack end. That is to say, the paper is folded in from the slack end as set forth and not by pushing in a previously formed tuck and drawing on the taut end.

The advantage of having the block 43 spring-drawn is that it is closed by the pivoted

creasing jaw and when this closing occurs the spring yields to the operation or movement. The spring holds the tucking blade off the central line, thus insuring its taking the paper below the line of tuck or from the slack end. The paper is folded under rather than tucked in, thereby bringing no strain upon the top or taut end.

In my machine the adjustment is from the center of the shaft. This keeps the blades an exact distance from the center, no matter to what point they are swung for adjustment. This insures the depth of the tuck from whatever position of adjustment.

The construction of my device enables me to accurately adjust the machine to provide for any change in fold.

I provide that the controlling gear-wheel 14 shall determine the number of folds desired in a given length of strip.

To illustrate: Gear 12 is the same size in either a four inch or five inch fold. Gear 14 controls the length of fold and with the same folding cylinders and plates variable lengths may be obtained by increasing or decreasing gear 14, for the reason that the strip of paper travels at a fixed and uniform speed controlled by main cylinder 10, and by changing gear 14 the blades of the folder may operate at variable speeds, thereby increasing or decreasing the length of the fold. This increase or decrease in gear 14 is cared for through a movable base on which gears 17 and 18 are fixed.

As the paper passes down between these cylinders it is touched only by the tucking blade and creasing jaws and then is carried out from side to side as indicated in Figs. 2 and 3.

If a fold should be longer on one side than on the other the tucking blade may be adjusted to precisely even the folds.

With my machine any length of fold may be obtained through change of number of revolutions of the folding cylinders. Any number of folds to each revolution of the main cylinder may be obtained up to the point where the circumference of the folding cylinders multiplied by the number of folds equals the circumference of the main cylinder.

My machine also, as above indicated, has pivoted spring-drawn tucking blades by which I am enabled to get the desired action of lifting the fold from the slack end and always getting the action of the tucking blade off the central line.

I provide gearing for controlling the number of folds as described. I provide an adjustment from the center of the shaft by which I keep the blades an exact distance from the center at any point of adjustment and insure the depth of the tuck in any position.

I may also observe that in the illustration

the feeding mechanism is placed as close to the folding cylinders as they can be placed, so that as little space as possible may be left between the delivery and the tucking action. By these means I insure that light paper in treatment may not be blown to one side and deranged.

I claim:—

1. In a folding machine, a pair of registering folding cylinders, each having a pivoted, adjustable tucking blade, creasing jaws one of which is pivoted, and a cam to open the pivoted jaw.

2. In a folding machine, the combination of folding cylinders, each cylinder carrying an adjustable, pivoted tucking blade which is spring drawn, creasing jaws, one of which is pivoted and spring drawn, and a cam for opening the pivoted jaw.

3. In a folding machine, the combination of cooperating folding cylinders each carrying a tucking blade borne by an adjustable plate pivoted on the cylinder shaft and complementary creasing jaws to receive the tucking blade on said cooperating cylinder at about the central meeting point and to fold the paper and carry the fold down and to one side.

4. In a folding machine, the combination of cooperating folding cylinders each carry-

ing a recessed disk at each end, a block adjustable in the recess and carrying a tucking blade, and complementary creasing jaws on each cylinder, operating with the tucking blade on said cooperating cylinder to fold the paper.

5. In a folding machine, the combination of cooperating cylinders each carrying a recessed disk at each end, a block adjustable in the recess and carrying a tucking blade which is spring-drawn and operates at an angle and complementary jaws on each cylinder cooperating with the tucking blade of the cooperating cylinders to fold the papers.

6. In a folding machine, the combination of cooperating cylinders, a tucking blade, complementary jaws on each cylinder cooperating with the tucking blade of the cooperating cylinders to fold the papers, a system of gearing controlling the operation of cylinders and so related to the folding parts that by changing the central gear of the system the speed of the folding cylinders may be changed thereby governing the length of the fold.

In testimony whereof I have hereunto signed my name.

WILLIAM FLETT.