Dec. 29, 1925. 1,567,106

V. A. BOKER

PAPER FOLDING MACHINE

Filed June 30, 1922 4 Sheets-Sheet 1

Fig. 1

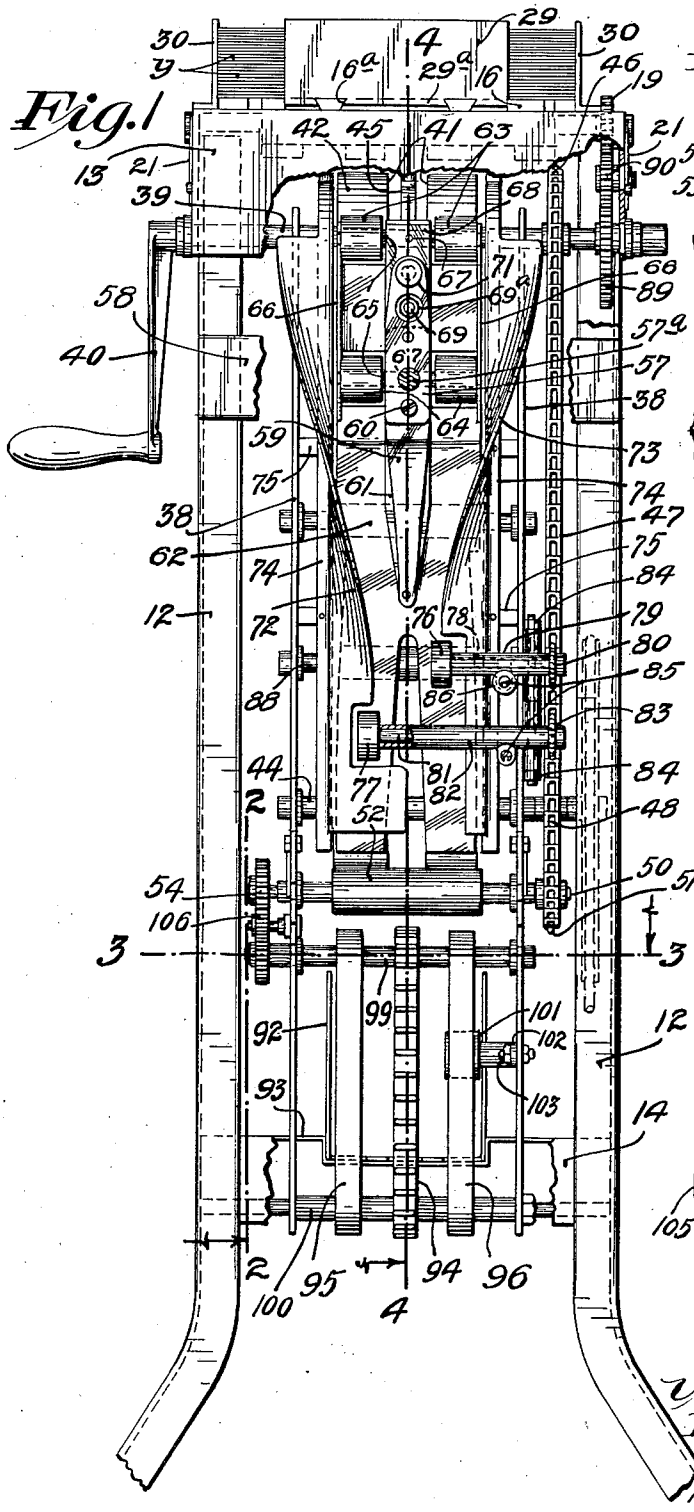


Fig. 2

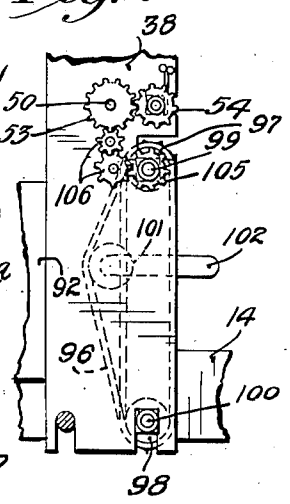
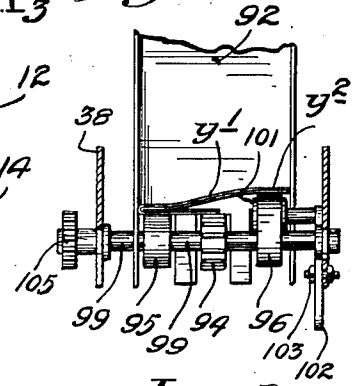


Fig. 3



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Dec. 29, 1925. 1,567,106

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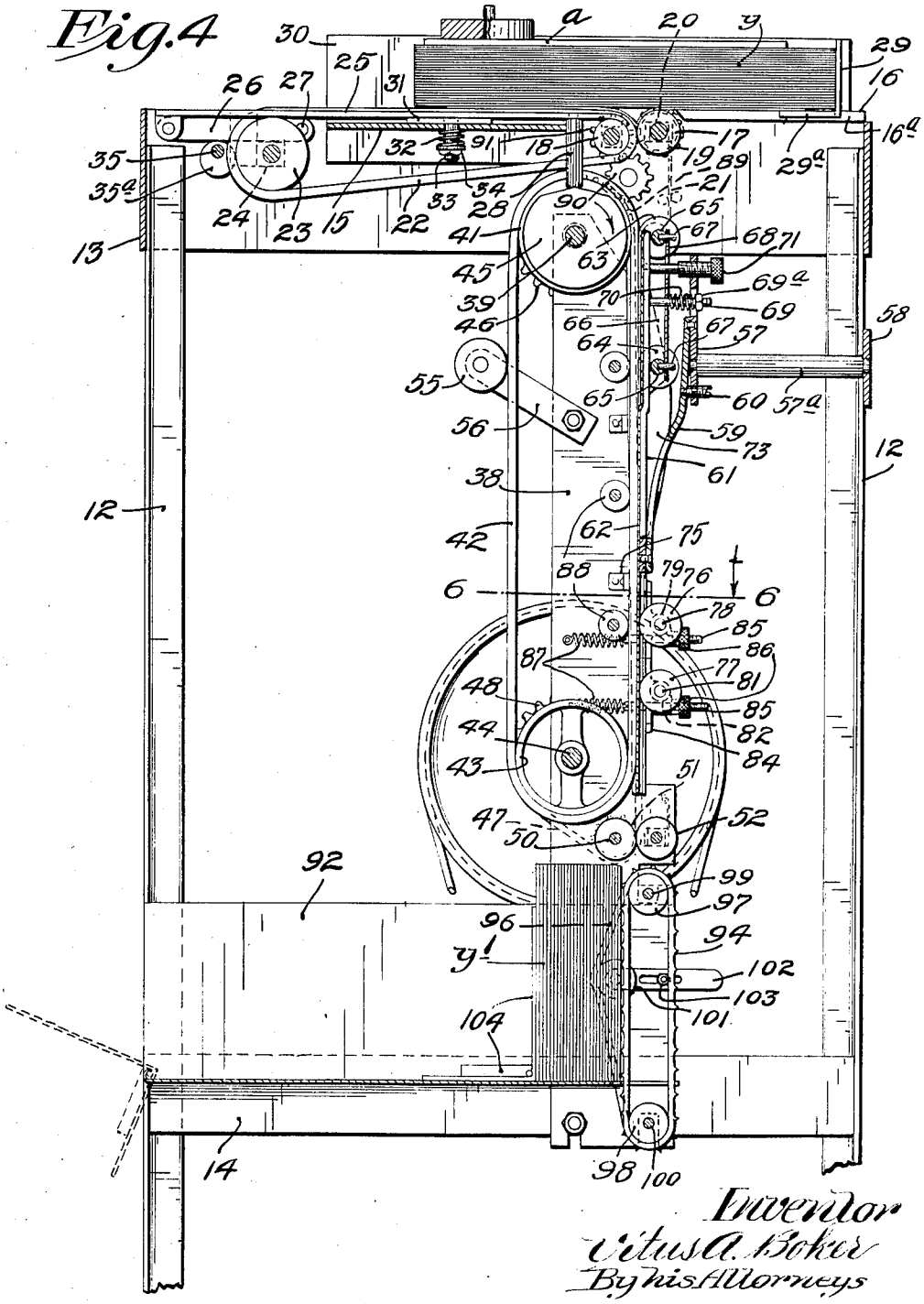
PAPER FOLDING MACHINE

Filed June 30, 1922 4 Sheets-Sheet 2

Fig. 4



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Dec. 29, 1925. 1,567,106

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PAPER FOLDING MACHINE

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Fig. 5

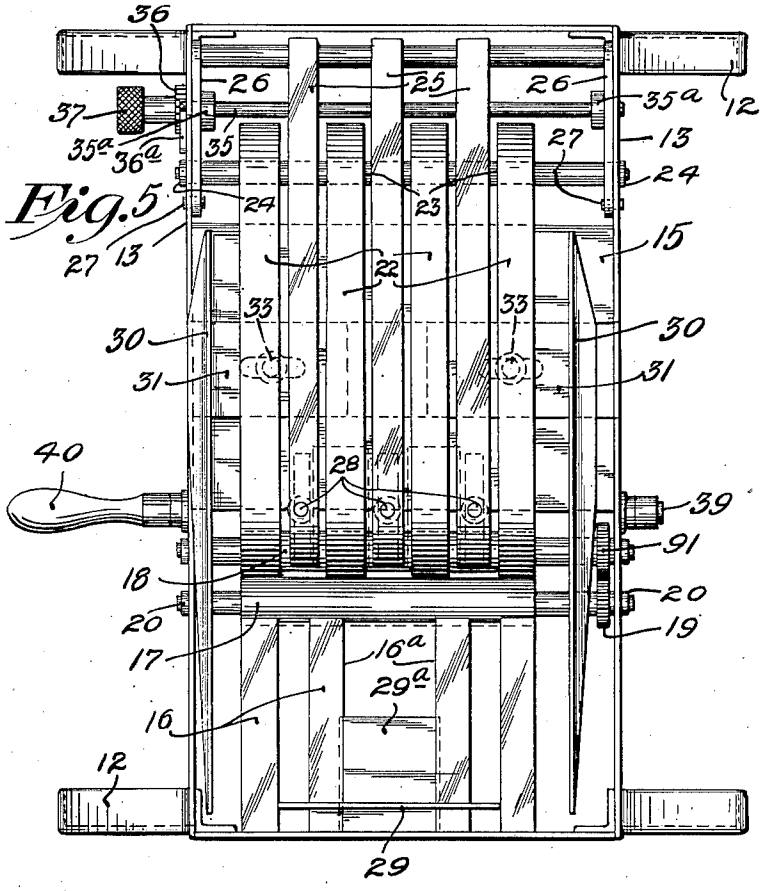
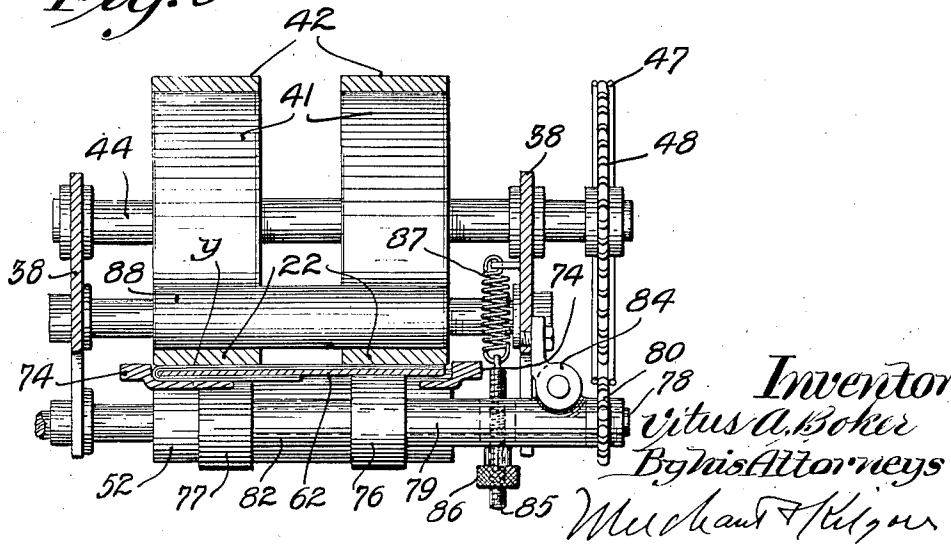


Fig. 6



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PAPER FOLDING MACHINE

Filed June 30, 1922 4 Sheets-Sheet 4

Fig.7

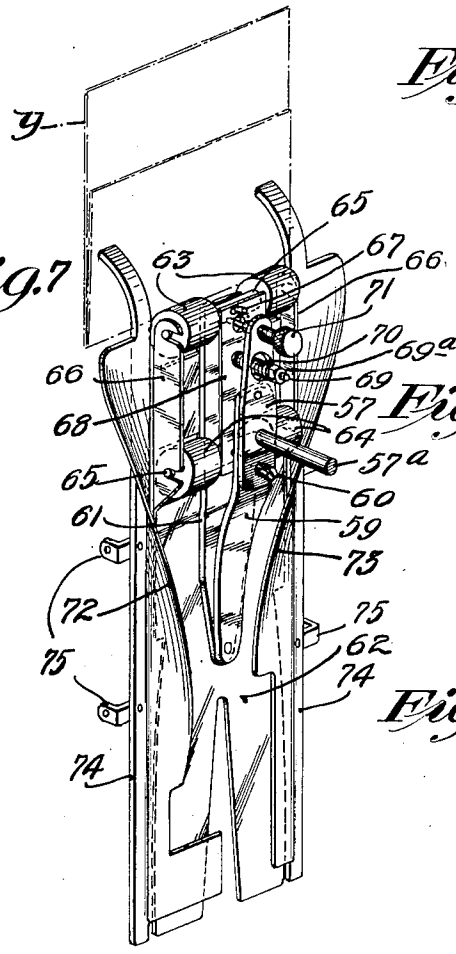


Fig.9

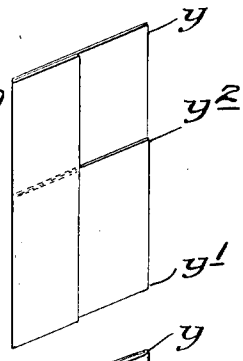


Fig.8

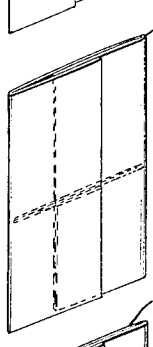


Fig.10

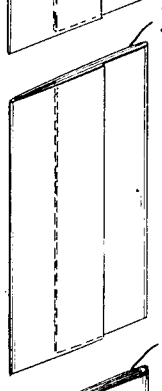
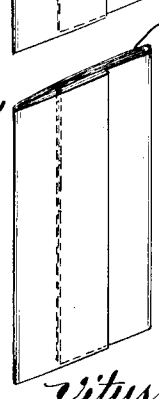


Fig.11



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Patented Dec. 29, 1925. 1,567,106

UNITED STATES PATENT OFFICE.

VITUS A. BOKER, OF MINNEAPOLIS, MINNESOTA.

PAPER-FOLDING MACHINE.

Application filed June 30, 1922. Serial No. 572,081.

To all whom it may concern:

Be it known that I, VITUS A. BOKER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Paper-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 present invention relates generally to sheet or paper-folding machines but is especially adapted for use in folding letters or similar sheets into condition to be placed in envelopes.

Generally stated, the objects of the invention are high capacity, efficiency and reliability combined with adjustability for a variety of different sheet-folding actions, and the production of such machine at reasonably low cost.

Generally stated, the invention consists of the novel devices and combinations hereinafter described and defined in the claims.

In the accompanying drawings, wherein like characters indicate like parts throughout the several views, I have illustrated a commercial form of the improved machine.

Referring to the drawings:

Fig. 1 is a front elevation of the machine with some parts broken away;

Fig. 2 is a fragmentary view with some parts broken away and some parts in vertical section on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary plan view with some parts sectioned on the horizontal line 3—3 of Fig. 1;

Fig. 4 is a vertical section taken from front to rear of the machine approximately on the line 4—4 of Fig. 1;

Fig. 5 is a plan view of the machine;

Fig. 6 is an enlarged horizontal section taken on the line 6—6 of Fig. 4;

Fig. 7 is a perspective showing the forming plate, its folding flanges and co-operating sheet-pressing devices operatively assembled in respect to each other but removed from the machine; and

Figs. 8, 9, 10 and 11 are perspective views illustrating the different ways in which a sheet may be folded by the use of the machine.

As illustrated, the framework in the machine comprises metallic leg posts 12 connected at their upper ends by a rectangular marginal frame 13 and connected near their lower portions by a similar rectangular tie frame 14. The marginal frame 13 rigidly supports a transverse main feed table 15 and a supplemental feed table 16, which tables are separated longitudinally of the machine to afford a gap through which are exposed co-operating feed rollers 17 and 18, see particularly Figs. 4 and 5. The shafts of said feed rollers 17 and 18 are journaled in suitable bearings in the sides of the marginal frame 13 and are connected to run in reverse directions by intermeshing gears 19, 89, 90 and 91. The bearings for the roller 18 are stationary, while the bearings 20 for the roller 17 are mounted to slide in said frame 13 toward and from the roller 18 and are pressed toward the latter by leaf springs 21 anchored to said frame 13. The roller 18 does not directly engage with the roller 17, but laterally spaced feed belts 22, preferably of heavy flexible rubber or possibly of leather or the like, are arranged to run over said roller 18 and over a rear guide roller 23, the shaft of which latter is journaled in bearings 24, which, as shown, are mounted in open seats in the sides of said vertical frame 13 and, hence, are vertically removable with the roller 23. These belts 22 have a circumference materially greater than that of the roller 17. Located between the feed belts 22 are table bars 25, which, at their rear ends, are pivotally connected to the free ends of arms 26, which, in turn, are connected at their front ends, by pivots 27, to the sides of the frame 13. The extreme front ends of these bars 25 are slightly curved and rest on the roller 18 and, rearward of said curved ends, said bars are provided with depending studs or lugs 28, for a purpose which will hereinafter appear.

Adjustably mounted on the supplemental feed table 16 is an upright stop plate or flange 29, the base 29^a of which is slidably mounted and frictionally held in a dovetailed groove 16^a formed in said supplemental table 16. Upstanding laterally spaced parallel gage plates or flanges 30 are adjustably mounted on the main table 15. As shown, the base portions 31 of the gage plates 30 are slidably mounted on or in the main table 15 and arranged to be frictionally held or set by coiled springs 32. These springs 32 are placed around studs 33, depending from the bases 31, and are depressed between the main table 15 and ad-

justable nuts 34 applied to the lower ends of said studs.

The sheets *y* to be folded are arranged in a stack and are placed with their front ends abutting against the stop plate 29, with the front portion of the lower sheets resting on the supplemental table 16 and with the rear portion of the lower sheet resting on the feed belts 22. For vertically adjusting the rear ends of the table bars 25, there is provided a transverse shaft 35 journaled in the frame 13 and provided with eccentrics 35ª that engage the under intermediate portions of the bar-supporting arms 26.

For holding the shaft 35 in its different adjustments, it is provided at one end with a ratchet wheel 36 that is engaged by a retaining dog 36ª pivoted to one side of the frame 13 and, at the same end, said shaft is shown as provided with a knurled operating knob 37, see Fig. 5.

Mounted within the framework and extended vertically downward below the feed rollers 17 and 18 is a supplemental frame 38 made up of laterally spaced parallel side plates and suitable cross ties. In the upper portion of this supplemental frame 38 is journaled a transverse driving shaft 39 that may be driven either by hand or machine power and which, as shown, is provided with an operating crank 40. Between the side plates of the frame 38, the shaft 39 is provided with a bifurcated pulley 41 over which runs a bifurcated vertically disposed conveyor belt 42 of rubber, leather or other suitable material, but preferably of the former material. The lower portion of the belt 42 runs over a lower bifurcated pulley 43 carried by a transverse shaft 44 also journaled in the side plates of the frame 38. The driving shaft 39 is provided with cam wheels 45 that operate on the lower ends of the studs 28 that depend from the front ends of the table bars 25, see Fig. 4. Said shaft also carries a driving sprocket 46, (see Fig. 1), over which runs a driving sprocket chain 47. The sprocket chain 47 also runs under a sprocket 48 carried by the lower shaft 44 and under a smaller sprocket 49 carried by a shaft 50 of one of two cooperating sheet-pulling rollers 51—52. The roller 52 is preferably spring-pressed toward the roller 51. The roller shaft 50 also, at the end opposite to the sprocket 49, carries a spur gear 53 that meshes with a slightly smaller spur gear 54 on the shaft of the roller 52. The numeral 55 indicates a slack-take-up roller supported by an arm 56 from the frame 38 and serving to take up the slack, if any, in the conveyor belt 42.

The numeral 57 indicates a bearing plate rigidly supported in respect to the main framework and in respect to the supplemental frame 38 in any suitable way, the same is shown being connected to a long stud 57ª rigidly secured to a cross bar 58 of the framework. The numeral 59 indicates a flat arm, which, at its upper end, is loosely riveted to the bearing plate 57 and is arranged to be adjusted by a set screw 60, (see Fig. 4). The lower end of the arm 59 is loosely riveted to the lower end of a bar 61 to which is rigidly secured a rectangular thin sheet metal forming plate 62 that is held in an upright position against or immediately adjacent to the downwardly moving vertical face of the conveyor belt 42 and is approximately co-extensive with the vertical portion of the latter.

As will presently be noted, the sheet, after receiving its first fold, will be fed downward between the conveyor belt 42 and forming plate 62. To assist in guiding this sheet between the said parts and for pressing the same against the upper portion of the belt, upper and lower pairs of anti-friction rolls 63 and 64 are provided. These rolls are loosely journaled, respectively, on upper and lower spindles 65, the ends of which are held loosely between outturned flanges 66 of the forming plate 62. To hold the shafts 65 against movements in all directions except toward and from the conveyor belt, said shafts are provided with small outstanding pins 67 that project through diametric perforations in a short vertically extended equalizing bar 68, the ends of which press against said shafts 65. The bar 61 is also provided with a rigidly secured stud 69 that is passed freely through a perforation in the equalizing bar 68 and, as shown, is also passed through a large opening in the bearing bar 57. At its outer end, the stud 69 has a nut 69ª between which and the central portion of the equalizing bar 68 a coiled spring 70 is compressed. This spring 70 exerts a pressure toward the conveyor belt which is equalized between the upper and lower rollers 63 and 64 and causes said rollers to press the paper sheet with equal tension against the feed belt. By reference to Fig. 1, it will be noted that the forming plate 62 is cut away to afford clearance for the rollers 63 and 64. By reference to Fig. 4, it will be noted that the forming plate 62, from its upper portion to a point below the lower presser rolls 64, is offset slightly away from the conveyor belt 42 so that the downwardly fed paper sheet will not be pressed by said forming plate until it has passed below said rollers.

In connection with the forming plate 62 located one along each edge thereof, I provide a pair of reverse cam-acting approximately spiral folding flanges 72 and 73. The rear edges of these folding flanges are formed integral with or otherwise rigidly secured to upright anchor bars 74 that are

rigidly secured to the supplemental frame 38, as shown, by cross bars 75. These anchor bars 74 are properly spaced from the adjacent edges of the forming plate 62 so that the sheet *y* may be folded around the edges of the latter. At their upper portions, the flanges 72 and 73 extend in opposite directions outward from the adjacent edges of the forming plate 62, but both of these flanges 72 and 73 are gradually bent on a spiral line until their lower portions are brought inward close to but slightly spaced from the outer face of said plate 62. It is important to note that the forming flange 72 has a somewhat slower bend than the forming flange 73, and extends further down than the latter, for an important purpose which will presently appear. As the folded sheet passes below the forming flange 73, it is engaged by a pressure roll 76, and as it passes a little further down and below the spiral portion of the forming flange 72, it is engaged by a presser roll 77. The presser roll 76 is carried by a shaft 78 journaled in a bearing sleeve 79 and provided at its outer end with a sprocket 80. The presser roll 77 is carried by a shaft 81 journaled in a bearing sleeve 82 and provided at its outer end with a sprocket 83. The bearing sleeves 79 and 82 are independently pivoted to lugs 84 rigidly secured to one side plate of the supplemental frame 38.

To cause the rolls 76 and 77 to yieldingly press the folded flaps of the sheet *y* against the back or outer face of the forming plate 62, the respective bearing sleeves 79 and 82 are shown as adjustably connected to short screw bolts 85 equipped with tension-adjusting nuts 86 and connected to co-operating springs 87 suitably anchored to the supplemental frame 38, (see particularly Figs. 4 and 6). The numeral 88 indicates idle guide rolls journaled to the supplemental frame 38 and engageable with the inner surface of the downwardly moving operative portion of the feed conveyor 42 to hold the same to its work on a true vertical line.

Here it should be noted that the driving sprocket chain or link belt 47 runs in contact with the sprockets 80 and 83, which, respectively, drive the presser rolls 76 and 77, and thus said presser rolls are driven in a proper direction to cooperate in the sheet-folding action. In Fig. 4, the character *a* indicates a weighted plate placed loosely on top of the stack of sheets *y*.

In the arrangement illustrated, the feed belts 22 and feed rollers 17 and 18 are driven from the driving shaft 39 through a spur gear 89 on said shaft, an intermediate gear 90 journaled to the frame 13 and a spur pinion 91 carried by the shaft of the roller 18.

The folded sheets y^1 delivered to and discharged downwardly between the rollers 51 and 52, are received by a packing device, which involves novel features and is preferably constructed as follows, (see Figs. 1, 2, 3 and 4): The numeral 92 indicates a rectangular trough, preferably of sheet metal, open at both ends and supported from the lower portion of the main framework by a cross bar 93 or other suitable means. At the receiving end of the trough 92 is a plurality of vertically movable packer belts, as shown three in number, the central belt 94 having a corrugated outer surface and the outside packing belts 95 and 96 being smooth. Preferably, all of the said belts are somewhat elastic rubber belts and are arranged to run over upper pulleys 97 and lower pulleys 98 carried, respectively, by shafts 99 and 100. Preferably, said shafts are mounted in bearings seated in open notches formed in the side plates of the supplemental frame 38, said bearings being held in position by the elasticity of the said belts. The downwardly moving working portions of the belts 94 and 95 run on vertical lines, but the downwardly moving portion of the belt 96 is caused to bulge rearwardly by a guide roll 101 journaled to the end of a bracket 102 that is adjustably secured to the adjacent side of the frame 38 by a bolt and slot connection 103. The important function performed by this offset belt 96 will be considered in the description of the operation.

The numeral 104 indicates a frictionally held follower against which the folded sheets are packed within the receiving trough 92. The shaft 99 of the packer belt driving roller 97 is provided at one end with a spur gear 105 driven from the gear 53 through intermediate gears 106, see Figs. 1 and 2. The gear 105 is slightly smaller than the gear 53.

Operation.

The use and operation of the machine above described are as follows:

The paper sheets may be folded in various different ways, as shown, for example, in Figs. 8, 9, 10 and 11. To fold sheets as illustrated in Fig. 8, the machine is adjusted substantially as shown in the drawings, by reference to which it will be noted that the adjustment of the stop plate 29 is such that the sheets *y* on the feed table project further to the left than toward the right of the passage between the cooperating feed rollers 17 and 18 and that the gage flanges 30 are adjusted equi-distant on opposite sides of the transverse center of the said feed rollers. The sheets being thus positioned and the machine being started into action, the table bars 25 will be vertically adjusted so that the feed belts 22 will have the proper frictional feeding action on the bottom sheet. The rubber feed belts 22, running in one direction, and the rubber-faced feed roller 17, running, in the opposite direction, will cause

the bottom sheet to buckle and to be doubled or folded together and fed vertically downward. The transverse line on which the sheet will be folded will, of course, depend on the adjustment of the stop plate 29, but said folding line will always be vertically above the line of contact between said feed belts and feed roller. As the belts 22 have materially greater frictional contact with the respective paper sheet than the roller 17, said sheet will be held against the stop plate 29 so that the sheet will be folded at the proper place.

The adjustment of the feed belt 22 should be such that it will contact with the lower sheet *y* only in the vicinity of its innermost portion or in the vicinity of the studs 28. Fig. 4 shows the table bars 25 lowered so that the feed belt 22 is then acting on the lower sheet and has started the buckling action thereof. Under rotation of the bifurcated pulley 41 in a clockwise direction indicated by the arrow in Fig. 4, the cams 45, acting on the studs 28, will lift the inner ends of the table bars 25 immediately after the buckled sheet has been caught between the feed roller 17 and belts 22 and thus the tendency of the feed belts to act on the second sheet from the bottom, before the proper time for the feeding thereof, is prevented.

The buckled sheet will be fed directly downward and delivered between the downwardly moving portions of the conveyor belts 42 on the one side and the forming plate 62 and presser rolls 63 and 64 on the other side.

The downwardly fed sheet will be wider than the forming plate 62 and, with the adjustment above noted, will project evenly on opposite sides thereof and these projecting flaps or portions of the sheet, as the sheet is moved downward, will be acted upon by the folding flanges 72 and 73 and will be turned over against the front or outer face of said forming plate. However, the spiral folding flange 73 will act ahead of the spiral folding flange 72, so that the one flap of the sheet will be folded inward ahead of the other and the latter will be folded on top of the first folded flap. This folding of the two flaps will take place before the sheet has reached the presser or accelerating rolls 76 and 77. In practice, I have found that in the above noted folding action, there is a tendency of the turned-over flaps of the sheet to be bent slightly backward in respect to the direction of movement of the sheet, this being due to the retarding action produced by the frictional contact with the folding flanges. To correct this, the rolls 76 and 77, in addition to their pressing function, are used as accelerators and, for that reason, are given a higher peripheral speed than the traveling speed of the conveyor belts 42, so that the said flaps will be brought down into proper parallel relation to the body of the folded sheet. Thus, the sheet is folded as shown in Fig. 8. The sheet thus folded is then fed between the presser rolls 51 and 52 and its folds are thereby tightly pressed and well defined so that the sheet will not tend to unfold. From said presser rolls, the folded sheet will be fed downward and will be caught by the packer belts 94, 95 and 96, and will be offset slightly rearward and packed in the receiving trough, as shown in Fig. 4.

It is not desirable that any pressure be exerted by the upper portion of the forming plate 62 against the conveyor belts, but, on the contrary, should be adjusted so that the sheet *y* can freely enter between the two. This adjustment may be taken care of by the adjusting screw 71, which limits the separation of the upper end of said plate from said conveyor rollers. The spring 70 exerts a force which keeps the presser rolls 63 and 64 against the sheet and its reacting force tends to keep the upper end of the forming plate 62 away from the sheet and against the stop or adjusting screw 71. The arm 59 has a spring action so that, by adjustments of the screw 60, the pressure of the lower portion of the forming plate 62 against the sheet may be properly set. As already noted, the tension of the combined presser and accelerating rolls 76 and 77 may be varied by adjustments of the tension of the springs 87. By these several adjustments, the action of the machine may be so regulated that the most efficient kind of a folding action can be obtained.

The driving of the presser roller 52 slightly faster than the presser roller 51 causes the former roller also to act as an accelerating roller to cooperate with the rolls 76 and 77 to insure the delivery of the folded sheets to the packer with their flaps folded perfectly flat down and in parallel relation to the body of the sheet.

Figs. 9 shows a sheet folded on a line very frequently employed by gas companies and various other concerns in folding their statements. This type of folding requires that the sheet be fed downward between the feed roller 17 and feed belts 22, as above described, but it requires that the sheet thus primarily folded, in being moved downward by the conveyor belts 42 and against the forming plate 62, be turned over at one side only. This operation will be accomplished by the machine when the gage bars 30 are so adjusted that one edge of the paper sheet will be in a vertical plane aligned with one edge of the forming plate 62, so that when the sheet is fed downward against the forming plate, the spiral folding flange on one side only will operate to turn over a flap of the sheet. Otherwise

than noted, the operation in folding, as shown in Fig. 9, will be as already above and fully described, with the further important exception that for the packing of these sheets thus folded, the belt 96, by means of the roll 101, should be offset, as shown in Figs. 1, 3 and 4. This offsetting of said belt, (see particularly Fig. 3), presses back the loose corner y^2 of the folding sheet y^1, so that it will not project out and catch the next delivered sheet.

Fig. 10 shows a sheet that has been passed between the feed roller 17 and feed belts 22 without having been folded or buckled thereby, but which has had its opposite edges turned over, one under the other, by the spiral folding flanges 73. For this type of folding, the gage bars 30 should be adjusted substantially as shown in Fig. 5, to-wit: equally on each side of the transverse center of the machine, but the stop plate 29 should be turned around, in respect to Fig. 4, and adjusted so far rearward that it will stop the front ends of the sheets y immediately over the contacting line between the feed roller 17 and belts 22. With such adjustment of the stop plate 29, the front ends of the sheets, one after the other, will be turned directly downward and fed between said roller 17 and belts 22 without being folded until the sheet comes in contact with the folding flanges.

The sheet shown in Fig. 11 is folded like the sheet shown in Fig. 8 except that the stop plate 29 had been so adjusted that the sheets y would be buckled and folded by the rollers 17 and belts 22 at the longitudinal centers of said sheets.

From what has been said, it will be understood that this machine may be adjusted in a great many different ways for folding letter heads, bills, statements or like paper sheets in a large variety of different ways.

What I claim is:

1. In a folding machine, means for holding a stack of sheets, reversely acting revoluble friction devices, and a stop located beyond said friction devices for holding the lowermost sheet, the friction device farthest from the stop having a circumference materially greater than that of the other friction device, whereby the respective portion of the lowermost sheet will be moved toward the stop and thereby buckled at its intermediate portion and fed between the friction devices.

2. In a folding machine, means for holding a stack of sheets, adjacent reversely driven rollers, and a belt running over one of said rollers and co-operating with the other roller, said means including a stop located beyond said rollers on the side thereof opposite to said belt for holding the lowermost sheet to cause the belt to move the rear portion thereof and thereby buckle the intermediate portion of said lower sheet and feed the same between the belt and said other roller, which belt and other roller are arranged to produce a primary folding of said lowermost sheet and remove the same from the stack.

3. In a folding machine, means for holding a stack of sheets, adjacent reversely driven rollers, a belt running over one of said rollers and co-operating with the other roller to buckle the intermediate portion of the lower sheet and to produce a primary folding of the same, said means including a stop located beyond said rollers on the side thereof opposite to said belt for holding the sheets during their buckling movement by the belt, and means for vertically adjusting the outer portion of said belt to vary the feeding action.

4. In a folding machine, means for holding a stack of sheets, adjacent reversely driven rollers, a belt running over one of said rollers and cooperating with the other roller to buckle the intermediate portion of the lower sheet and to produce a primary folding of the same, and means for intermittently throwing said belt into and out of action with a timed action in respect to the folding action.

5. In a folding machine, means for holding a stack of sheets, adjacent reversely driven rollers, a belt running over one of said rollers and co-operating with the other roller to buckle the intermediate portion of the lower sheet and to produce a primary folding of the same, said means including a stop located beyond said rollers on the side thereof opposite to said belt for holding the sheets during their buckling movement by the belt, a sheet-supporting strip engageable with the bottom sheet, and timed means for intermittently raising and lowering said strip to automatically throw said belt into and out of feeding action.

6. In a folding machine, means for holding a stack of sheets, reversely driven rollers, a belt running over one of said rollers and cooperating with the other roller to buckle the intermediate portion of the lower sheet and to produce a primary fold in the same, sheet-holding means receiving the primarily folded sheet and operative to further fold the same, the said sheet-holding means being adjustable transversely of the line of feed movement to vary the folding action of the secondary folding means.

7. In a folding machine, means for holding a stack of sheets, reversely driven rollers, a belt running over one of said rollers and cooperating with the other roller to buckle the intermediate portion of the lower sheet and to produce a primary fold in the same, means for receiving the primarily folded sheet and operative to fold the same transversely of the primary fold, the said sheet-folding means being adjustable trans-

versely of the line of feed movement to thereby vary the secondary folding action.

8. In a folding machine, means for holding a stack of sheets, reversely acting frictional feed devices operative on the intermediate portion of the bottom sheet to buckle and produce a primary fold in the same, secondary folding means for receiving the primarily folded sheet and operative to fold the same transversely of its primary fold, certain of said parts being adjustable transversely of the line of feed movement to vary the action of the secondary folding means.

9. In a folding machine, the combination with sheet-feeding means, of sheet-folding means comprising a forming plate along which the sheets are fed, laterally spaced spiral cam-acting folding flanges extending along the edges of said forming plate, one folding flange being shorter than the other and the shorter flange being arranged to operate in advance of the longer flange, and accelerating rollers positioned for engagement with the turned flaps of the sheets and operative to accelerate the onward movement thereof.

10. In a folding machine, the combination with sheet-feeding means, of sheet-folding means comprising a forming plate along which the sheets are fed, laterally spaced cam-acting folding flanges extended along the edges of said forming plate, one folding flange being shorter than the other and the shorter flange being arranged to operate in advance of the longer flange, a frictional conveyor belt working adjacent to the back of said forming plate and operative to convey the sheets, and accelerating rollers positioned for engagement with the turned flaps of the sheets, said rollers having a peripheral speed greater than the speed of said conveyor belt.

11. The structure defined in claim 10 in which said accelerating rollers are power-driven and are yieldingly held in operative position, the one laterally offset from the other.

12. In a folding machine, the combination with sheet-feeding means, of sheet-folding means comprising a forming plate along which the sheets are fed, a spiral cam-acting folding flange extended adjacent one edge of said forming plate, an equalizing bar yieldingly connected to the upper end of said forming plate, and upper and lower presser rolls journaled at the ends of said equalizing bar and thereby yieldingly pressed against the sheet.

13. In a folding machine, the combination with sheet-feeding means, of sheet-folding means comprising a forming plate, a cam-acting folding flange extended along one edge of said forming plate, a conveyor belt working adjacent to one face of said forming plate, and an accelerating roll operative on the turned flap of the sheet and driven at a peripheral speed greater than the travel of said conveyor belt.

14. In a folding machine, the combination with sheet-feeding means, of sheet-folding means comprising a forming plate, a cam-acting folding flange extended along one edge of said forming plate, a conveyor belt working adjacent to one face of said forming plate, and co-operating presser rolls receiving the folded sheet from the said forming plate, the flap-engaging member of said presser rolls being driven faster than the cooperating roll and at a speed exceeding that of said conveyor belt.

15. The structure defined in claim 13 in which a folding flange similar to that first noted is located at the other side of said forming plate, the said two forming flanges being arranged to operate one ahead of the other.

16. In a folding machine, the combination with a forming plate and a conveyor belt working along one face thereof, of a folding flange adjacent to one edge of said forming plate, driving connections for said feed belt including a sprocket chain, a presser roll engageable with the folded flap, said presser roll having a shaft to which it is secured, a bearing for said shaft mounted on a pivot, a sprocket on said shaft engageable with said sprocket chain, and a spring operative on said bearing to press said presser roll against the flap of the folded sheet.

17. The structure defined in claim 16 in which said sprocket chain and sprocket are so related that said presser roll will be driven at a peripheral speed greater than that of the conveyor belt.

18. In a folding machine, the combination with a forming plate, an adjustable arm supporting the same, a conveyor belt working adjacent to one face of said forming plate, a folding flange adjacent to one edge of said plate, an equalizing bar yieldingly and adjustably connected to the receiving end of said forming plate, and upper and lower presser rolls journaled to the ends of said equalizing bar and thereby yieldingly pressed toward said conveyor belt.

19. The structure defined in claim 18 in further combination with an adjustable stop mounted in a relatively fixed port and operative on the upper portion of said forming plate.

20. In a folding machine, the combination with a forming plate, a folding flange adjacent to one edge thereof, a conveyor belt working adjacent to one face of said forming plate, and a packing device receiving the folded sheets and comprising means for rearwardly offsetting one side of the sheet beyond that of the other.

21. In a folding machine, the combination with a forming plate, a folding flange adja-

cent to one edge thereof, a conveyor belt working adjacent to one face of said forming plate, and a packing device receiving the folded sheets and comprising a plurality of belts and guiding and driving means therefor, all of said belts being arranged to rearwardly offset and press the folded sheets, but the one belt being arranged to rearwardly offset one side of the sheets to a greater extent than the other sides thereof.

22. In a folding machine, means for holding a stack of sheets, reversely acting frictional feed devices operative on the intermediate portion of the bottom sheet to buckle and produce a fold in the same, and means for intermittently lowering and raising the stack of sheets, respectively, to start and stop the action of said frictional feed devices.

23. In a folding machine, means for holding a stack of sheets, reversely driven rollers, a belt running over one of said rollers and cooperating with the other roller to buckle the intermediate portion of the lower sheet and to produce a primary fold in the same, and means for automatically and intermittently lowering and raising the stack of sheets, respectively, to start and stop the frictional action of said belt.

24. In a folding machine, means for holding a stack of sheets, adjacent reversely driven rollers, a belt running over one of said rollers and cooperating with the other roller to buckle the intermediate portion of the lower sheet and to produce a primary folding of the same, sheet-folding means receiving the primarily folded sheet and operative to further fold the same, and means timed in respect to said belt and cooperating roller and operative intermittently to lower and raise the stack of sheets, respectively, to start and stop the action of said belt.

25. In a folding machine, means for holding a stack of sheets, adjacent reversely driven rollers, a belt running over one of said rollers and cooperating with the other roller to buckle the intermediate portion of the lower sheet and to produce a primary folding of the same, a conveyor belt and guide pulleys therefor, and cooperating secondary sheet-folding means, a cam carried by one of said conveyor-belt-guiding rollers, and a vertically movable device engageable with the bottom of the stack of sheets and subject to said cam, said cam operating to lower and raise the stack of sheets, respectively, to start and stop the frictional action of said first noted belt.

In testimony whereof I affix my signature.

VITUS A. BOKER.