Nov. 15, 1938. J. MENTGES 2,136,977

PAPER FOLDING MACHINE

Filed Jan. 24, 1938 6 Sheets-Sheet 1

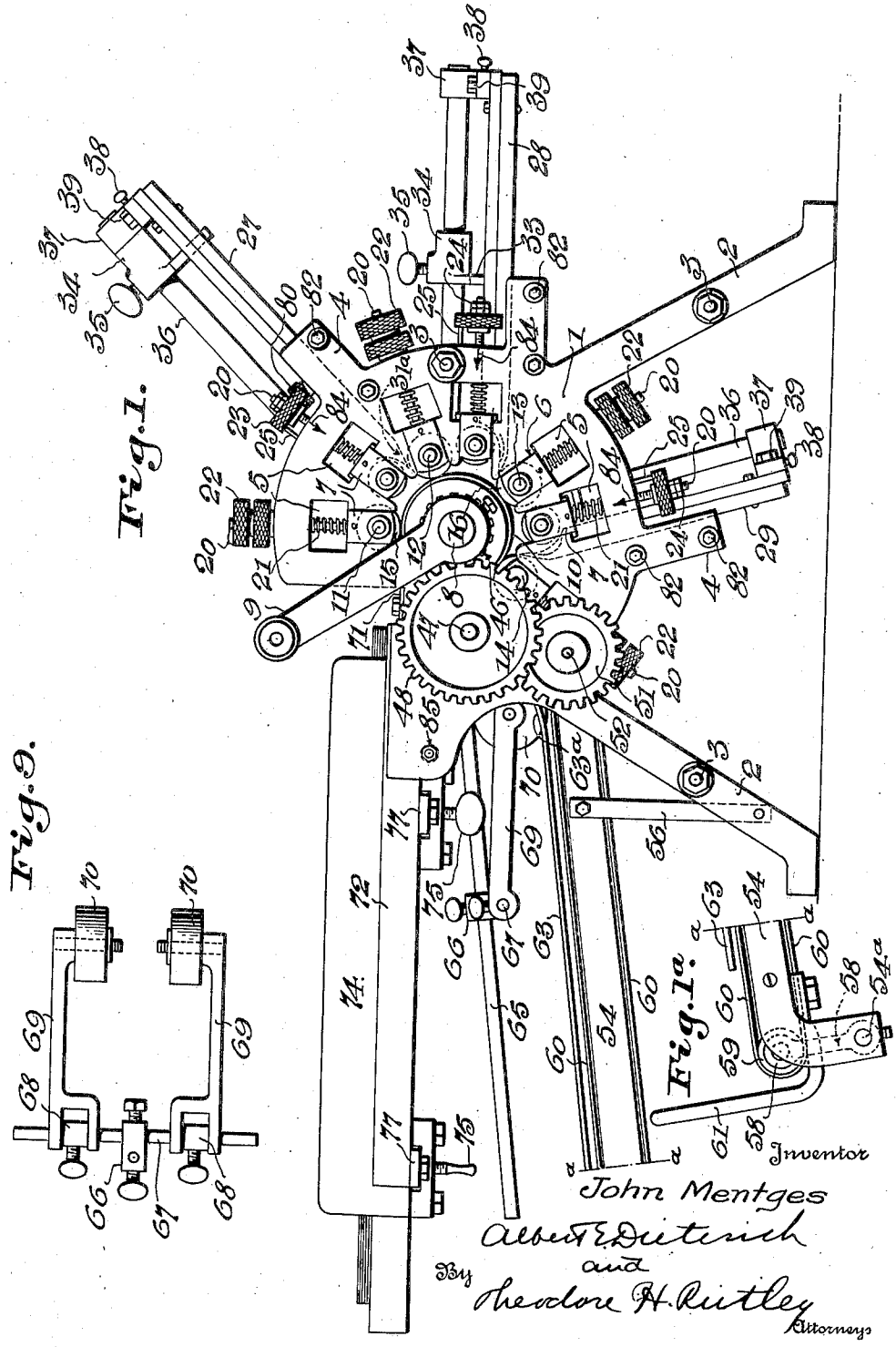


Fig. 1.

Fig. 2.

Fig. 1a.

Inventor
John Mentges
Albert E. Dietrich
and
By Theodore H. Ritley
Attorneys

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PAPER FOLDING MACHINE

Filed Jan. 24, 1933 6 Sheets-Sheet 2

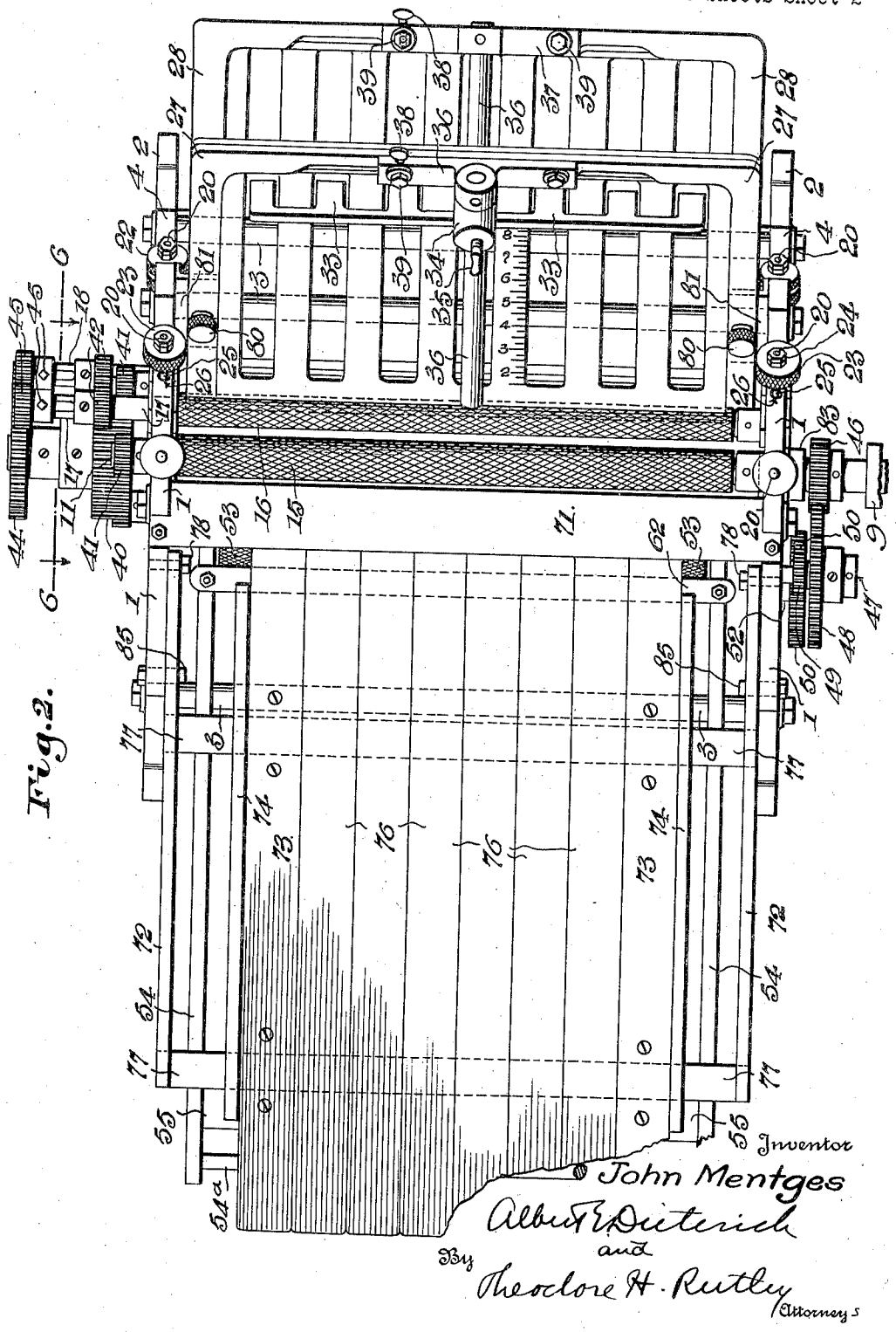


Fig. 2.

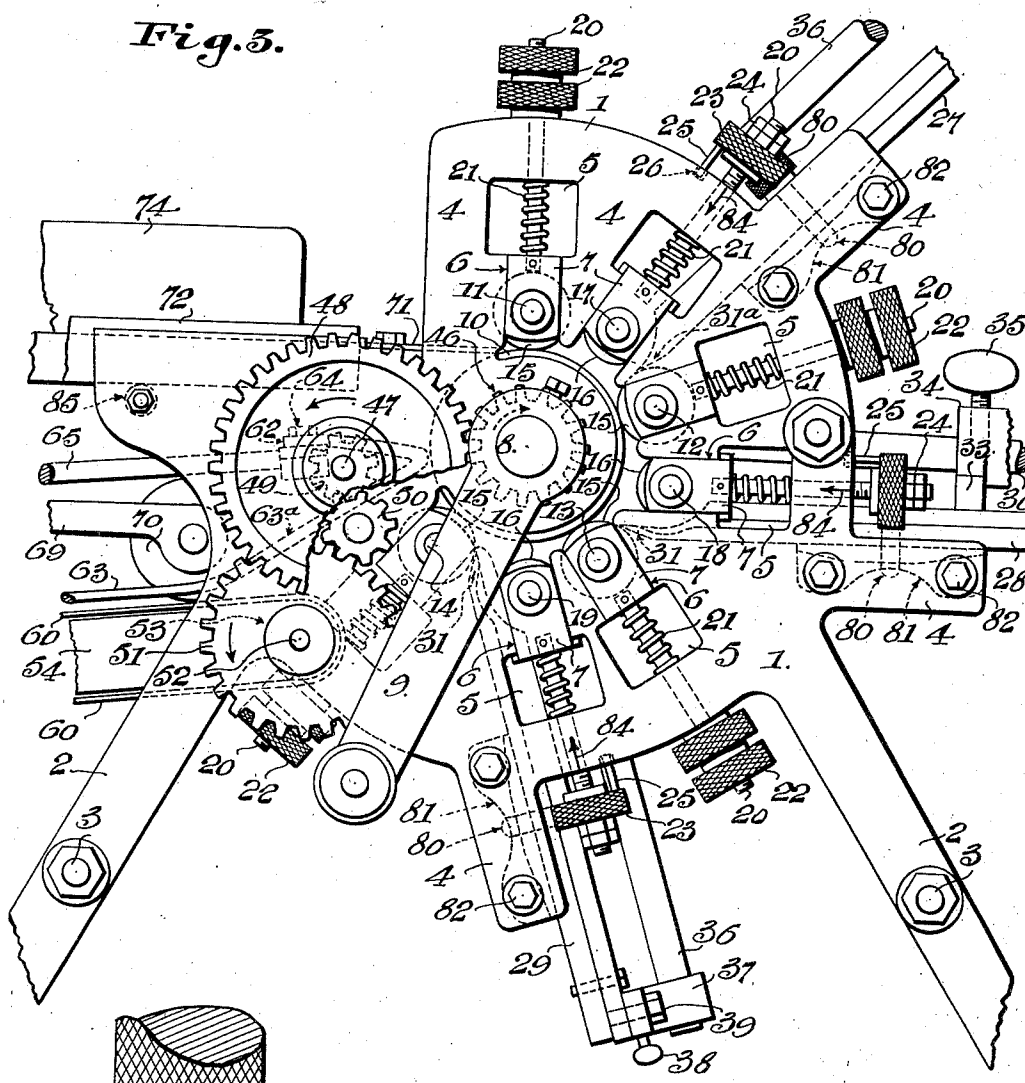
Inventor
John Mentges
Albert F. Dieterich
and
By Theodore H. Rutley
Attorneys

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PAPER FOLDING MACHINE

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Fig. 3.



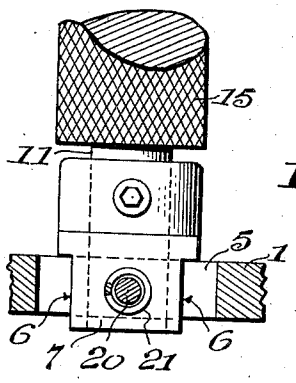


Fig. 4.

Inventor
John Mentges
Albert F. Dieterich
and
By Theodore H. Rutley
Attorneys

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Fig. 5.

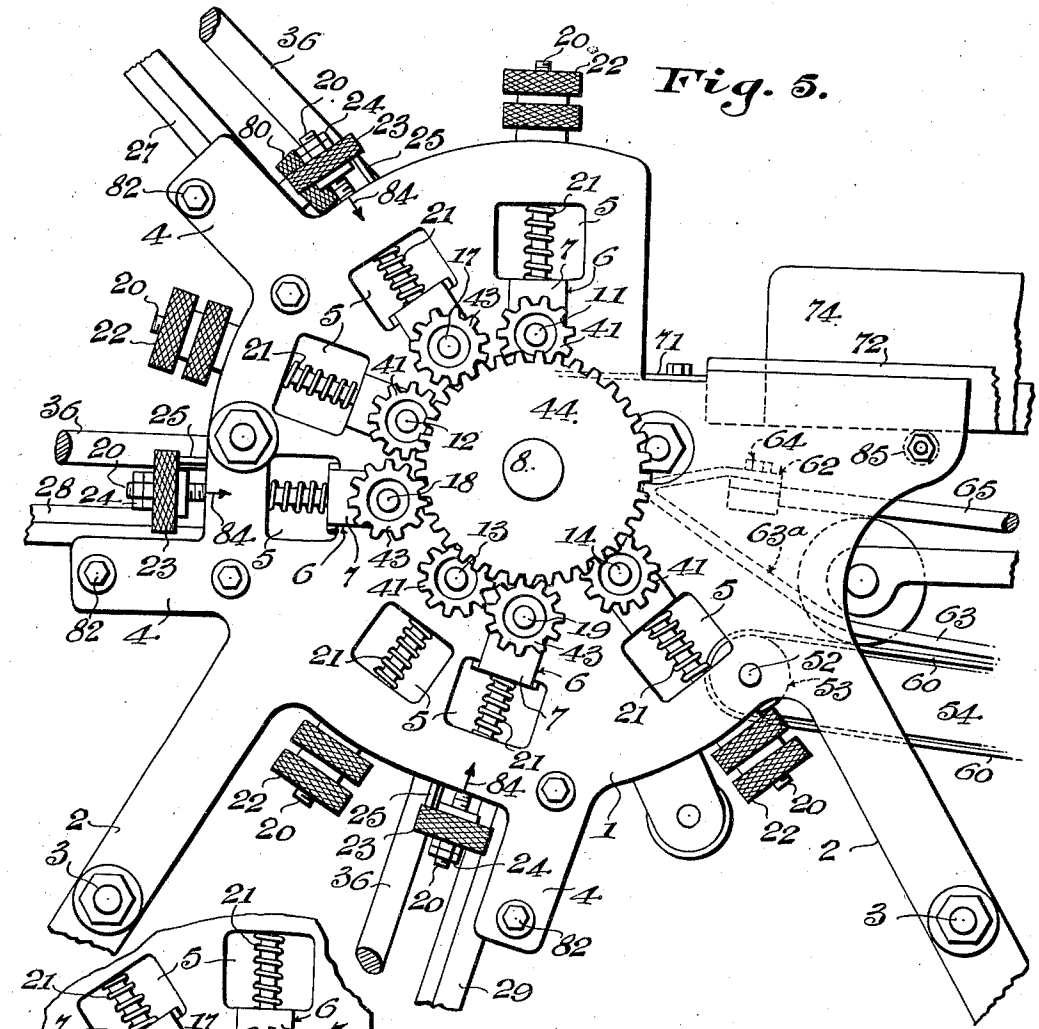
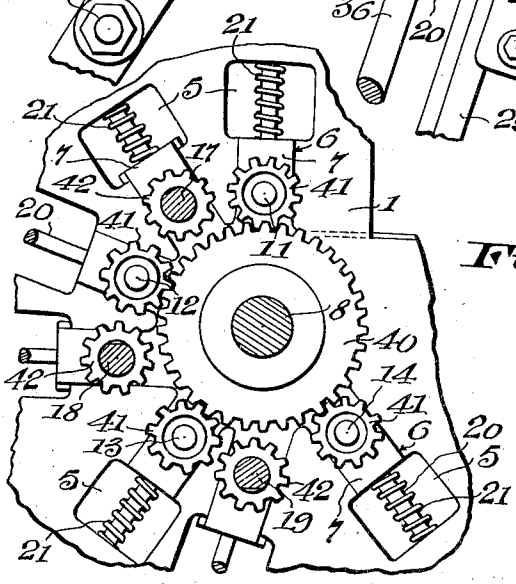


Fig. 6.



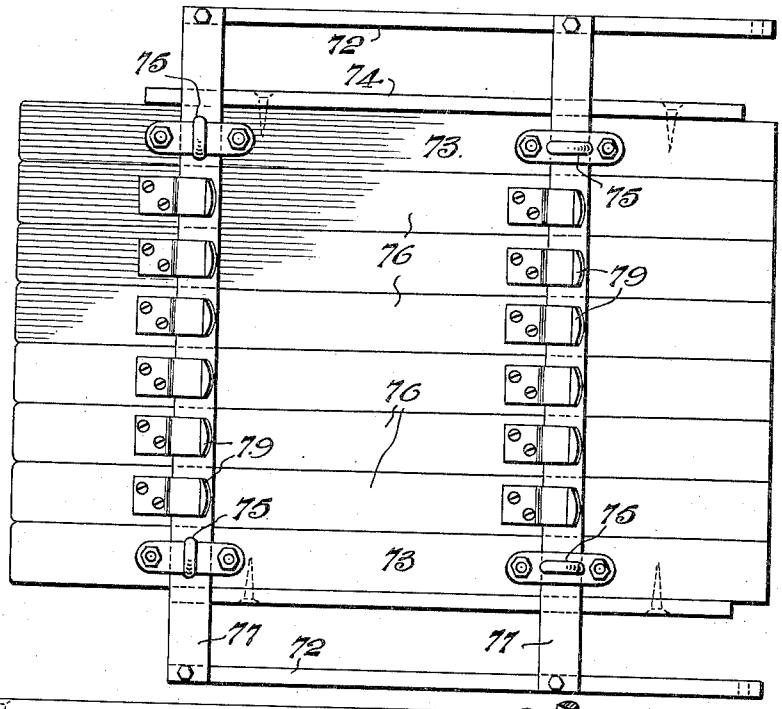
Inventor
John Mentges
Albert F. Dieterich
and
By Theodore H. Rutley
Attorneys

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PAPER FOLDING MACHINE

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Fig. 7.



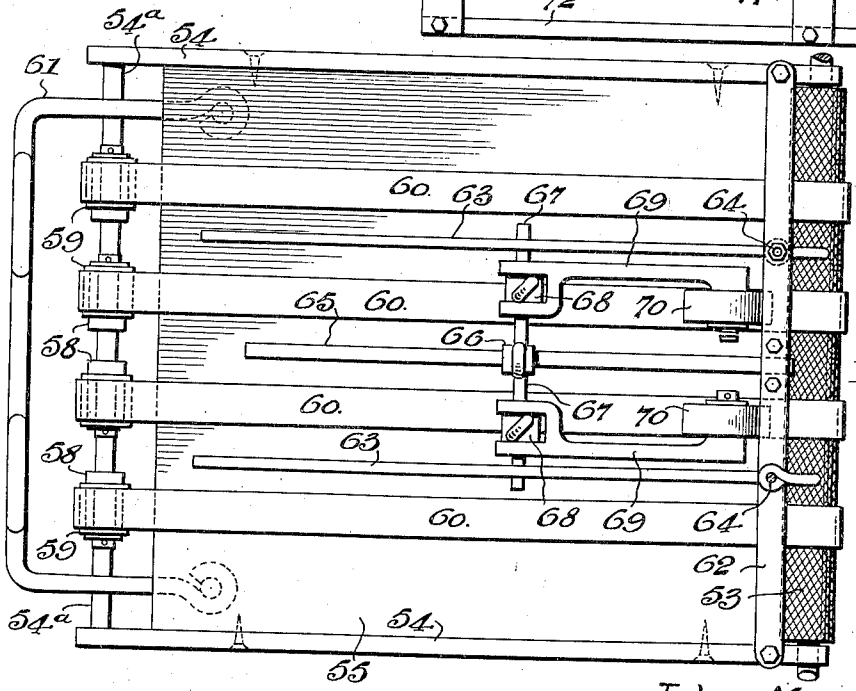


Fig. 8.

Inventor

John Mentges

Albert F. Dietrich

and

By Theodore H. Rutley

Attorneys

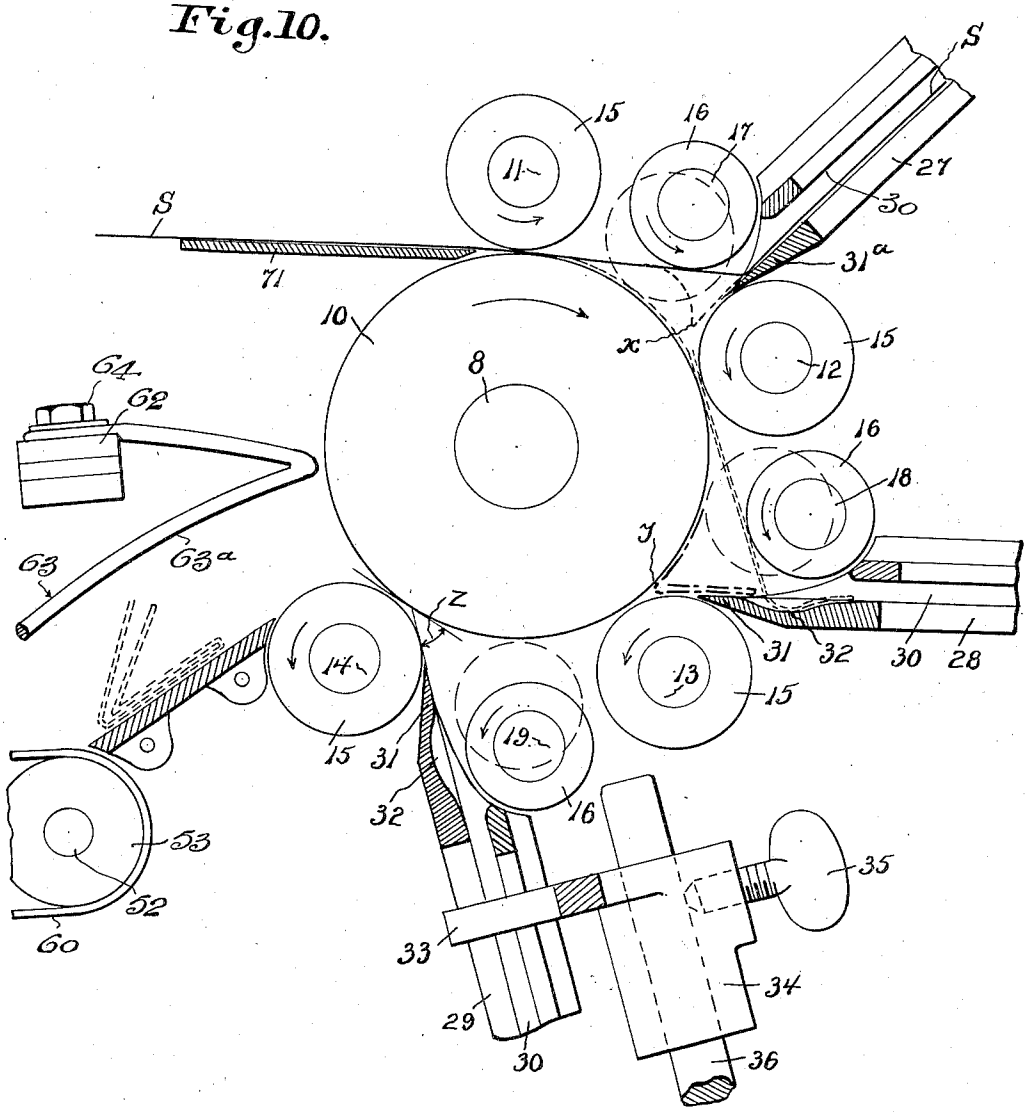
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PAPER FOLDING MACHINE

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6 Sheets-Sheet 6

Fig.10.



Inventor

John Mentges

Albert E. Dieterich

and

By Theodore H. Rutley

Attorneys

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UNITED STATES PATENT OFFICE

2,136,977

PAPER FOLDING MACHINE

John Mentges, Sidney, Ohio

Application January 24, 1938, Serial No. 186,727

18 Claims. (Cl. 270—68)

The present invention relates to that type of folding machines which employs buckling grids or plates and folding rollers for effecting one or more folds of the sheet of paper by means of the well known buckling method.

Such machines usually employ groups of three rollers and a buckling grid for completing one fold, and as these rollers are usually of one diameter and all run at the same speed, considerable bearing-wear takes place. It is one of the objects of the present invention to overcome, in large measure, this objectionable feature by a construction and combination of rollers such that bearing-wear, which develops when all rollers in the combination are of the same size (same diameter), is greatly reduced.

In folding machines of the type stated it is sometimes desirable to dispense with the use of one or more buckling grids and to pass the sheet of paper through the folding rollers without making a fold. It has heretofore been proposed to accomplish such purpose by removing the buckling grid or girds from the machine and substituting deflecting devices therefor, or by providing a comb or sheet stop of such construction and adjustment that it may be moved inwardly to the grid edge and adjacent the feed and folding rollers so as to close off, as it were, the entrance to the grid and deflect the paper past the same. These old methods are objectionable for several reasons, among which may be mentioned chiefly the time lost in removing a grid and substituting the deflecting device (as in the case of the first above proposal), and the time lost in resetting the comb or sheet stop again to its operative position when the grid is to be used once more (as in the case of the second above proposal). Furthermore, when the comb or sheet stop is used as a deflector, the deflecting surface is stationary and the edge of the paper sheet must be slid along it, encountering retarding friction. It is therefore another object of the invention to overcome these objectionable features.

It is a further object of this invention to provide a means to enable one to dispense with the action of the grid and at the same time to provide an additional feed roller to pass the paper by the entrance to that grid without the attendant frictional retardation present in those machines which use the paper stop comb as the deflector.

Again, in buckle-folding type machines heretofore known, the grids or buckling plates are usually disposed in positions radial (or approximately radial) to the common feeding roller of the group of three and when so disposed the loose end of the folded sheet, as the sheet is being drawn from the second grid, has a tendency sometimes to roll up on contact with the common feeding roller and turn over, thereby making a false fold, or what is known as a "dog-ear" turn-over on this loose end of the sheet. It is therefore a still further object of the present invention to overcome this difficulty.

Again, it is an object to provide a buckle-fold type machine in which the in-feed of the paper and the out-feed of the folded sheets are both located at the front or the same side of the machine.

Again it is an object to provide a single means which, when in one position, will act in cooperation with the grid as a means to guide or deflect the paper into the grid and which, when in another position, will serve to deflect the paper past the entrance to the grid and cooperate with the common or master feed roller to feed the sheet along its path of travel without retarding friction.

A further object is to so improve the machines of the type stated that their cost of operation will be reduced, their effective life lengthened, and their action speeded up so as to turn out more work in a given time than has heretofore been accomplished.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, and then be particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figs. 1—1A (combined on the line *a-a*) disclose a side elevation of a complete machine embodying the present invention.

Fig. 2 is a top plan view of the same, portions being broken away.

Fig. 3 is an enlarged side elevation of the major portion of the machine.

Fig. 4 is an enlarged detail section on the line **4—4** of Fig. 3.

Fig. 5 is a side elevation of the side opposite that shown in Fig. 3.

Fig. 6 is an enlarged section on the line **6—6** of Fig. 2, Figs. 5 and 6 being drawn on the same scale.

Fig. 7 is an inverted plan view of the paper feed-table.

Fig. 8 is a plan view of the off-take mechanism for the folded sheets.

Fig. 9 is a detail plan view, later again referred to.

Fig. 10 is a diagrammatic view, parts being in section, hereinafter specifically mentioned.

In the drawings, in which like numerals and letters of reference designate like parts in all the figures, 1 represents the side plates of the frame which include legs 2 and which are spaced apart and braced by cross braces 3. The side plates 1 of the frame, have a set of extensions 4 to pairs of which grids 27, 28 and 29, respectively, are secured by means of milled thumb-screws 80 threaded into angle brackets 81 that are secured to the extensions 4 by cap screws 82 in the embodiment of the invention illustrated.

The frames 1 have cut-outs 5 and slide-ways 6 for the bearing blocks 7 that carry the shafts 11, 12, 13 and 14 of the feeding and folding rollers 15, and the shafts 17, 18 and 19 of the combined sheet forwarding and deflecting grid rollers 16, as the cases may be.

In the present machine there is provided a master roller 10 whose shaft 8 is journalled in suitable fixed bearings 83 in the frame plates 1. Power is applied to the shaft 8 of the master roller in any desired way, a crank 9 being shown for purposes of illustration.

The various feeding and folding rollers 15 and the sheet forwarding and deflecting rollers 16 are yieldingly mounted by having their bearing blocks 7 carried by adjusting rods 20, and urged toward the master roller 10 by springs 21 on the rods within the cut-outs 5.

A pair of milled nuts 22 on the rods 20 of the rollers 15 serve for adjustment purposes, while a milled nut 23 on each of the rods 20 for the rollers 17 is free to turn 90° and carries a spacing pin 25. Pairs of nuts 24 on the last named rods 20 serve for adjustment purposes. When pins 25 rest in recesses 26 in frames 1 the rollers 16 are in their outer or "raised" positions and there function to guide the sheet into the mouths of the respective grids. When pins 25 are moved out of the recesses 26 and the nuts 23 are turned 90° until pins 25 lie over arrows 84 (see Figs. 3 and 5) springs 21 will move rollers 16 inwardly to adjacent the master roller 10 where they then act as feed rollers and to pass the sheet by the mouths of their adjacent grids.

Each grid 27, 28, 29, has a sheet receiving slit 30 into which the sheet to be folded is directed. Save for their mouths, the several grids are of like construction. The grid 27 has a relatively short plane surfaced lip 31a, while the lips 31 of succeeding grids are, or may be, somewhat longer and are provided with concaved faces 32 (see Fig. 10).

Each grid is provided with a paper stop consisting of a bearing 34 for the stop-comb 33, the bearing 34 being slidably adjustably secured to the supporting rod 36 by a set screw 35. The rod 36 is secured in a carrier 37 (see Fig. 2) that is secured to the grid by cap screws 39, which pass through holes (not shown) in the carrier 37, one of which holes is elongated. A thumb screw 38 passes into the elongated hole and engages the adjacent screw 39 to move 37 on the other screw 39 as a pivot for the purpose of aligning the rod 36 and, consequently, the comb 33.

Referring now particularly to Figs. 2, 5 and 6, the manner in which the several rollers 15 and 16 are driven will become clear. On the shaft 8, adjacent the frame 1, is secured what is termed, for convenience, the inner master gear 40 with which the gears 41 on the ends of the shafts 11, 12, 13, and 14 constantly mesh and with which gears 42 fixed to the shafts 17, 18 and 19 mesh when said shafts are in their inmost positions, i. e., are nearest the master roller 10. On the outer end of the shaft 8 is secured another master gear 44 with which shiftable gears 43 on shafts 17, 18 and 19 mesh when those shafts are adjusted to lie in their positions remote from the roller 10. The gears 43 are slidable along their shafts and are held in place by set screws 45.

Referring now more particularly to Figs. 1, 2 and 3, it will be seen that the shaft 8 is provided with a driving gear 46 which meshes with a large idler gear 48 on a stub shaft 47, the gear 48 having on its back a smaller gear 49 which turns with it and which itself meshes with a second idler gear 50 that in turn meshes with the driven gear 51 on the shaft 52 of the driving roller 53 (see Fig. 8) of the delivering conveyor.

The delivery mechanism includes a table 55 having side bars 54 that are pivoted on the shaft 52 and are supported by braces 56. The bars 54 have their outer ends turned down and carry a cross rod 54a on which are rotatably and transversely adjustably mounted brackets 58 which carry rollers 59 over which and over roller 53 a set of belts 60 passes. By means of the adjustable brackets or roller carriers 58 the tensions of the belts may be individually adjusted. At the outer end of the table 55 is a stop 61 for the folded sheets.

Mounted on a bridge 62, carried by the side bars 54 (see Fig. 8) and secured at 64, is a pair of rods 63 under which the folded sheets are conveyed. A rod 65 is rigidly held by the bridge 62 over the table 55 centered between but located above the rods 63. On the rod 65 is adjustably mounted a block 66 that carries a cross rod 67 (see Figs. 8 and 9) on which is adjustably mounted blocks 68 between the furcations of roller-carrying arms 69 on the free ends of which arms the pressure rollers 70 are mounted. These rollers ride on the tapes 60 beneath, and may be adjusted to lie adjacent the inclined deflecting portions 63a of the rods 63 and aid in starting the folded sheet on its journey along the off-take or delivery table.

Referring now particularly to Figs. 1, 2, 3 and 10, it will be seen that 71 indicates a flat plate or blade over which the sheets to be folded are passed from the sheet holding table. This table comprises, in a preferred form, a pair of side bars 72 pivoted at their inner ends to the frame sides 1, as at 78 (Fig. 2), and resting on stop 85 (Fig. 1). The bars 72 are connected by cross bars 77. Secured, adjustably laterally, to the bars 77 by fittings with set screws 75 are the side slats 73 of the table, the intermediate slats 76 being removably held to the bars 77 by spring clips 79.

The side slats 73 have upstanding side plates 74. The pile of paper sheets to be folded is placed on the table between the side plates 74. By adding or removing slats 76 and adjusting slats 73 the table may be made wider or narrower as desired for the sheets to be folded.

In the practical construction of a machine embodying the invention, the master roller is of a diameter of 3 inches, the rollers 15 are each 1¼ inches in diameter and the rollers 16 are 1 inch in diameter. The gears between master

roller 10 and servant rollers 15 and 16 are of such ratios that the surface speeds of all said rollers is the same and this regardless of the adjusted positions of rollers 16 (out or in, with respect to the master roller).

The bearing blocks of the several shafts 11 to 14, inclusive, are so adjusted that the rollers 15 and 16 do not bear on roller 10 with sufficient pressure to dull the knurling on the faces of the several rollers. By reason of the adjustability of the rollers 15 and 16 from and toward the master roller 10 the machine will not mark the most delicate stock and will produce a soft fold when desired because the rollers can actually be separated according to the thickness of the paper being handled at any given point.

By reference to Fig. 10 it will be seen that the first feed roller 15 is directly above the roller 10 and the paper sheet S is fed horizontally through between the rollers 10—15 and engages grid roller 16 near its lowest point, being guided by roller 16 (whose surface speed is the same as the linear speed of the sheet at the line of contact) to the upwardly inclined lip 31a of the first grid 27 and by which the leading edge of the sheet is deflected into the grid, the sheet continuing into the grid's slot 30 until it encounters the stop-comb 53 of that grid.

Further movement causes the sheet to buckle downwardly (as indicated at x) until it is gripped by and fed between the roller 10 and second roller 15 to make the first fold. The sheet is then fed, fold first, by these rollers to the second roller 16 and concavity 32 of lip 31 of the second-fold grid 28, where the process is repeated.

Upon formation of the second buckling y (Fig. 10), the paper is caught by roller 10 and the third roller 15 and again folded and passed to the third roller 16 and grid 29, where the process is again repeated; the third buckle occurs and the third fold is made as the sheet passes between the roller 10 and the fourth roller 15 by which the folded sheet is passed to the off-take conveyor and by it delivered as usual.

By the arrangement shown the paper slots 30 of the second and succeeding grids, instead of being located substantially along a radius of roller 10 (i. e. approximately normal to a tangent of the circle of roller 10) as is the first grid 27 (and as are all grids in the machines of the prior art with which applicant is familiar), the second and succeeding grids lie at a very acute angle z between the tangent of the roller 10 at the place where the slot 30 would intersect the circle of roller 10, thereby making it practically impossible to "dog-ear" the sheet.

When it is desired to cut out of action one of the grids, it is only necessary to loosen the set screw 45 of its gear 43, slide that gear inwardly until it clears master gear 44, tighten set screw again, and then pull out nuts 23 to free pins 25 and turn nuts 23 a quarter-turn to bring their pins over the arrows 84 and release the nuts, whereupon springs 21 will move the roller 16 inwardly until 23 rests on 1 and gear 42 will drop into mesh with master gear 40. The sheet will then be fed past the mouth of the grid by rollers 10—16 (see dotted lines of rollers in Fig. 10). Any grids may thus be put out of action as desired.

In my machine, with a 3-inch diameter master roller 10, with 1¼-inch diameter folding rollers 15 and 1-inch diameter grid rollers 16, and by using the proper gear ratios, I secure the same surface speed on both the master and servant rollers. Consequently, as all folds are made in conjunction with the master roller, the master roller need be operated at only one-third the speed of the smaller roller groups (heretofore used in buckle-folding machines) in order to secure a given number of completed folded signatures within a predetermined time limit. In this way I am enabled to reduce the bearing-wear which develops when all rollers in the combinations are of the same size (or diameter), as such combinations must operate all rollers at the same speed in order to secure the same surface speed. Also by using the large driving gears on the master roller to operate the smaller roller driving gears I eliminate the transverse bearing-wear which develops when rollers of the same size are used under pressure speed; consequently I produce a longer wearing combination, a more rigid and solid operation, as well as securing better alignment of all rollers over a longer period of time.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, operation and advantages of my machine will be clear to those skilled in the art.

What I claim is:

1. In a paper folding machine of the type described, the combination with a group of three feeding and folding rollers and a grid, of a grid roller adjacent the mouth of the grid to guide the sheet into the grid.

2. In a paper folding machine of the type described, in combination, a master roller and two feed rollers spaced apart, a grid located between said feed rollers, and a grid roller adjacent the mouth of said grid for guiding the paper into the grid.

3. In a paper folding machine of the type described, in combination, a master roller and two feed rollers spaced apart, a grid located between said feed rollers, a grid roller adjacent the mouth of said grid for guiding the paper into the grid, and means to adjust said grid roller to cooperate with said master roller to pass the paper by the mouth of the grid.

4. In a machine of the character described, a master roller, a plurality of feed rollers located in proximity to said master roller to cooperate with the same to feed the sheet along, said feed rollers being spaced apart, a grid in the spaces between adjacent feed rollers, each grid having a mouth with a lip which overlies one feed roller, a grid roller adjacent the mouth of each grid, and means to turn all said rollers at the same surface speed.

5. In a machine of the character described, a master roller, a plurality of feed rollers located in proximity to said master roller to cooperate with the same to feed the sheet along, said feed rollers being spaced apart, a grid in the spaces between adjacent feed rollers, each grid having a mouth with a lip which overlies one feed roller, a grid roller adjacent the mouth of each grid, and means to turn all said rollers at the same surface speed, the first grid in order lying approximately normal to the face of said master roller.

6. In a machine of the character described, a master roller, a plurality of feed rollers located in proximity to said master roller to cooperate with the same to feed the sheet along, said feed rollers being spaced apart, a grid in the spaces between adjacent feed rollers, each grid having

a mouth with a lip which overlies one feed roller, a grid roller adjacent the mouth of each grid, and means to turn all said rollers at the same surface speed, the second and succeeding grids in order lying at an acute angle to the surface of the master roller and having their lips provided with a concave surface to receive the sheet being folded.

7. In a machine of the character described, a master roller, a plurality of feed rollers located in proximity to said master roller to cooperate with the same to feed the sheet along, said feed rollers being spaced apart, a grid in the spaces between adjacent feed rollers, each grid having a mouth with a lip which overlies one feed roller, a grid roller adjacent the mouth of each grid, and means to turn all said rollers at the same surface speed, the first grid in order lying approximately normal to the face of said master roller and the second and succeeding grids in order lying at an acute angle to the surface of the master roller and having their lips provided with a concave surface to receive the sheet being folded.

8. In a machine of the character described, a master roller, a plurality of smaller-diameter feed rollers located in proximity to and cooperating with said master roller to feed the sheets forward, said feed rollers being spaced from one another, a grid between each pair of feed rollers and having a mouth with a lip located adjacent one feed roller of the pair, in combination with a grid roller spaced from said master roller and located between said grid and the other feed roller of the pair, and means to drive said feed and grid rollers from said master roller.

9. In a machine of the character described, a master roller, a plurality of smaller-diameter feed rollers located in proximity to and cooperating with said master roller to feed the sheets forward, said feed rollers being spaced from one another, a grid between each pair of feed rollers and having a mouth with a lip located adjacent one feed roller of the pair, in combination with a grid roller spaced from said master roller and located between said grid and the other feed roller of the pair, and means to drive said feed and grid rollers from said master roller and all at the same surface speed.

10. In a machine of the character described, a master roller, a plurality of smaller-diameter feed rollers located in proximity to and cooperating with said master roller to feed the sheets forward, said feed rollers being spaced from one another, a grid between each pair of feed rollers and having a mouth with a lip located adjacent one feed roller of the pair, in combination with a grid roller spaced from said master roller and located between said grid and the other feed roller of the pair, means to drive said feed and grid rollers from said master roller, and means to mount said grid roller for adjustment toward and from said master roller so that said grid roller when in a position remote from said master roller will act to guide the sheet into the mouth of the adjacent grid and when it is in a position adjacent said master roller it will act in conjunction therewith to feed the sheet past the mouth of the grid and thereby render the grid functionally inoperative.

11. In a machine of the character described, a master roller, a plurality of smaller-diameter feed rollers located in proximity to and cooperating with said master roller to feed the sheets forward, said feed rollers being spaced from one another, a grid between each pair of feed rollers and having a mouth with a lip located adjacent one feed roller of the pair, in combination with a grid roller spaced from said master roller and located between said grid and the other feed roller of the pair, means to drive said feed and grid rollers from said master roller and all at the same surface speed, and means to mount said grid roller for adjustment toward and from said master roller so that said grid roller when in a position remote from said master roller will act to guide the sheet into the mouth of the adjacent grid and when it is in a position adjacent said master roller it will act in conjunction therewith to feed the sheet past the mouth of the grid and thereby render the grid functionally inoperative.

12. In a machine of the class described, a master roller, two feed rollers located in close proximity to and cooperating with said master roller to feed the sheet forwardly, said two feed rollers being spaced apart, a grid located in part in the space between said feed rollers and having a mouth to receive the sheet passing from the first feed roller, and a grid roller located adjacent the mouth of the grid and between the grid and the first feed roller for guiding and assisting in passing the sheet into the grid.

13. In a machine of the class described, a master roller, two feed rollers located in close proximity to and cooperating with said master roller to feed the sheet forwardly, said two feed rollers being spaced apart, a grid located in part in the space between said feed rollers and having a mouth to receive the sheet passing from the first feed roller, a grid roller located adjacent the mouth of the grid and between the grid and the first feed roller for guiding and assisting in passing the sheet into the grid, and means for supporting said grid roller in either of two positions, one position being adjacent the grid mouth and remote from the master roller and the other position being adjacent the master roller so as to deflect the sheet from the grid and assist the master roller to feed the sheet forwardly.

14. In a machine of the class described, a master roller, two feed rollers located in close proximity to and cooperating with said master roller to feed the sheet forwardly, said two feed rollers being spaced apart, a grid located in part in the space between said feed rollers and having a mouth to receive the sheet passing from the first feed roller, a grid roller located adjacent the mouth of the grid and between the grid and the first feed roller for guiding and assisting in passing the sheet into the grid, and yieldable means for supporting said grid roller in either of two positions, one position being adjacent the grid mouth and remote from the master roller and the other position being adjacent the master roller so as to deflect the sheet from the grid and assist the master roller to feed the sheet forwardly.

15. In a machine of the class described, a frame including side plates and cross braces connecting the same, a paper-feed table carried by said frame, a master roller having a shaft journalled in bearings in said side plates, a set of feed rollers cooperating with said master roller to advance and fold the sheets, grids located between adjacent feed rollers, means for mounting said grids on said frame, a grid roller for each grid, means adjustably mounting said grid rollers in said frame for location either in a position to guide the sheet into the grid or in a position to pass the sheet by the grid and assist the

master roller to feed the sheet forward, and an off-take conveyor mechanism carried by said frame and located below said feed table.

16. In a machine of the class described, a suitable frame, a master roller having a shaft journalled in bearings in said frame, means by which said shaft may be turned, a set of feed rollers having shafts and spaced apart around said master roller and located in proximity thereto for cooperation with said master roller in feeding and folding the sheets, yieldable and adjustable bearings for said feed roller shafts, a master gear on said master roller shaft, gears on said feed roller shafts constantly meshing with said master gear, a grid located between each pair of feed rollers and mounted on said frame, a grid roller having a shaft and located adjacent each grid, yieldable and adjustable bearings on said frame for the shafts of said grid rollers and including means to locate said grid rollers in either of two positions, one position beng adjacent the mouth of the grid so as to guide and pass the sheet into the grid and the other position being in proximity to the master roller to pass the sheet by the mouth of the grid and assist the master roller to feed the sheet forwardly, a second master gear on said master roller shaft, a shiftable gear on each grid roller shaft adapted when in one position to mesh with said second master gear and when in another position to disengage the same, and a second gear fixed to each grid roller shaft to mesh with said first master gear only when the grid roller is positioned to cooperate with the master roller for feeding the sheet forwardly.

17. In a machine of the class described, a suitable frame, a master roller having a shaft journalled in bearings in said frame, means by which said shaft may be turned, a set of feed rollers having shafts and spaced apart around said master roller and located in proximity thereto for cooperation with said master roller in feeding and folding the sheets, yieldable and adjustable bearings for said feed roller shafts, a master gear on said master roller shaft, gears on said feed roller shafts constantly meshing with said master gear, a grid located between each pair of feed rollers and mounted on said frame, a grid roller having a shaft and located adjacent each grid, yieldable and adjustable bearings on said frame for the shafts of said grid rollers and including means to locate said grid rollers in either of two positions, one position being adjacent the mouth of the grid so as to guide and pass the sheet into the grid and the other position being in proximity to the master roller to pass the sheet by the mouth of the grid and assist the master roller to feed the sheet forwardly, a second master gear on said master roller shaft, a shiftable gear on each grid roller shaft adapted when in one position to mesh with said second master gear and when in another position to disengage the same, a second gear fixed to each grid roller shaft to mesh with said first master gear only when the grid roller is positioned to cooperate with the master roller for feeding the sheet forwardly, a feed table for sheets, carried by said frame and an off-take endless-belt conveyor located directly beneath said feed table, a driving gear on the master roller shaft and a power transmitting gear train carried by said frame and connecting said driving gear with said conveyor.

18. In a machine of the class described, a suitable frame, a master roller having a shaft journalled in bearings in said frame, means by which said shaft may be turned, a set of feed rollers having shafts and spaced apart around said master roller and located in proximity thereto for cooperation with said master roller in feeding and folding the sheets, yieldable and adjustable bearings for said feed roller shafts, a master gear on said master roller shaft, gears on said feed roller shafts constantly meshing with said master gear, a grid located between each pair of feed rollers and mounted on said frame, a grid roller having a shaft and located adjacent each grid, yieldable and adjustable bearings on said frame for the shafts of said grid rollers and including means to locate said grid rollers in either of two positions, one position being adjacent the mouth of the grid so as to guide and pass the sheet into the grid and the other position being in proximity to the master roller to pass the sheet by the mouth of the grid and assist the master roller to feed the sheet forwardly, a second master gear on said master roller shaft, a shiftable gear on each grid roller shaft adapted when in one position to mesh with said second master gear and when in another position to disengage the same, a second gear fixed to each grid roller shaft to mesh with said first master gear only when the grid roller is positioned to cooperate with the master roller for feeding the sheet forwardly, a feed table for sheets, carried by said frame and an off-take endless-belt conveyor located directly beneath said feed table, and a driving gear on the master roller shaft and a power transmitting gear train carried by said frame and connecting said driving gear with said conveyor, said grid roller locating-means including bearing-carrying rods longitudinally movable in the frame, a member on each rod having a spacing pin to engage the frame and hold the grid roller away from the master roller when the grid roller is in its position to pass the sheet into the grid, said member being turnable to effect a disengagement of the pin with the frame and allow the grid roller to assume its position in proximity to the master roller to feed the sheet by the grid.

JOHN MENTGES.