

Oct. 27, 1936.

R. HITCHCOCK

2,058,876

FOLDING MACHINE

Filed April 17, 1935

2 Sheets-Sheet 1

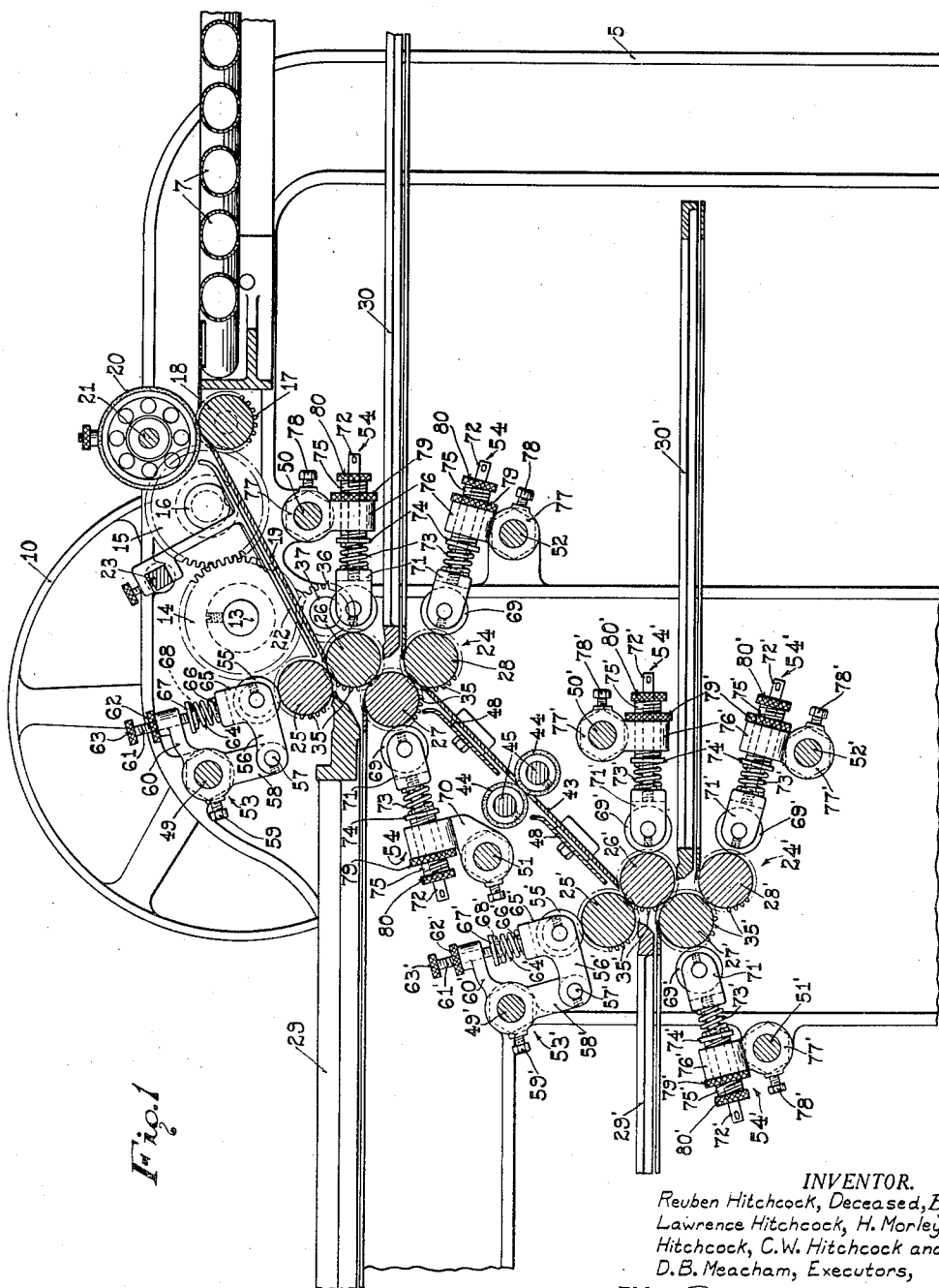


Fig. 1

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2 Sheets-Sheet 2

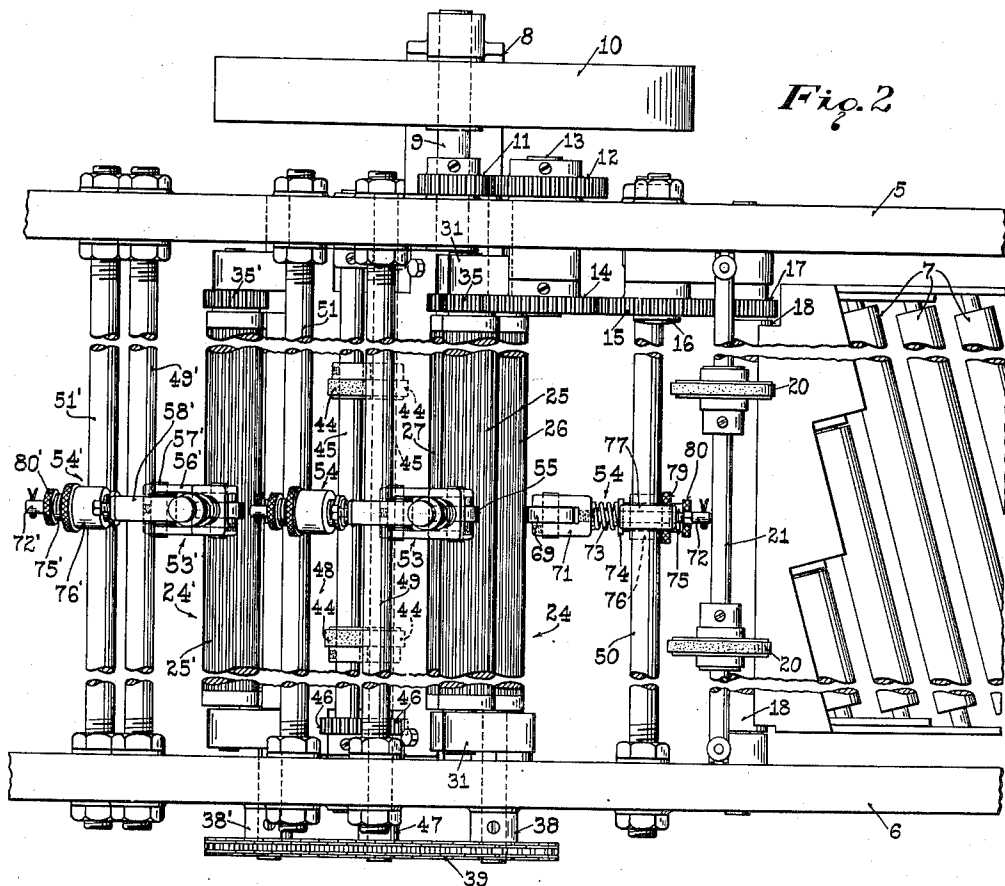


Fig. 2

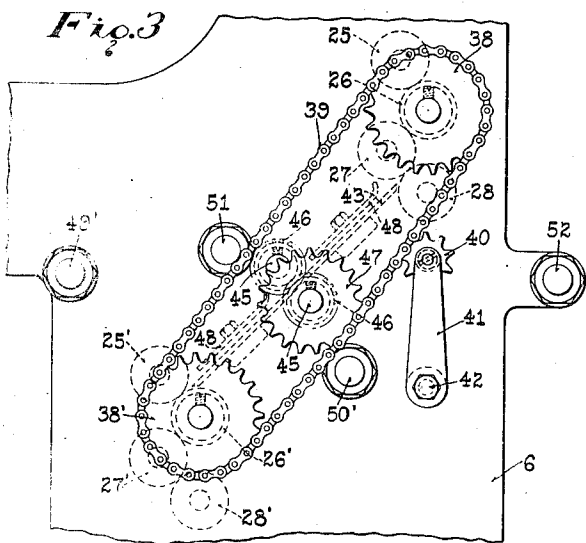


Fig. 3

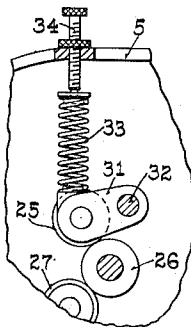


Fig. 4

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UNITED STATES PATENT OFFICE

2,058,876

FOLDING MACHINE

Reuben Hitchcock, deceased, late of Cleveland, Ohio, by Lawrence Hitchcock, H. Morley Hitchcock, and C. W. Hitchcock, Cleveland, and D. B. Meacham, Cincinnati, Ohio, executors, assignors to Dexter Folder Company, New York, N. Y., a corporation of New York

Application April 17, 1935, Serial No. 16,824

20 Claims. (Cl. 270-68)

This invention relates to folding machines, and more particularly to folding machines of the well known buckle type embodying fold plates and sheet feeding and folding rollers acting in conjunction therewith to feed sheets of paper or other material therethrough and fold said sheets by buckling and feeding actions produced thereon.

In folding machines of the buckle type, individual folding mechanisms or units thereof are frequently adapted for the making of as many as four parallel folds in sheets fed therethrough. This is particularly the case in a first fold mechanism or unit such as disclosed, for example, in the patent to William Glasgow, No. 1,707,979, granted April 9, 1929. In first or other folding mechanisms or units of the buckle type that are capable of making several folds in a sheet fed therethrough, the feeding and folding rollers have heretofore been arranged in a bank or series extending without interruption horizontally or vertically as the case may be, with the fold plates, as well as the rollers, in relatively close relationship. It frequently happens, particularly in large machines, that the feeding and folding rollers of multi-fold buckle type mechanisms or units such as above referred to, while of relatively small diameter, are of considerable length, and this being the case, the rollers, particularly during rotation thereof, have a tendency to bow or bend to an extent which prevents proper contact of opposed rollers along the entire length thereof with the sheets fed therethrough or folded therebetween. This condition, known in the trade as deflection of the rollers, frequently causes inaccurate feeding or folding of the sheets and improper register of component parts of the folded product, with resulting loss of time, labor and materials, and decreased efficiency of the machine.

In the Glasgow Patent No. 1,707,979, above referred to, means are disclosed and claimed for controlling or preventing deflection of one of the relatively long rollers at the entrance to the first fold mechanism or unit therein shown, and it is stated in said patent that the use of such means on the other rollers of said mechanism or unit would be exceedingly difficult if not impossible of accomplishment. This will be readily understood from the practice which, as pointed out above, has been to provide, in a multi-fold buckle type mechanism, feeding and folding rollers all of which are arranged in a single uninterrupted bank or series necessitating such close relationship of the rollers and fold plates as to afford

insufficient space for application of deflection preventing means to any of the rollers except one of the feeding rollers at the entrance to the folding mechanism.

Referring again to Glasgow Patent No. 1,707,979 and the application of the deflection controlling means to but one of the uninterrupted bank or series of rollers therein shown, it is stated that, in addition to the difficulty or impossibility of applying such means to the other rollers, the use thereof is not so essential upon said other rollers inasmuch as they act upon more than one thickness of paper. Experience has proven, however, since the grant of said patent, and with the tendency for the manufacture and use of larger machines, that deflection of all relatively long rollers of the single bank or series frequently occurs to an extent resulting in disadvantages such as pointed out above, and that this is true with respect to any relatively long rollers of a bank or series that act upon more than one thickness of material, as well as any rollers of said bank or series that act upon a single thickness only of material.

In accordance with the foregoing, one object of the present invention is to provide a buckle type folding machine, the relatively large individual folding unit or units of which have a construction and arrangement such as to enable deflection of any or all of the rollers thereof to be controlled or prevented whether the same act on single or multiple thicknesses of material.

Another object of the present invention is to provide a buckle type folding machine, the relatively large individual folding unit or units of which are so constructed and arranged as to afford ready access to all the parts thereof and at the same time enable deflection of any or all of the rollers of said unit or units to be controlled or prevented as desired.

Another object of the present invention is to provide a buckle type folding machine, the relatively large individual multi-fold unit or units of which have a spaced grouping of rollers and fold plates facilitating application of deflection preventing means to any or all of said rollers and not requiring increase in the dimensions of the machine.

Another object of the present invention is to provide a relatively large buckle type folding mechanism adapted for the making of a series of parallel folds in sheets of paper or the like fed therethrough and which has a spaced grouping of rollers and associated fold plates not requiring increase of the dimensions of the machine but

which, at the same time, enables deflection preventing means to be associated with any or all of the rollers and affords ready access to all the parts of said mechanism.

Another object of the present invention is to provide a buckle type folding machine of which any multi-fold mechanism or unit has a spaced grouping of rollers and associated fold plates which does not require any increase in the dimensions of the machine but which, at the same time, affords ready access for the making of repairs, adjustments and replacements of the parts of said unit and enables "choke-ups" or other improperly fed or folded sheets to be readily removed therefrom.

Another object of the present invention is to provide a folding machine of the buckle type which, through division of any multi-fold mechanism or unit thereof into a plurality of spaced sections and the provision of conveying means therebetween, renders the parts of said mechanism or unit readily accessible for the purposes aforesaid and enables the sheets to be rapidly and accurately delivered from one section of the mechanism or unit to another section thereof.

Another object of the present invention is to provide a folding machine of the buckle type which, through division of any multi-fold mechanism or unit thereof into a plurality of spaced sections and the provision of driving means interposed therebetween, insures ready access to all the parts of each section and enables the rollers of one section to be driven from the rollers of another section.

These and other objects of the present invention will appear as the following description thereof proceeds, and in order to more clearly understand the inventive idea, reference may be had to the accompanying drawings which illustrate one embodiment of said invention and wherein:—

Fig. 1 is a vertical longitudinal sectional view of a buckle type folding machine embodying the present invention;

Fig. 2 is a broken top plan view of the machine shown in Fig. 1 with certain of the parts omitted for purposes of clearer illustration;

Fig. 3 is a side view of roller driving means shown in Fig. 2; and

Fig. 4 is a fragmentary side view, partly in section, of means for mounting and adjusting certain rollers of said machine.

Referring to the drawings, wherein like reference characters designate like parts throughout the several views, 5 and 6 indicate the side frames of a buckle type folding machine provided with a horizontally disposed table having feed rollers 7 journaled thereon and extending diagonally thereof. This table, which is of well known construction, is supported in any suitable manner on and between said side frames at the top and rear thereof, and the rollers 7 are driven by any suitable means, in order to feed sheets from a supply thereof to feeding and folding instrumentalities hereinafter described.

Journaled in suitable bearings on the side frame 5 and a support or bracket 8 (Fig. 2) bolted or otherwise suitably secured thereto, is a short shaft 9 which has fixed thereon a pulley 10 that is driven by a belt (not shown) from an electric motor or any other suitable source of power. The shaft 9 also has fixed thereon a gear 11 which meshes with a gear 12 that is fixed on one end of a short shaft 13 journaled in a suitable bearing on the side frame 5. Fixed on the opposite end

of the shaft 13 is a gear 14 which meshes with a gear 15 that is rotatably mounted on a stud 16 secured in any suitable manner on the side frame 5. The gear 15 meshes with a gear 17 that is fixed on a feed roller 18 extending transversely of the machine and journaled forwardly of the angle roller feed table in suitable bearings on the side frames 5 and 6.

The sheets to be folded by the mechanism for this purpose are fed thereto over an inclined plate 19 through the medium of the angle roller feed table, the feed roller 18, and feed wheels 20. These feed wheels 20 are frictionally driven by the feed roller 18 and said wheels are rotatably mounted on a shaft 21 that extends transversely of the machine and is secured on the side frames 5 and 6 thereof in any suitable manner. The feed wheels 20, which are adjustable to various positions on the shaft 21, are retained against accidental displacement from such positions by any suitable means for this purpose. The inclined plate 19 also extends transversely of the machine and said plate and guide fingers 22 spaced thereabove and cooperating therewith in the feeding of sheets thereover, are secured in any suitable manner on a bar 23 supported on and between the side frames 5 and 6 and bolted or otherwise suitably secured thereto.

The present invention is herein shown, by way of example, as embodied in the first fold mechanism or unit of the machine. This or any other multi-fold buckle type mechanism or unit having relatively long rollers is, in accordance with the present invention, divided into groups of rollers and associated fold plates spaced apart in directions extending transversely of each other or, as herein shown, laterally and vertically of the machine.

The arrangement of these groups in the novel manner aforesaid does not require any increase in the dimensions of the machine, while at the same time, said arrangement affords ample space for deflection preventing devices which, in accordance with the present invention, are applied on any or all of the rollers of the folding mechanism or unit comprised by said groups. Further, and in accordance with the present invention, the spaced groups of rollers and associated fold plates have conveying means interposed therebetween for delivering sheets from one group to the next group, and said rollers have driving means therefor such that the rollers of one group may, if desired, be driven from the rollers of the preceding group.

Accordingly, the first fold mechanism or unit of the machine is, for example, divided into two spaced parallel sections indicated broadly at 24 and 24' (Fig. 1) and comprised by vertically and laterally spaced parallel groups of juxtaposed rollers 25, 26, 27, 28, and 25', 26', 27', 28', and parallel fold plates 29, 30 and 29', 30' which are also spaced vertically and laterally in groups each including fold plates located at opposite sides of one of the groups of rollers to cooperate therewith in feeding and folding sheets of paper or the like in a manner well understood in the art and therefore requiring no detailed explanation.

All of the aforesaid rollers, which are of equal diameters, extend transversely of the machine and are journaled in suitable bearings on the side frames 5 and 6 thereof. The rollers 26 and 26' have fixed bearings in said side frames and all of the remaining rollers have pivoted, yieldable and adjustable bearings therefor such, for example, as shown in Fig. 4 of the drawings

wherein it will be noted that one end of the roller 25 is journaled in an arm 31 pivoted at 32 on the side frame 5, and that a spring 33, the tension of which may be regulated or adjusted by a screw 34 on said frame, is interposed between said screw and said arm to hold the roller 25 in yieldable and adjustable relation with the roller 26. The fold plates 29, 30 and 29', 30' are supported horizontally in parallel relation on the side frames 5 and 6 by any suitable means for this purpose, and said fold plates are of well known construction enabling them to cooperate with the groups of rollers in feeding and folding sheets passing therethrough.

The rollers 25, 26, 27, 28 and 25', 26', 27' and 28' are intergeared through the medium of trains of gears 35 and 35' fixed thereon, the rollers 25, 26, 27 and 28 being driven by a gear 36 (Fig. 1) which meshes with the gear 35 on roller 26. The gear 36 is journaled on a stud 37 on frame 5 and meshes with, and is driven by, the gear 14. The roller 26 has fixed thereon a sprocket 38 (Figs. 2 and 3) around which passes a chain 39 that also passes around a sprocket 38' which is fixed on the roller 26'. The gears 35, 35', the gear 36 and the sprockets 38, 38' are of such size that, with the chain 39, they serve to drive all of the rollers of the spaced apart groups thereof at the same speed. Slack in the chain 39 may, if desired or necessary, be taken up by an idler sprocket 40 meshing therewith and journaled on an arm 41 that is adjustably mounted at 42 on the side frame 6 of the machine.

In accordance with the present invention, sheet conveying means are interposed between the vertically and laterally spaced groups of rollers and associated fold plates, in order to deliver sheets from the upper fold section 24 of the folding mechanism or unit to the lower fold section 24' thereof. This conveyor may be of any suitable construction and, as herein shown, includes an inclined plate 43 extending from the lower feeding and folding rollers 27, 28 of the upper fold section 24 to the upper feed rollers 25', 26' of the lower fold section 24'. Said conveyor also includes pairs of opposed feed wheels 44 extending in suitable openings formed in the plate 43 intermediate the upper and lower extremities thereof. These feed wheels 44 are fixed on shafts 45 extending transversely of the machine at opposite sides of the plate 43 and journaled in suitable bearings in the side frames 5 and 6. The shafts 45 have intermeshing gears 46 fixed thereon and one of said shafts has rigidly secured thereto a sprocket 47 over which passes the chain 39. Said chain, the sprocket 47, and the gears 46 thus serve to drive the shafts 45 and the feed wheels 44, and said feed wheels act to feed sheets therebetween over the plate 43 from the rollers 27, 28 to the rollers 25', 26'. The plate 43 has spaced thereabove guide members 48 between which and said plate the sheets are fed over the latter by the feed wheels 44. The guide members 48 are disposed above the plate 43 on opposite sides of the rollers 44, and said members and said plate are secured in any suitable manner on and between the side frames 5 and 6 and extend transversely of the machine between the groups of rollers and fold plates aforesaid.

Extending transversely of the machine at intervals about the spaced groups of rollers are stay shafts 49, 50, 51, 52 and 49', 50', 51', 52' which connect the side frames 5 and 6 of said machine together and also support deflection preventing devices that are indicated broadly at 53,

54 and 53', 54', and serve to prevent deflection of said rollers. The deflection preventing devices 53, 53', which are mounted on the stay shafts 49 and 49', include small wheels or disks 55, 55' rotatably engaging the rollers 25, 25' intermediate the ends thereof and said devices being identical in construction and operation, have the same reference characters applied to the parts thereof except that in the case of the device 53', the reference characters are primed. A description of one of the last mentioned devices will therefore suffice for both of the same, and referring to the device 53, for example, it will be noted that the same comprises the wheel or disk 55 which is journaled on an arm 56 pivoted at 57 on a bracket 58 secured, as by a set screw 59, on the shaft 49 opposite the roller 25 and adjustable along said shaft to position the wheel or disk 55 in engagement with the roller 25 at any desired point between the ends thereof.

The bracket 58 is provided on the upper part thereof with an arm 60 in which is mounted an adjusting screw 61 having a lock nut 62 therefor and a knurled operating head 63. Interposed between the arms 56 and 60 is a coil spring 64 the lower end of which is seated on a yoke 65 over a lug 66 thereon, the yoke 65 being formed on arm 56 and the wheel or disk 55 being journaled thereon in said yoke. The upper end of the spring 64 is provided with a cap plate 67 having a lug 68 thereon projecting in the spring, and the screw 61 bears against said cap plate and serves to regulate the tension of said spring so that the latter maintains the wheel or disk 55 in engagement with the roller 25 with the desired amount of pressure thereon.

The deflection preventing devices 54, 54', which are mounted on the stay shafts 50, 51, 52 and 50', 51', 52', include small wheels or disks 69, 69' rotatably engaging the rollers 26, 27, 28 and 26', 27', 28' intermediate the ends thereof, and said devices being identical in construction and operation, except for a bracket 70 supporting the wheel or disk 69 that engages roller 27, have the same reference characters applied thereto which, however, are primed in their application to the device 54'. A description of one of the devices 54 or 54' will therefore suffice for all of the same, and referring, for example, to the device 54 that is associated with the roller 28, it will be noted that the same comprises the wheel or disk 69 which is journaled in a yoke 71 having threaded thereon a rod 72 which extends through a spring 73. One end of spring 73 bears against a cap plate 74 having a suitable opening therein through which the rod 72 extends. Said rod also extends through a tubular adjusting screw 75 that engages cap plates 74 and is threaded in the boss 76 of a bracket 77.

The bracket 77 has a suitable opening therein through which the stay shaft 52 extends, the bracket being secured to the stay shaft as by a set screw 78, and said bracket and the wheel or disk 69 thereon being movable along said shaft to position said wheel or disk in engagement with the roller 28 at any desired point along the same. The adjusting screw 75 serves to regulate the tension of spring 73 so that the latter maintains the wheel or disk in engagement with the roller 28 with the desired amount of pressure thereon. Screw 75 has threaded thereon a lock nut 79 and is provided with a knurled operating head 80. The deflection preventing devices, as clearly shown in Fig. 1 of the drawings are located at opposite sides of the fold plates 29, 30, 29', 30' and

the groups of sheet feeding and folding rollers associated therewith, and the deflection of any or all of said rollers may therefore be controlled or prevented as desired by said devices and the described adjustment therefor.

Each of the fold plates 29, 30, 29', 30' is operatively associated with two outer rollers and an intermediate roller all cooperating with the fold plate to feed, buckle and fold sheets when the three rollers and the fold plate associated therewith are employed for this purpose. The arrangement is such that each fold plate extends toward an intermediate roller between two outer rollers in angularly related planes coincident with the axis of rotation thereof and intersecting on the axis of rotation of said intermediate roller. Through this arrangement of the rollers and fold plates, and the use thereon of sheet stops and defectors such as disclosed, for example, in the patent to L. R. Tufts No. 1,682,446, granted August 28, 1928, sheets fed to the folding mechanism or unit by the described means for this purpose may have one or more parallel folds made therein by each or both of the sections 24, 24' of said mechanism or unit while, at the same time, deflection of any or all of the feeding and folding rollers thereof may be controlled or prevented as described through the novel arrangement and construction of the mechanism or unit and the provision of deflection preventing means for all of the rollers thereof.

The present invention, as heretofore pointed out, may be embodied in any of the multi-fold mechanisms or units of a buckle type folding machine, particularly those which have relatively long rollers and while an embodiment of the invention is herein disclosed comprising the first fold mechanism or unit of such a machine, it is to be expressly understood that said invention is not limited to said embodiment or otherwise than by the terms of the appended claims.

What is claimed is:

1. In a folding machine of the buckle type, a first fold mechanism or unit comprising two vertically and laterally spaced groups of juxtaposed horizontally extending parallel sheet feeding and folding rollers and four horizontally extending fold plates operatively associated with certain rollers of the groups and located one at each side of each group, means for driving the rollers of the upper group, means for driving the rollers of the lower group from the rollers of said upper group, inclined means interposed between the two groups for delivering sheets from lower rollers of the upper group to upper rollers of said lower group, and a plurality of means one for each roller of each group and adapted to prevent deflection of the rollers, said last named means comprising devices rotatably mounted in said machine above and below the fold plates of both groups and each rotatably engaging one of the rollers thereof.

2. In a folding machine of the buckle type, an upper fold section comprising a group of driven juxtaposed horizontally extending parallel sheet feeding and folding rollers and a plurality of fold plates operatively associated therewith and located at opposite sides of said group, a lower fold section comprising a group of driven juxtaposed sheet feeding and folding rollers parallel with and spaced laterally and vertically from said first named rollers and a plurality of fold plates operatively associated with the rollers of said last named group and located at opposite sides thereof, means interposed between the fold sections for delivering sheets from lower rollers of the upper

group to upper rollers of the lower group, and a plurality of means one for each roller of each group and adapted to prevent deflection of the rollers, said last named means comprising devices rotatably mounted in said machine at opposite sides of the fold plates of both groups and each rotatably engaging one of the rollers thereof.

3. In a folding machine of the buckle type, a folding mechanism or unit comprising two spaced groups of driven juxtaposed parallel sheet feeding and folding rollers and four fold plates operatively associated with certain rollers of the groups and located one at each side of each group, means interposed between the two groups for delivering sheets from rollers of one group to rollers of the other group, a plurality of devices one for each roller of each group and rotatably engaging the same to prevent deflection thereof, and means rotatably mounting said devices at opposite sides of the fold plates of each of said groups.

4. In a folding machine of the buckle type, a fold section comprising a series of driven juxtaposed parallel sheet feeding and folding rollers and one or more fold plates operatively associated therewith, a fold section spaced from the first named fold section and comprising a second series of driven juxtaposed parallel sheet feeding and folding rollers and one or more fold plates operatively associated therewith, means interposed between the fold sections for delivering sheets from one to the other of the same, and a plurality of means adjacent the two fold sections respectively for preventing deflection of all of the rollers of each of said fold sections.

5. In a folding machine of the buckle type, a plurality of fold sections spaced apart and consisting of driven sheet feeding and folding rollers arranged in a plurality of groups spaced apart in directions extending transversely of each other and a plurality of fold plates operatively associated with each of said groups, sheet conveying means interposed between the spaced groups of rollers, a plurality of sets of devices for preventing deflection of the rollers of the groups and each rotatably engaging one of said rollers, and means for rotatably supporting said sets of devices in said machine adjacent said groups.

6. In a folding machine of the buckle type, two spaced parallel series of driven juxtaposed sheet feeding and folding rollers and one or more fold plates operatively associated with each of said series, means interposed between the two series of rollers for delivering sheets from one to the other of the same, and two sets of devices adjacent the two series of rollers respectively for preventing deflection of all of the rollers of each of said series.

7. In a folding machine of the buckle type, a fold section comprising a group of juxtaposed sheet feeding and folding rollers and one or more fold plates operatively associated therewith, means for driving said rollers, a fold section spaced from the first named fold section and comprising a group of juxtaposed sheet feeding and folding rollers and one or more fold plates operatively associated therewith, means for driving the rollers of the last named fold section from said first named rollers, means interposed between the fold sections for delivering sheets from one to the other of the same, and a plurality of means for preventing deflection of all of the rollers of each of said fold sections.

8. In a folding machine of the buckle type, spaced groups of driven sheet feeding and folding rollers and a plurality of fold plates opera-

tively associated therewith, sheet conveying means interposed between the groups of sheet feeding and folding rollers, means for preventing deflection of all of the rollers in each of the groups, and means for driving all of the rollers of each group and including driving means for the rollers of one group and driving connections for said last named rollers with the rollers of the next group.

9. In a folding machine of the buckle type, two fold sections comprising parallel groups of driven juxtaposed sheet feeding and folding rollers and a plurality of fold plates operatively associated with the rollers of each group and disposed at opposite sides thereof, means interposed between said fold sections for delivering sheets from one to the other of the same, means for driving the group of rollers of one fold section from the group of rollers of the other fold section, means for driving the rollers of the last named fold section, and means in each fold section for preventing deflection of each roller thereof, said last named means comprising devices rotatably mounted in said machine at opposite sides of the fold plates of both fold sections and rotatably engaging the rollers thereof.

10. In a folding machine of the buckle type, a folding mechanism or unit consisting of a plurality of fold sections spaced apart and each comprising a fold plate and three rollers disposed in sheet feeding and folding relation therewith, sheet conveying means interposed between the fold sections, means for driving the rollers of one fold section, driving connections between said last named rollers and the remaining rollers, and means at opposite sides of said fold plates for preventing deflection of a plurality of rollers of each of said sections.

11. In a folding machine of the buckle type, a folding mechanism or unit consisting of two sections spaced apart and each comprising a fold plate and three driven rollers disposed in sheet feeding and folding relation therewith, means interposed between said sections for delivering sheets from folding rollers of one section to feeding rollers of the other section, and means at opposite sides of both of the fold plates for preventing deflection of a plurality of the rollers of each of said sections.

12. In a folding machine of the buckle type, a folding mechanism or unit comprising a series of driven sheet feeding and folding rollers and a plurality of fold plates operatively associated therewith and located at opposite sides thereof, and a plurality of means disposed at opposite sides of said fold plates and said series and each rotatably engaging one of said rollers to prevent deflection thereof.

13. In a folding machine of the buckle type, a folding mechanism or unit comprising a fold plate and three driven rollers arranged in sheet feeding and folding relation therewith, means at opposite sides of the fold plate for preventing deflection of two of the rollers with respect to the third roller, and means for preventing deflection of said third roller with respect to said two rollers.

14. In a folding machine of the buckle type, a folding mechanism comprising two outer rollers and an intermediate roller for feeding and folding sheets, the outer rollers having axes disposed in two angularly related planes intersecting each other on the axis of the intermediate roller, a fold plate operatively associated with the rollers and extending toward the intermediate roller

between said planes and said outer rollers, means for preventing deflection of the intermediate roller with respect to the outer rollers, and means at opposite sides of said fold plate for preventing deflection of said outer rollers with respect to said intermediate roller.

15. In a folding machine of the buckle type, a folding mechanism comprising a fold plate and two driven rollers arranged in sheet feeding and folding relation therewith, and means for preventing deflection of each of said rollers with respect to the roller adjacent thereto.

16. In a folding machine of the buckle type, a folding mechanism comprising a fold plate, two outer rollers and an intermediate roller disposed in sheet feeding and folding relation with said fold plate, and means for preventing deflection of the intermediate roller with respect to said outer rollers.

17. In a folding machine of the buckle type, a first fold mechanism or unit comprising two vertically and laterally spaced groups of juxtaposed horizontally extending parallel sheet feeding and folding rollers and four horizontally extending fold plates operatively associated with certain rollers of the groups and located one at each side of each group, means for driving the upper group of sheet feeding and folding rollers, means for driving the lower group of sheet feeding and folding rollers from the rollers of said upper group, stationary inclined means interposed between the two groups for guiding sheets from lower rollers of the upper group to upper rollers of the lower group, and driven means for feeding the sheets along said stationary inclined means from said lower rollers to said upper rollers.

18. In a folding machine of the buckle type, an upper fold section comprising a vertical group of driven juxtaposed horizontally extending parallel sheet feeding and folding rollers and a plurality of fold plates operatively associated with the rollers of said group and located at opposite sides thereof, a lower fold section spaced from the upper fold section and comprising a second vertical group of juxtaposed sheet feeding and folding rollers parallel with said first named rollers and a plurality of fold plates operatively associated with the rollers of said second group and located at opposite sides thereof, means for driving the group of rollers of the lower fold section from the group of rollers of the upper fold section, stationary means interposed between the two fold sections for guiding sheets from lower rollers of the upper section to upper rollers of the lower section, and driven means for feeding the sheets along said stationary means from said lower rollers to said upper rollers.

19. In a folding machine of the buckle type, a fold section comprising a series of intergeared sheet feeding and folding rollers and one or more fold plates operatively associated therewith, driving means for said rollers operatively connected with one of the same, a fold section spaced from the first named fold section and comprising a second series of intergeared sheet feeding and folding rollers parallel with said first named rollers and one or more fold plates operatively associated with the rollers of said second series, driving means for the second series of rollers operatively connecting one of the same with a roller of said first named series, and means interposed between the two series of rollers for

guiding and feeding sheets from one to the other of the same.

20. In a folding machine of the buckle type, a folding mechanism or unit consisting of two
5 parallel fold sections each including a fold plate and three rollers arranged in sheet feeding and folding relation therewith, the rollers of one fold section being parallel with and spaced from the rollers of the other fold section, means for driv-
10 ing the rollers of both fold sections, and driven

means interposed between the fold sections for feeding sheets from feeding and folding rollers of one section to feeding rollers of the other section.

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