

Aug. 19, 1958

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2,848,219

PAPER FEEDING MACHINE

Filed Jan. 3, 1957

2 Sheets-Sheet 1

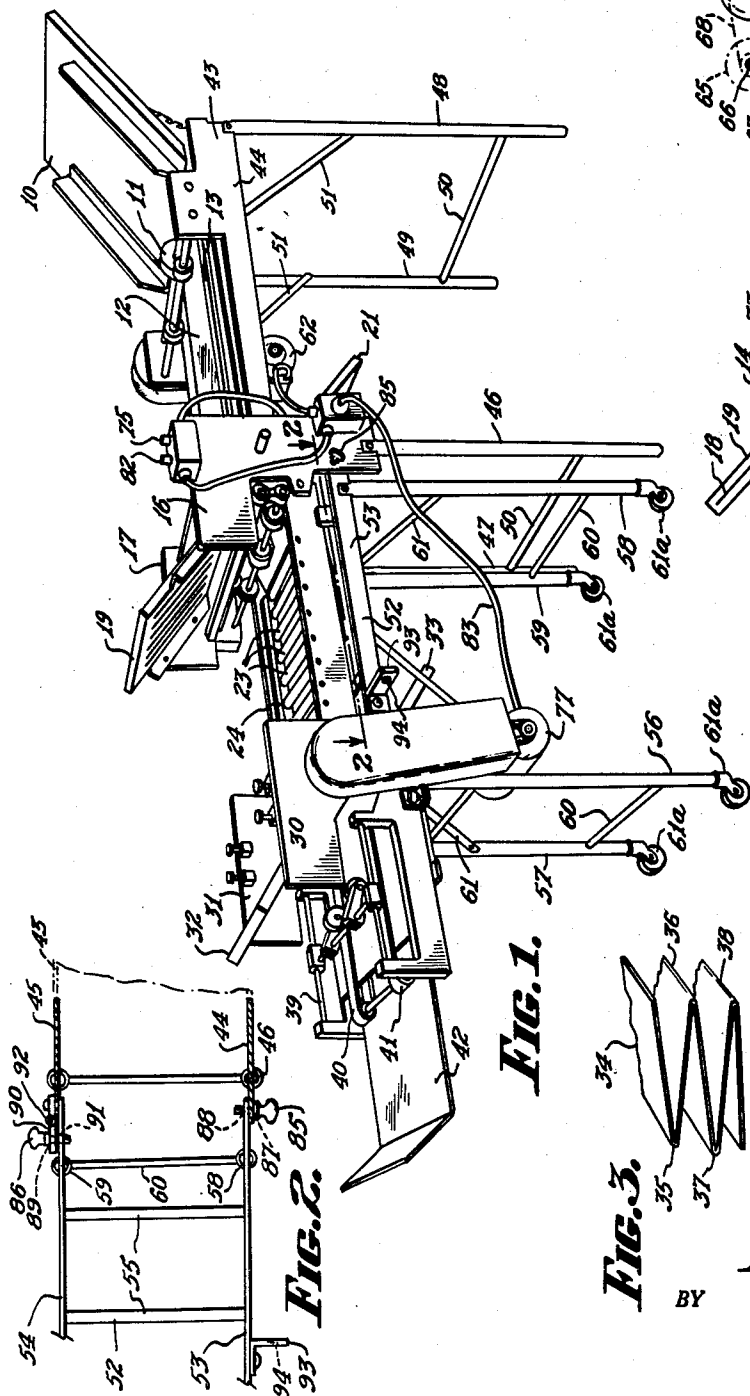


FIG. 1.



FIG. 3.

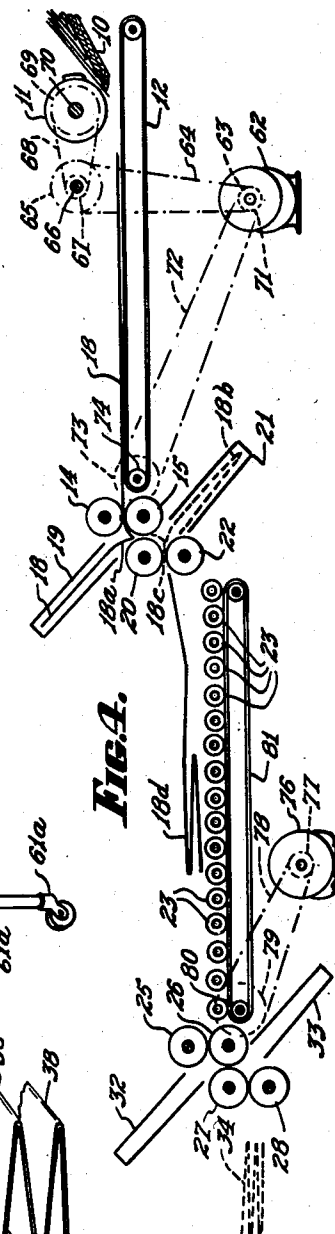


FIG. 4.

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FIG. 5.

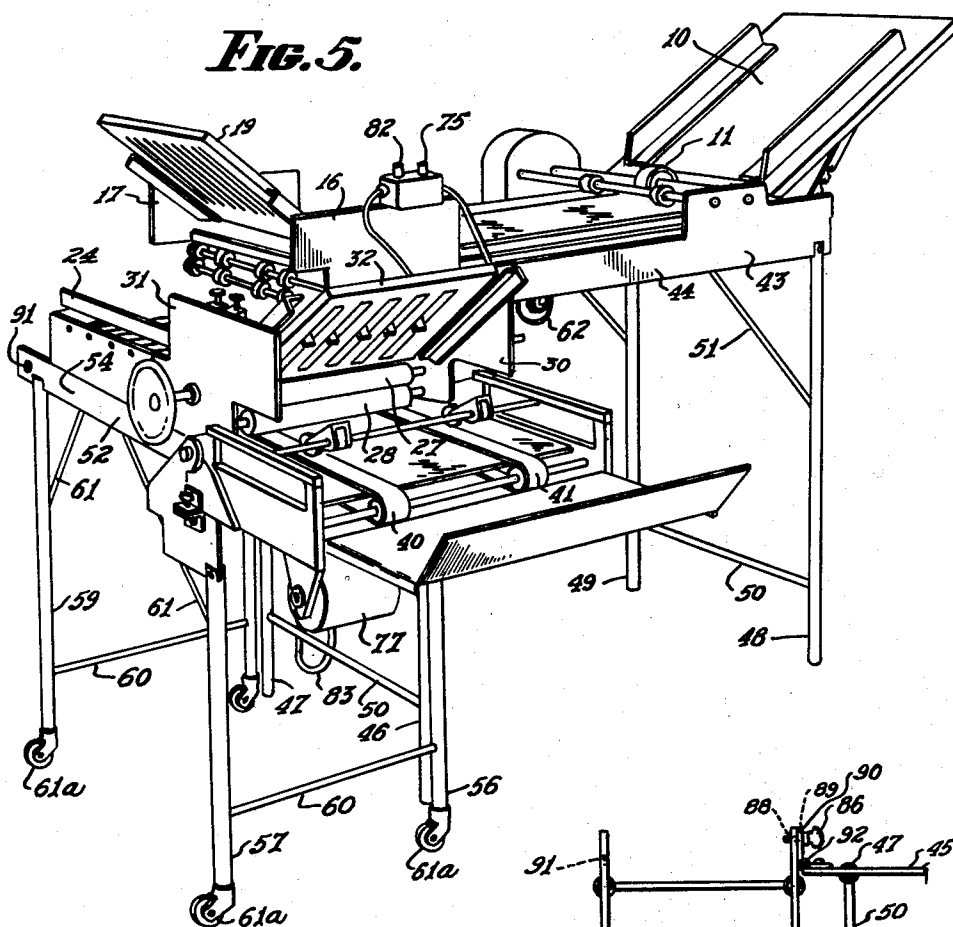
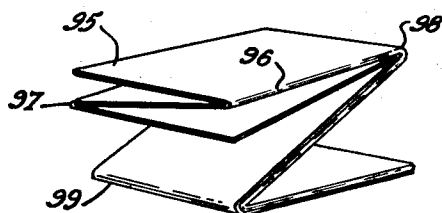


FIG. 7.

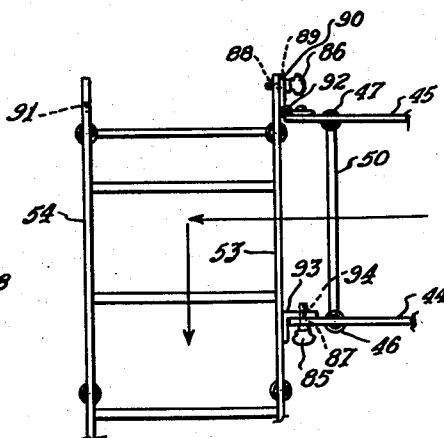


FIG. 6.

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PAPER FEEDING MACHINE

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1 Claim. (Cl. 270—68)

This invention relates to paper folding machines and more specifically to a novel and advantageous arrangement of parts providing an improved folding machine of the well known buckle type such as commonly employed for folding maps, pamphlets and the like.

A principal object of the invention is to provide a folding machine of the buckle type which is characterized by a plurality of folding units which are rearrangeable, this being highly advantageous in that it permits construction of a relatively inexpensive folding machine whereby various folding operations heretofore considered impractical to attain in a relatively inexpensive machine, may be readily effected merely by rearrangement of the folding units.

Another object of the invention is to provide a folding machine as above set forth comprising a plurality of folding units and wherein individual electrical drive motors are employed for driving successive units, this arrangement being economically advantageous in that expensive construction involving various mechanical driving elements is obviated, and providing an arrangement in which one of the units may be continued in operation while the other unit may be shut down for momentary adjusting or cleaning.

Another object of the invention is to provide a folding machine as above set forth and wherein the said individual drive motors comprise variable speed electrical motors, this being advantageous in that operating speeds of successive folding units may be varied as deemed desirable for optimum folding results.

Another object of the invention is to provide a folding machine as above set forth, comprising successive folding units having individual electrical drive motors and wherein the said drive motors are energized through flexible electrical cables connected to a common control box, this being advantageous in that during rearrangement of the folding units minimum manipulation of parts is required.

A further object of the invention is to provide a folding machine as above set forth comprising successive folding units rearrangeably retained in cooperative relation by virtue of novel bracket elements.

Other objects and advantages of the invention will be apparent to those skilled in the art upon an understanding of the following specification, taken in conjunction with the appended drawings, wherein

Figure 1 is a perspective view illustrating a preferred embodiment of my invention and wherein my improved machine is arranged for imparting a plurality of parallel folds to work-pieces passing therethrough.

Figure 2 is a semi-diagrammatic sectional view taken along the line 2—2 of Figure 1 and showing certain bracket elements.

Figure 3 is a fragmentary perspective view of a folded work piece having a plurality of parallel folds.

Figure 4 is a diagrammatic vertical sectional view illustrating a preferred arrangement of driving elements.

Figure 5 is a view similar to Figure 1 but showing my

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improved machine as adapted for imparting to the work-pieces a plurality of parallel folds followed by a plurality of right angle folds.

Figure 6 is a view similar to Figure 2 but showing the bracket elements as employed during the adaptation of Figure 5.

Figure 7 is a perspective view illustrating a workpiece having parallel folds and right angle folds.

With reference to the exemplary machine illustrated throughout the drawings, my invention employs conventional parts or conventional assemblies of parts, so well known in the art that precise detailed descriptions thereof are deemed unnecessary for a full and complete understanding of my invention, and to avoid undue prolixity of this specification will not be described in full detail, it being understood that various substitutions and deviations of the structure shown and herein described, will readily occur to those skilled in the art without departing from the principle of my invention and the scope of the appended claims.

Thus, with reference now to Figure 1 of the drawings, my improved machine comprises a conventional hopper 10 from which workpieces are singly withdrawn by a feed wheel 11 to be advanced by suitable conveying means, herein shown as a belt 12 having conventional and coacting side guide means 13 serving to advance and direct the workpieces into the bite of rolls 14 and 15 (Figure 4) which rolls are journaled between the side plates 16 and 17 of the machine.

As is well known in the art, the rolls 14 and 15 advance the leading end of each workpiece 18 into a conventional buckling plate or pocket indicated at 19 in the drawings. Thus each of the workpieces 18 is caused to buckle as at 18a whereupon the buckled portion 18a is engaged between the rolls 15 and 20 which effectively crease the buckled portion 18a and drives this then leading end 18b of the workpiece into a second buckling pocket indicated at 21. As the folded and creased end 18b of the workpiece strikes the bottom of the pocket 21 a new line of buckling 18c is caused to develop and this buckled portion, together with the formerly folded portions of the workpiece, is engaged by the rolls 20 and 22 which effectively crease the line of fold 18c and advance the workpiece to the position indicated at 18d.

The workpiece emerging from the rolls 20 and 22 will comprise two parallel creases or lines of fold and as it is discharged from the said folding and creasing rolls each workpiece will be received upon a conventional and second advancing means herein shown as comprising a plurality of slightly diagonally disposed conveyor rollers 23, which coact with a suitable side guide indicated at 24 to advance and direct each workpiece into engagement with a series of rolls 25, 26, 27 and 28 mounted between the side plates 30 and 31 of the machine and adapted to coact with buckling pockets 32 and 33, each of which, in coaction with the rolls, serves to impart an additional parallel line of fold to the workpieces.

Thus with reference to Figure 4 of the drawings, a workpiece 34 emerging from the buckling plates 32 and 33 will pass between the rolls 27 and 28 and will comprise four parallel lines of fold as illustrated in Figure 3 of the drawings wherein the workpiece 34 has parallel lines of fold 35, 36, 37 and 38. Workpieces thus folded and emerging from between the rolls 27 and 28 are received by a stacking device generally indicated at 39 and comprising driven belts 40 and 41 which discharge the workpieces onto a receiving platform or the like 42.

In accordance with the concepts of my invention the machine is characterized by a sectional arrangement of parts whereby the first described folding apparatus, including the hopper 10 and the sequence of elements up to and including the discharge rolls 20 and 22, comprise a

first folding unit which, in accordance with my invention, has been mounted and arranged upon a common frame generally indicated at 43, which is formed with side plates 44 and 45 (Figure 2) joined by suitable spacing members (not shown) and has legs 46, 47, 48 and 49, reinforced by cross members generally indicated at 50 and by diagonal braces generally indicated at 51.

Also in accordance with the concepts of my invention, the secondly described folding apparatus including the conveyor rollers 23 and the described sequence of parts up to and including the receiving platform 42, comprise a second folding unit which in accordance with my invention has been mounted and arranged upon a common frame generally indicated at 52, which is formed with side plates 53 and 54 (Figure 2) joined by suitable spacing elements generally indicated at 55 and has legs 56, 57, 58 and 59 reinforced by cross members generally indicated at 60 and by diagonal braces generally indicated at 61. At their lower ends the legs 56 through 59 are provided with casters generally indicated at 61a, which casters facilitate rearrangement of the units as will later be more clear.

Referring to Figures 1 and 4 of the drawings, a variable speed electric motor 62 has a sprocket 63 which drives chain 64 running over a larger sprocket 65 fixed on a shaft 66 upon which is also mounted a sprocket 67 driving a chain 68 running over a larger sprocket 69 fixed on the shaft 70 which mounts the feed wheel 11. The motor 62 also has a sprocket 71 which drives a chain 72 running over a larger sprocket 73 mounted on a shaft 74 which also may serve as a driving roll for the conveyor belt 12. While not shown in the drawings, it will be obvious that the shaft 74 and the rolls 14, 15, 20 and 22 may comprise a train of spur gears serving to drive the rolls 14, 15, 20 and 22 as required. Thus the motor 62 provides driving power for the mechanism of the first folding unit. Energization of the motor 62 and consequently the operating speed of the first folding unit is accomplished by means well known in the art and controlled by an actuating knob 75 which as shown in Figure 1, is conveniently mounted upon the frame of the first folding unit.

A second variable speed electric motor 76 has a sprocket 77 which drives chain 78 running over a larger sprocket 79 fixed on a shaft 80 which shaft may also serve as a driving roll for a belt 81 serving to drive the assembly of conveyor rolls 23. While not shown in the drawings, it will be obvious that the shaft 80 together with the rolls 25, 26, 27 and 28 may comprise a train of spur gears serving to drive the rolls 25, 26, 27 and 28 as required. Energization of the motor 76 and consequently the operating speed of the second folding unit is controlled by an actuating knob 82, which for convenience is mounted alongside the actuating knob 75 as shown in Figure 1, a flexible cable 83 being employed for supplying current to the motor 76.

With reference now to Figures 1 and 2, the frames 43 and 52 are detachably retained in rectilinear relation by means of thumb screws 85 and 86, the screw 85 extending through a perforation 87 provided in the side plate 44 of the frame 43 to engage a threaded perforation 88, formed in the side plate 53 of the frame 52 to clamp the parts together. The thumb screw 86 extends through

a perforation 89 provided in a plate 90 to engage a threaded perforation 91 provided in the side plate 54 of the frame 52, the plate 90 being hingedly attached as at 92 to the side plate 45 of the frame 43. The side plate 53 of the frame 52 mounts an angle bracket 93 having a threaded perforation 94. Upon removal of the thumbscrews 85 and 86 the frames 43 and 52 may be rearranged to the right angled relation illustrated in Figures 5 and 6, whereupon the thumbscrew 85 again extending through the perforation 87, now engages the threaded perforation 94 of the bracket 93, and the thumbscrew 86 again extending through the perforation 89 now engages the threaded perforation 88, the plate 90 having been turned about its pivoted attachment 92, to retain the frames in right angled relation.

Thus merely by use of the thumbscrews 85 and 86 the units may be rearranged in right angled relation whereby both parallel folds and folds at right angles thereto will be imparted to the workpieces. Thus the workpiece 95 (Figure 6) has parallel folds 96 and 97 and right angle folds 98 and 99.

It will now be apparent that my invention provides a relatively inexpensive arrangement of parts whereby folding operations and advantages heretofore considered impractical to attain in a relatively inexpensive machine may be readily effected and that various modifications of the embodiment known and described will readily occur to those skilled in the art without departing from the spirit of my invention and the scope of the appended claim.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

In a paper folding machine a first frame mounting a first folding unit comprising conveying means, a series of folding and creasing rolls and an electrical motor including driving elements arranged to drive said conveying means and said series of folding and creasing rolls, a second frame mounting a second folding unit comprising second conveying means, a second series of folding and creasing rolls, and a second electrical motor including driving elements arranged to drive said second conveying means and said second series of folding and creasing rolls, said first frame and said second frame comprising supporting members of different elevations whereby workpieces emerging from the said first mentioned series of folding and creasing rolls are deposited on the said second conveying means, said first frame and said second frame also comprising bracket members adapted to retain the said frames in rectilinear alignment whereby parallel folds only will be imparted to workpieces, said bracket members also being adapted to selectively retain the said frames in right angled relation whereby both parallel folds and folds at right angles thereto will be imparted to workpieces.

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