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FOLD PLATE SHIFTER

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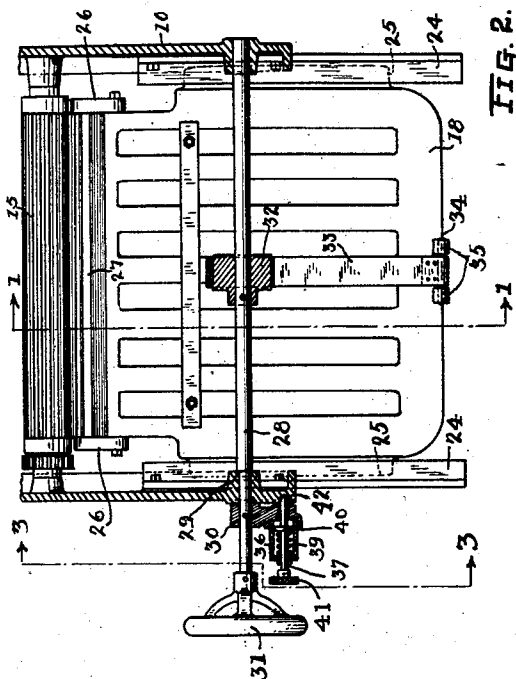


FIG. 1.

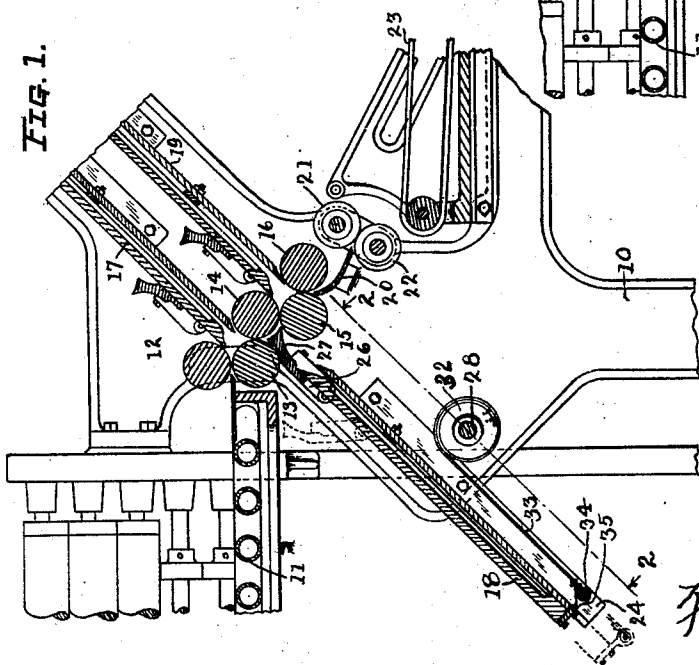


FIG. 2.

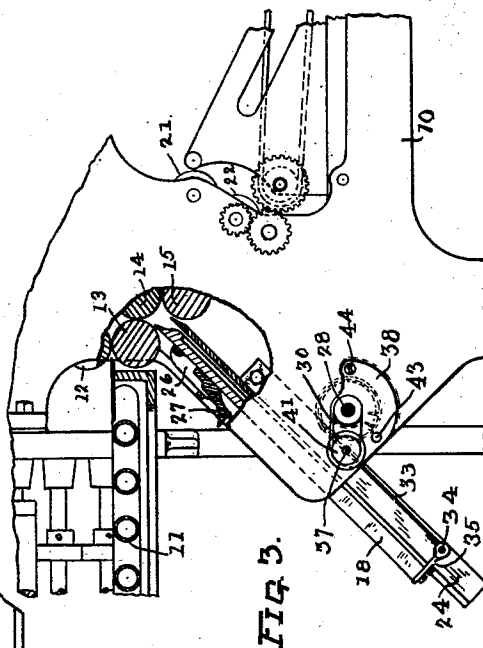


FIG. 3.

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FOLD-PLATE SHIFTER

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This invention relates to a fold plate shifter for use upon folding machines of the buckle-fold type.

Most fold sections, in machines of this type, are fitted with a plurality of fold plates so as to provide the capacity for a maximum number of folds. In ordinary operations however the maximum number of folds is seldom utilized. Hence provision must be made for disabling part of the fold plates. This is accomplished as to any particular fold plate by withdrawing the plate slightly from its operative position and mounting in front of the entrance to the plate a fold plate deflector. As a rule the deflector is pivotally mounted upon the fold plate itself and is capable of being swung either into operative position in front of the plate or into inoperative position against one side of the plate. Where the fold plates are mounted upon horizontal guides it is relatively easy to shift them sufficiently to swing the deflectors to operative or inoperative position or vice versa, but in the case of plates mounted at an angle to the horizontal, generally 45°, it is difficult for one man to support the weight of the plate while swinging the deflector from one position to the other, and this is particularly true where the fold plate is more or less inaccessible on account of extending diagonally downward beneath a feed table or other part of the machine.

One of the objects of the present invention therefore is the provision of means for conveniently and easily shifting a fold plate set at an angle to the horizontal and holding it in a withdrawn position while the fold plate deflector is being swung from operative to inoperative position or vice versa.

Another object is the provision in connection with means of this character for securing the fold plate either in folding position or in sheet deflecting position.

Other objects and features of novelty will appear as I proceed with a description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawing, in which

Figure 1 is a vertical sectional view through

a portion of a folding machine in which my invention is embodied, the section being taken substantially on the line 1—1 of Fig. 2.

Fig. 2 is a bottom view of an inclined fold plate looking upwardly at the same at an angle of 90° to the fold plate, the view being taken partly in section upon the line 2—2 of Fig. 1, and

Fig. 3 is a side elevational view, partly in section on the line 3—3 of Fig. 2, certain of the parts being broken away and others shown in section in order to more clearly illustrate the invention.

In the drawing I have shown at 10 a fragment of the frame of a folding machine of the buckle-fold type. In Figs. 1 and 3 there is illustrated partially a cross-feed table 11 for delivering sheets into a 45° fold section. The latter may comprise fold rolls 12, 13, 14, 15 and 16 and fold plates 17, 18 and 19. Sheets leaving this fold section travel over a deflector 20 into feed rolls 21 and 22 by which the sheets are delivered onto a stacker belt 23 in the present instance. It is of course immaterial, in so far as the present invention is concerned, what operations precede or follow the folding operations performed in the fold section herein illustrated.

In the framework of the machine there are fixed a pair of guide rails 24. These rails are preferably in the form of angle irons, each having a flange extending inwardly or toward the other rail. The fold plate 18 is provided at its side edges with upwardly offset flanges 25 which overlie the flanges on the guide rails 24, thus constituting a slidable mounting of the fold plate on the guide rails. The forward end of the fold plate is somewhat reduced in width, as will be apparent in Fig. 2, and on the ends of this reduced portion are pivoted a pair of arms 26 supporting between them a fold plate deflector 27 of known form. The operative position of the deflector, whereby sheets are prevented from entering the fold plate, is illustrated in Figs. 1 and 2. Its inoperative position, folded back and resting upon the upper side of the fold plate, whereby sheets are permitted to enter the fold plate, is illustrated in Fig. 3.

In the frame of the machine I mount a

shaft 28 disposed laterally and beneath the fold plate 18 and extending transversely to the path of movement of the fold plate. This shaft is rotatably mounted in the side members of the frame and is held against longitudinal movement by any suitable means. In the form illustrated the shaft 28 has a shoulder which engages one side of a boss 29 on the frame, and on the opposite side of this boss an arm 30 is pinned to the shaft. The shaft may be turned by any convenient means, such for instance as the hand-wheel 31 pinned to the extremity of the shaft where it is readily accessible from the outside of the machine.

On the shaft 28 intermediate its ends and preferably midway between the side members of the machine frame I pin or otherwise secure a winding reel or sector 32 having a cylindrical face. On this face I secure by screws or the like, one end of a strap 33 made preferably of metal. The opposite end is looped over a pin 34 and fastened together, this pin being carried by a pair of brackets 35 depending from the lower end of fold plate 18. Hence, when the reel 32 is wound up by turning the hand-wheel 31, the fold plate 18 is slid upwardly upon its guide rails 24, while the turning of the hand-wheel 31 in the opposite direction permits gravity to lower the fold plate along the guide rails.

In the arm 30 I mount a cylindrical guide 36. A plunger 37 is slidably mounted in this guide and projects through a hole in the arm 30. A flat boss 38 on the frame member over which the arm 30 swings has sockets formed therein adapted to receive the end of this plunger, which is releasably held in engagement with one or the other of such sockets by a coil spring 39 surrounding the plunger and bearing against a collar 40 secured thereupon.

The outer end of the plunger is fitted with a knob or head 41 by means of which the operator may retract the plunger against the action of spring 39. There are two sockets, one of which is shown at 42 in Fig. 2 and the other at 43 in Fig. 3. When the plunger is in engagement with socket 42 the fold plate is held in its operative or sheet folding position. When the plunger is in socket 43 however the fold plate is withdrawn from operative position and held at the proper height to maintain the deflector 27 in operative position. A screw 44 serves as a stop which is adapted to be engaged by the plunger 37 to limit the downward travel of the fold plate.

In the drawing the fold plates 17 and 19 are not shown as equipped with my shifter mechanism. These plates are quite accessible, and may generally be slid upon their guides and have their deflectors changed by a single operator without difficulty. However, it will be appreciated that the shifter

mechanism herein described may be employed in connection with such fold plates whenever that may seem to be desirable.

Assuming that the fold plate 18 and associated parts are in the operative position illustrated in Figs. 2 and 3, and assuming that the operator desires to disable this fold plate, he grasps the wheel 31 in one hand and the knob 41 in the other hand, pulls upon the knob 41 to withdraw the plunger 37 from engagement with the socket 42, and then turns the wheel 31 through an angle of approximately 180° or until the plunger 37 contacts with the head of screw 44. At this time the fold plate 18 is in the position indicated by dotted lines in Fig. 1. The deflector 27 is then swung upward, as indicated in dotted lines in Fig. 1, until it assumes a position in front of the fold plate. The operator then turns the wheel 31 in the opposite direction far enough to permit the plunger 37 to take into the recess 43, when the fold plate and deflector will be in the position illustrated in full lines in Fig. 1. When it is desired to again put the fold plate 18 into use the reverse operation is followed, that is to say the fold plate is first lowered as far as it will go in order to enable the deflector to clear the fold roll 13, when it may be swung down onto the upper surface of the fold plate, after which the plate is raised as far as it will go, that is until the plunger 37 engages with socket 42.

While in the foregoing description and accompanying drawing I have disclosed one particular embodiment of the invention more or less in detail, I desire it to be understood that such detail disclosure has been resorted to primarily for the purpose of fully illustrating the invention, and is not to be construed as amounting to a limitation upon the scope thereof.

Having thus described my invention, I claim:

1. In a folding machine, a frame, a pair of guides mounted thereon, a fold plate slidable upon said guides, a flexible connector, means carried by the plate and frame respectively to which the ends of said connector are secured, and means for exerting a pull upon the connector to cause the ends thereof to approach each other.

2. In a folding machine, a frame having parallel guides thereon, a fold plate slidable upon said guides, a reel, a flexible connector attached to said reel, means for joining said frame and fold plate through said reel and connector, and means for rotating said reel.

3. In a folding machine, a fold plate, guides upon which said plate is mounted to slide, and means for moving said plate upon said guides comprising a flexible connector attached to the plate, and rotatable means for exerting a pull upon said connector.

4. In a folding machine, a fold plate slid-

ably mounted at an angle to the horizontal, and means for moving said plate upwardly comprising a winding reel, and a flexible connector attached at its ends to said reel and said plate respectively.

5 5. In a folding machine, a fold plate slidably mounted at an angle to the horizontal, and means for moving said plate upwardly comprising a winding reel, and a strap attached to said reel and to said plate below the
10 axis of said reel.

6. In a folding machine, a frame, a pair of parallel guides mounted in said frame at an angle to the horizontal, a fold plate mounted
15 to slide on said guides, a shaft mounted in said frame transversely to the path of movement of the fold plate, means at one end of the shaft for turning the latter, a winding reel mounted on the shaft intermediate its
20 ends, and a flexible connector attached at its ends to said reel and to said plate below said shaft.

7. In a folding machine, a fold plate slidably mounted at an angle to the horizontal, a
25 deflector pivotally mounted on said fold plate and adapted to assume an operative position in front of the fold plate or an inoperative position at the side of the fold plate, means for moving said plate comprising a winding
30 reel and a flexible connector attached at its ends to said reel and said plate respectively, and stop mechanism operatively connected with said reel adapted to hold said plate in either folding or non-folding position.

8. In a folding machine, a frame, a pair of parallel guides mounted in said frame at an angle to the horizontal, a fold plate mounted to slide on said guides, a shaft mounted in
40 said frame transversely to the path of movement of the fold plate, means at one end of the shaft for turning the latter, a winding reel mounted on the shaft intermediate its ends, a flexible connector attached at its ends to said reel and to said plate below said shaft,
45 and stop means operatively connected with said shaft for holding said plate in either folding or non-folding position.

9. In a folding machine, a frame, a pair of parallel guides mounted in said frame at an
50 angle to the horizontal, a fold plate mounted to slide on said guides, a shaft mounted in said frame transversely to the path of movement of the fold plate, means at one end of the shaft for turning the latter, a winding
55 reel having a cylindrical face, and a strap attached to said reel and to said plate below said shaft.

In testimony whereof, I hereunto affix my signature.

60 LESLEY R. TUFTS.