Nov. 30, 1943. J. E. MEYER 2,335,431

SHEET COLLECTING AND FOLDING MECHANISM FOR PRINTING PRESSES

Filed Oct. 16, 1942 3 Sheets-Sheet 1

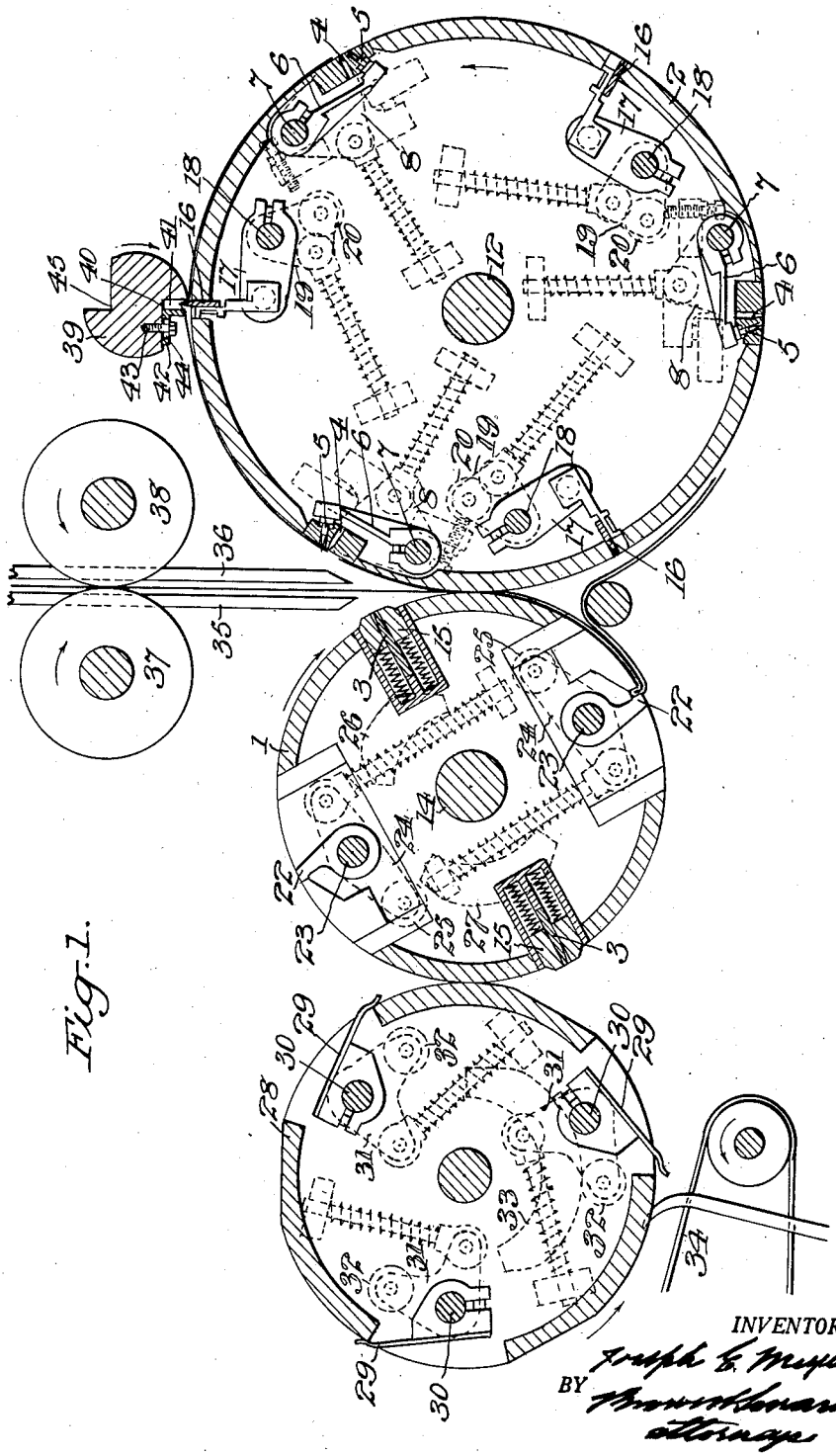


Fig. 1.

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Filed Oct. 16, 1942 3 Sheets-Sheet 2

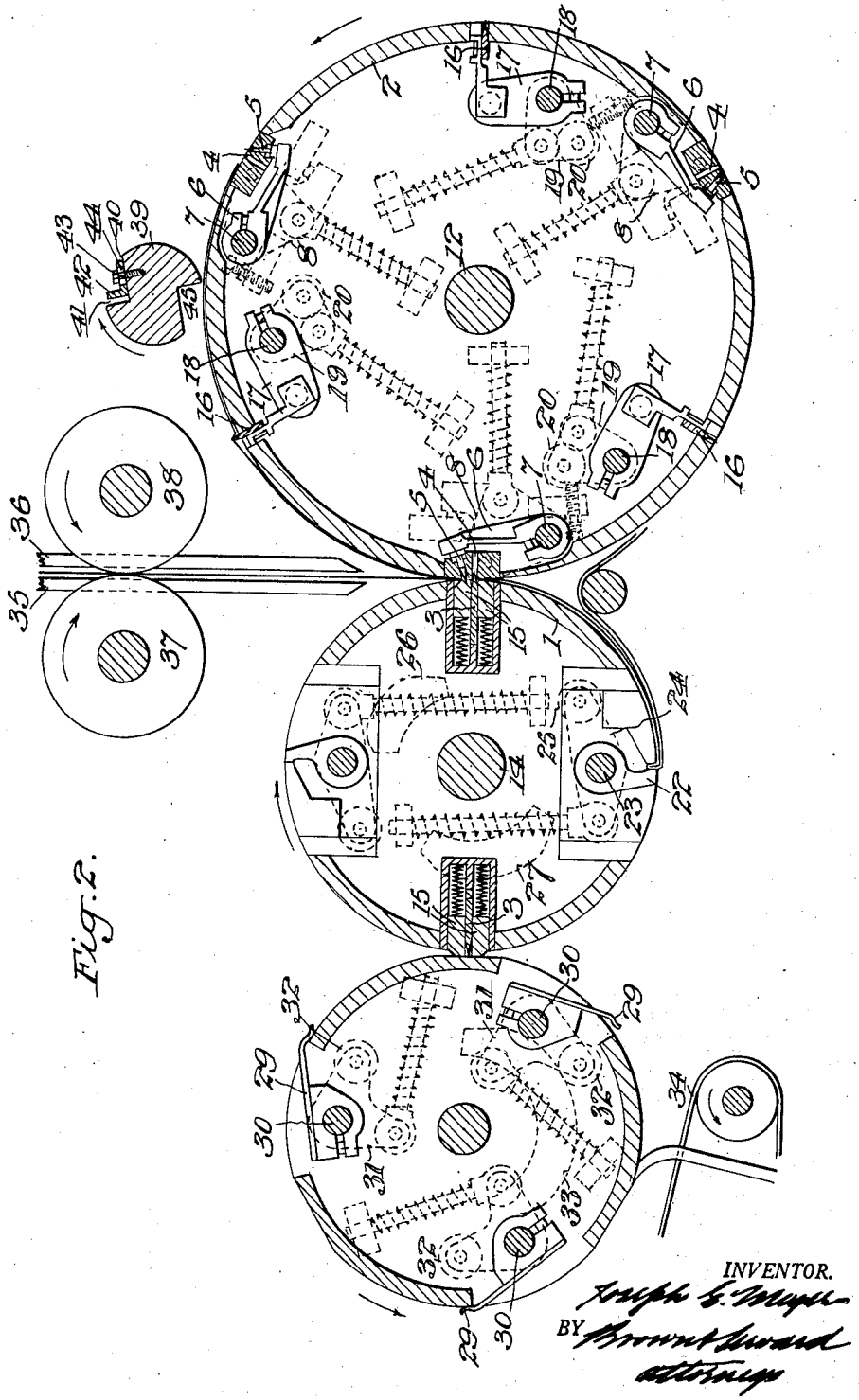


Fig. 2.

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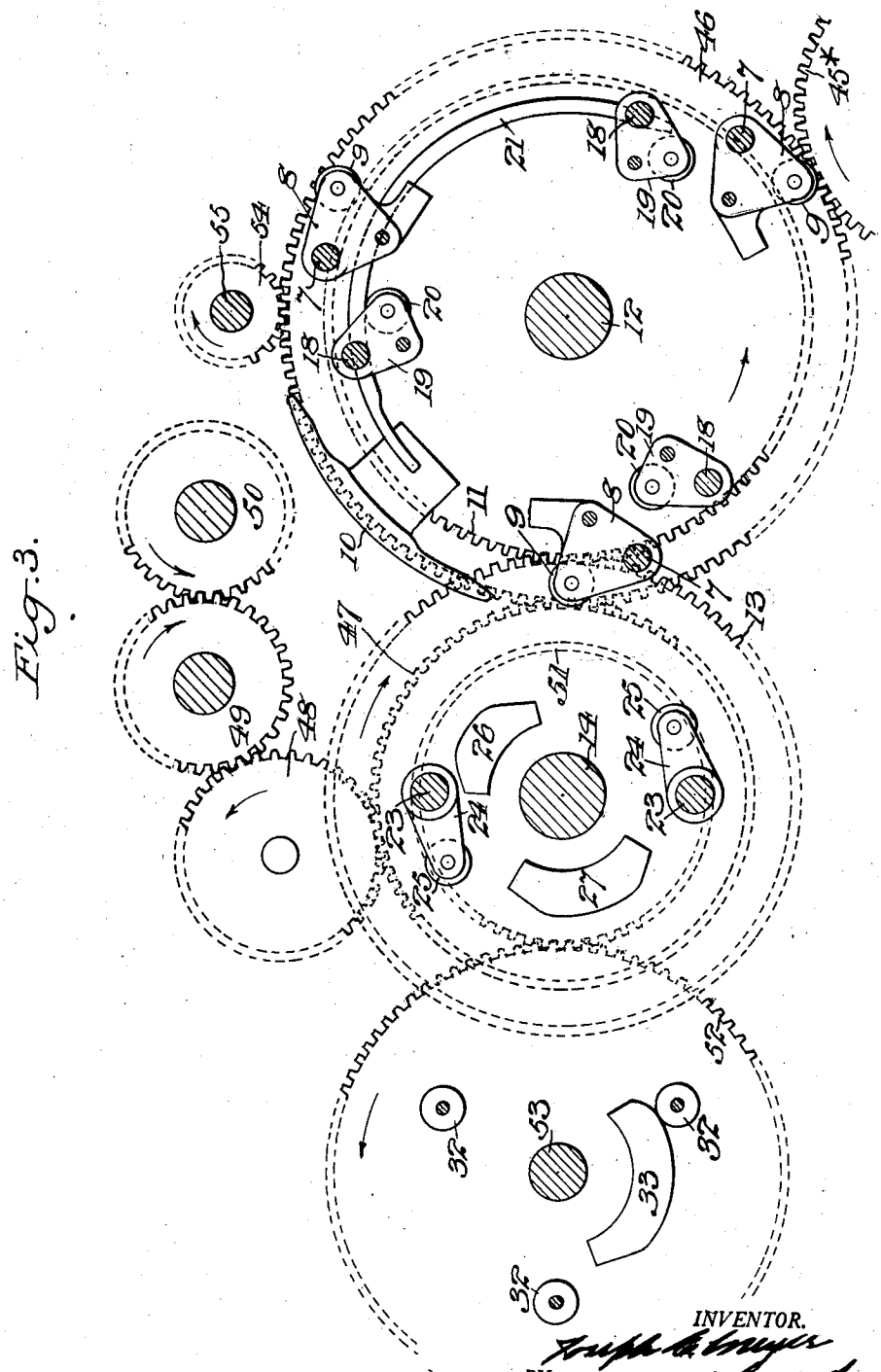


Fig. 3.

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UNITED STATES PATENT OFFICE

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SHEET COLLECTING AND FOLDING MECHANISM FOR PRINTING PRESSES

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Application October 16, 1942, Serial No. 462,220

12 Claims. (Cl. 270—43)

In rotary sheet folders for printing presses of the type where two coacting combined cutting, collecting and folding cylinders are employed and in which the sheet collecting cylinder is also the female cutting cylinder, the sheets carried around the said cylinder are at times dragged back slightly because of their frictional engagement with guides, etc., to cause their tail ends to extend over the knife slots in the said cylinder, thereby causing the tail ends to be trimmed at the cutting line between the cylinders. These trimmings are very objectionable in that they get into the signatures or pack up in the knife slots and thus interfere with the cutting operations.

The object of my invention is to eliminate this objectionable feature by providing means for drawing the tail ends of the sheets carried around the collecting cylinders forwardly away from their adjacent knife slots before the sheets reach the cutting line between the cylinders; as by transversely deforming the sheets to shorten their circumferential lengths.

A further object is to provide means for positively maintaining the sheets in their deformed condition until after they pass the said cutting line between the cylinders.

A practical embodiment of my invention is represented in the accompanying drawings in which

Fig. 1 represents a vertical longitudinal section through so much of a sheet cutting, collecting and folding mechanism as will clearly illustrate the present invention; the elements on the cylinder which collect the sheets being in the positions they assume at the time of the sheet deforming operation;

Fig. 2 represents a similar view in detail showing the elements in the positions they assume shortly after the sheet deforming operation; and

Fig. 3 represents a vertical longitudinal section showing the means for driving the several elements.

The pair of coacting rotary cylinders are denoted by 1 and 2, the cylinder 1 being a combined cutting and folding cylinder, and the cylinder 2 being a combined cutting, collecting and folding cylinder.

The cylinder 1 is shown as provided with two equally spaced knives 3, and the cylinder 2 as provided with three equally spaced knife slots 4, arranged to coact with the knives 3 to sever the sheets or groups of sheets from the web or associated webs each revolution of the cylinders.

The cylinder 2 is also shown as provided with three equally spaced sets of sheet collecting devices, as, for instance, normally projected impaling pins 5. The spring pressed holders 6 for these impaling pins have their rock shafts 7 provided with arms 8 which carry rollers 9 arranged in position to be operated at the proper intervals by the traveling cam 10 to retract the pins to withdraw from the head ends of the sheets at the proper times. This traveling cam 10 is carried by a gear 11 which is rotatably mounted on the shaft 12 of the cylinder 2, said gear 11 being driven by an equal sized gear 13 fast on the shaft 14 of the cylinder 1.

Two equally spaced cheek pieces 15 are provided on the cylinder 1 in position to successively coact with their respective sets of impaling pins 5 on the cylinder 2 as the knives 3 sever the sheets from the web. The cylinder 2 is also shown as provided with three equally spaced spring pressed normally retracted tucking blades 16 which serve the double purpose of deforming the sheets carried around the cylinder 2 and of folding off the collected sheets to the cylinder 1. These tucking blades 16 are carried by holders 17 whose rock shafts 18 are provided with arms 19 which carry rollers 20 arranged in position to be operated by the traveling tucking cam 21 on the aforesaid cam gear 11 to project the tucking blades to their operative positions.

The cylinder 1 is also shown as provided with two equally spaced spring pressed folding jaws 22 arranged to coact with the tucking blades 16 on the cylinder 2 to fold the collected sheets onto the cylinder 1. The movable elements of the folding jaws 22 are mounted on rock shafts 23 provided with arms 24 which carry rollers 25 in position to be operated at the proper times by the fixed cam 26, to take the folded sheets from the cylinder 2. A fixed cam 27 is provided for causing the folding jaws 22 to transfer the folded sheets to a suitable delivery cylinder 28. This delivery cylinder 28 is shown as provided with three equally spaced spring pressed sets of grippers 29 whose rock shafts 30 are provided with arms 31 which carry rollers 32 in position to be engaged by the fixed cam 33 for causing the grippers to take the folded sheets from the folding jaws 22 of the cylinder 1 and deliver them to a predetermined point, such, for instance, as an endless delivery carrier 34.

The web or associated webs may be fed to the cylinders 1 and 2 between the guides 35, 36 by the pair of coacting feed rolls 37, 38.

The means which I have shown for transversely deforming the sheets carried around the cyl-

inder 2 as they approach the cutting line between the two cylinders, for drawing the tail ends of the sheets forwardly away from over the knife slots before reaching the cutting line, is as follows:

A sheet deforming roll 39 is provided in position to coact with the projected tucking blades 16 at the proper intervals for causing the sheets to be transversely deformed as they pass between the said roll 39 and the cylinder 2.

This deforming roll 39 is shown as provided with an angular recess 40 extending lengthwise of the roll, one wall of the recess 40 being radially disposed and the other wall being tangentially disposed with respect to the deforming roll 39.

A longitudinally disposed slot 41 is formed between the radial wall of the recess 40 and an angle plate 42, which plate is adjustable toward and away from the said radial wall to vary the width of the slot according to the number of sheets being deformed at one operation and/or according to the amount of sheet deformation required. This slot adjustment may be accomplished by means of a set screw and slot arrangement 43, 44 in the base of the said angle plate 42.

A second longitudinal recess 45 may be provided along the roll 39 diametrically opposite the recess 40 for counterbalancing the roll, if so desired.

In operation: The deforming slot 41 is brought into position to coact with the projected tucking blade 16 as the middle of the sheet passes the slot 41, thus causing the blade 16 to tuck the sheet into the slot to transversely deform the sheet and thus draw the free tail end of the sheet into position where it will be circumferentially shortened and maintained in such condition so that it will not be trimmed by the coaction of the knife 3 with its slot 4.

It will be understood that the traveling cam 21 which projects the tucking blade beyond the surface of the cylinder 2 to transversely deform the sheets thereon, will maintain this projected position until the folding-off operation is completed.

The driving means for the several elements are shown as including the following gears. A drive gear 45* meshes with a gear 46 fast on the shaft 12 of the cylinder 2, which gear 46 drives a gear 47 fast on the shaft 14 of the cylinder 1. This gear 47 drives the feed rolls 37, 38 through the gears 48, 49, 50.

A gear 51 fast on the shaft 14 of the cylinder 1 drives the gear 52 fast on the shaft 53 of the delivery cylinder 28. The intermeshing gears 11 and 13 have already been described. The gear 46 also drives a gear 54 fast on the shaft 55 of the sheet deforming roll 39 at the proper speed, to cause its deforming slot 41 to coact with the projected tucking blades 16 at the proper intervals, to cause the circumferential shortening of the sheets imposed on the cylinder 2.

It will be noted that in the present arrangement the cylinder 1 is two-thirds the diameter of the cylinder 2 and equal in diameter to the delivery cylinder 28; and that the web feed rolls 37, 38 are driven at the same surface speed as the cylinders 1 and 2.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiment herein shown and described, but what I claim is:

1. Two rotary cylinders, coacting devices on said cylinders for cutting sheets from a traveling web, devices on one of the cylinders for collecting the sheets thereon, coacting devices on said cylinders for folding the sheets off from the collecting cylinder, and means arranged to coact with the folding devices on the collecting cylinder for circumferentially shortening the sheets carried around the collecting cylinder, to prevent the tail ends of the sheets from being trimmed at the cutting line between the two cylinders.

2. Two rotary cylinders, coacting devices on said cylinders for cutting sheets from a traveling web, devices on one of the cylinders for collecting the sheets thereon, coacting devices on said cylinders for folding the sheets off from the collecting cylinder, and means arranged to coact with the folding devices on the collecting cylinder for transversely deforming the sheets carried around the collecting cylinder, to prevent the tail ends of the sheets from being trimmed at the cutting line between the two cylinders.

3. Two rotary cylinders, coacting devices on said cylinders for cutting sheets from a traveling web, devices on one of the cylinders for collecting the sheets thereon, coacting devices on said cylinders for folding the sheets off from the collecting cylinder, and means arranged to coact with the folding devices on the collecting cylinder for drawing forward the tail ends of the sheets carried around the collecting cylinder, to prevent the tail ends of the sheets from being trimmed at the cutting line between the two cylinders.

4. Two rotary cylinders, coacting knives and slots for cutting sheets from a traveling web, devices for collecting the sheets on one of the cylinders, coacting tucking blades and folding jaws for folding the collected sheets, and a roll arranged to coact with the tucking blades for circumferentially shortening the sheets carried around the collecting cylinder to prevent the tail ends of the sheets from being trimmed at the cutting line between the cylinders.

5. Two rotary cylinders, coacting knives and slots for cutting sheets from a traveling web, devices for collecting the sheets on one of the cylinders, coacting tucking blades and folding jaws for folding the collected sheets, and a roll arranged to coact with the tucking blades for transversely deforming the sheets carried around the collecting cylinder to prevent the tail ends of the sheets from being trimmed at the cutting line between the cylinders.

6. Two rotary cylinders, coacting knives and slots for cutting sheets from a traveling web, devices for collecting the sheets, normally retracted tucking blades and folding jaws for folding the collected sheets, a roll having a slot arranged to coact with the tucking blades for drawing the tail ends of the sheets carried around the collecting cylinder away from the slots to prevent the tail ends from being trimmed at the cutting line between the cylinders, and means for projecting the tucking blades beyond their cylinder during their sheet deforming and folding operations.

7. Two rotary cylinders, a knife and a set of folding jaws carried by one of the cylinders, a sheet collecting device, a knife slot and a tucking blade carried by the other cylinder, a sheet deforming roll having a slot, and means for projecting said tucking blade into said deforming roll slot to draw the tail end of a sheet away from its adjacent knife slot to prevent the tail end from being trimmed at the cutting line between the cylinders.

8. Two rotary cylinders, knives and sets of folding jaws carried by one of the cylinders, sheet collecting devices, knife slots and tucking blades carried by the other cylinder, a sheet deforming roll having a slot, and means for projecting said tucking blades into said deforming roll slot to draw the tail ends of the sheets away from their adjacent knife slots to prevent the tail ends from being trimmed at the cutting line between the cylinders.

9. Two rotary cylinders, two knives and two sets of folding jaws carried by one of the cylinders, three sheet collecting devices, three knife slots and three tucking blades carried by the other cylinder, a sheet deforming roll having a slot, and means for projecting said tucking blades into said deforming roll slot to draw the tail ends of the sheets away from their adjacent individual slots to prevent the tail ends from being trimmed at the cutting line between the cylinders.

10. Two rotary cylinders, a knife and a set of folding jaws carried by one of the cylinders, a sheet collecting device, a knife slot and a normally retracted tucking blade carried by the other cylinder, a sheet deforming roll having a slot, and means for projecting said tucking blade into said deforming roll slot to draw the tail end of a sheet away from its adjacent knife slot to prevent the tail end from being trimmed at the cutting line between the cylinders, said means serving to maintain the tucking blade in said projected position during the folding operation.

11. Two rotary cylinders, knives and sets of folding jaws carried by one of the cylinders, sheet collecting devices, knife slots and normally retracted tucking blades carried by the other cylinder, a sheet deforming roll having a slot, and means for projecting said tucking blades into said deforming roll slot to draw the tail ends of the sheets away from their adjacent knife slots to prevent the tail ends from being trimmed at the cutting line between the cylinders, said means serving to maintain the tucking blades in their projected positions during the folding operations.

12. Two rotary cylinders, two knives and two sets of folding jaws carried by one of the cylinders, three sheet collecting devices, three knife slots and three normally retracted tucking blades carried by the other cylinder, a sheet deforming roll having a slot, and means for projecting said tucking blades into said deforming roll slot to draw the tail ends of the sheets away from their adjacent knife slots to prevent the tail ends from being trimmed at the cutting line between the cylinders, said means serving to maintain the tucking blades in their projected positions during the folding operations.

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