

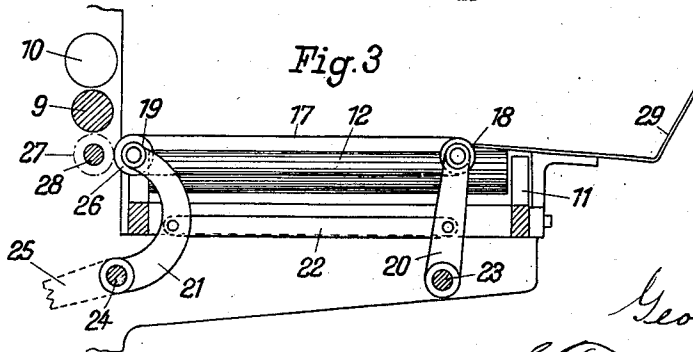
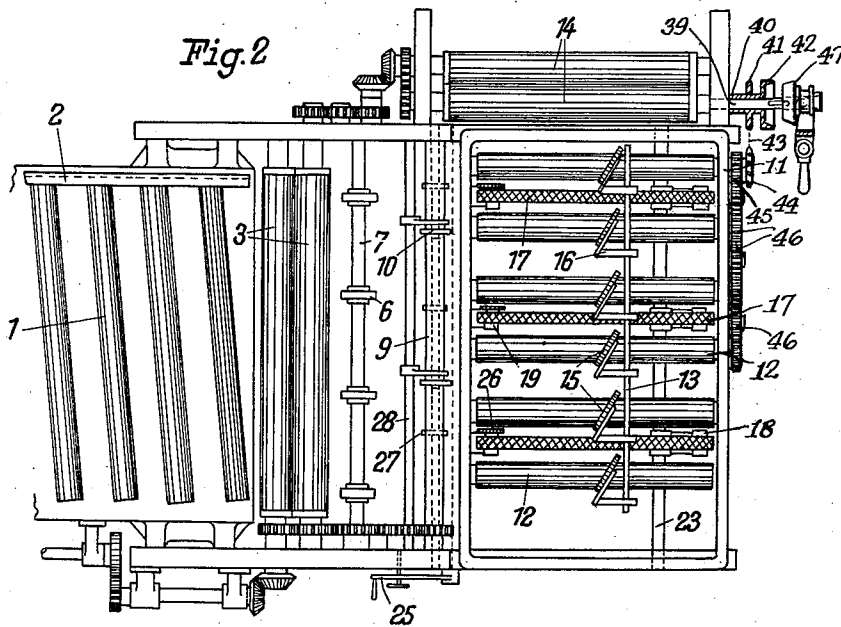
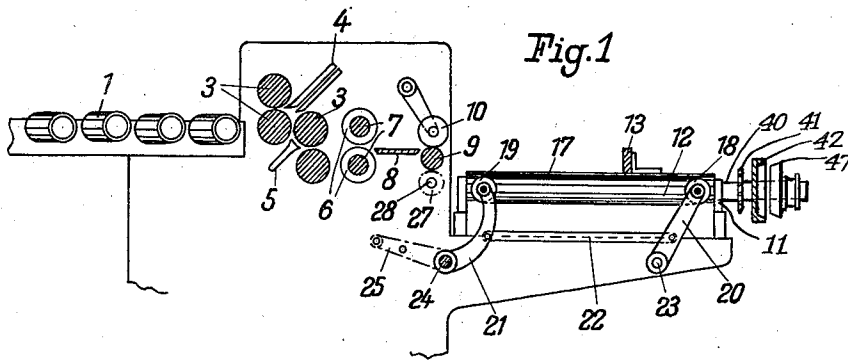
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SHEET DELIVERY APPARATUS FOR FOLDING MACHINES

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SHEET DELIVERY APPARATUS FOR FOLD-
ING MACHINES

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4 Claims. (Cl. 271-64)

This invention relates to improvements in and relating to sheet delivery apparatus for folding machines.

In buckling folding machines for transverse folding, various arrangements are already known which render it possible to feed the sheets issuing from a folding mechanism as desired either by means of a transverse feeding table to a transverse folding machine, or directly to a place of delivery. In one arrangement the transverse feeding table for the delivery and collecting of the folded sheets is put out of action and is replaced by a collecting band or the like arranged additionally above the transverse feeding table and continuing the feeding in the former direction. This apparatus necessitates the installation of a special collecting band and the connection thereof with the machine driving mechanism and the stopping of the transverse feeding means. In another known apparatus, delivery feeding means are provided, between the transverse feeding means of the angular feeding table of the folding mechanism which means are moved in the same, or approximately the same, direction as the sheet ejection from the previous folding mechanism and which have a disconnectible drive adapted to the sheet delivery. With this arrangement of the transverse feeding table, the sheets are injuriously affected on feeding to the delivery position by the transverse feeding means of the table and on the transverse feeding to the next transverse folding mechanism by the delivery feeding means. The sheets to be delivered according to the parallel folding method must be fed over the transverse feed rollers which easily put the sheets to be delivered out of adjustment. Apart from this, the transverse feeding, provided in the known arrangement, by two conical rollers engaging at one edge of the sheet and only at the very limited front part of this edge together with pressing of the sheets by balls, is scarcely reliable. Interference by the delivery feeding bands still takes place.

The principal object of this invention is to overcome these disadvantages and to this end according to the invention, the feeding means serving for delivering the sheets are arranged raisable and lowerable between the usual transverse feeding rollers cooperating with inclined running pressure rollers, brush wheels or the like which are adjustable and bear from above such that its feeding plane can be lowered beneath the feeding plane of the transverse feeding means or can be elevated above the latter. For this purpose, for example, the feeding-band rollers

can be arranged on a common lever system so that they form a complete delivery table. If the bands lie between long angular feeding rollers then their feeding direction will, owing to the space proportions, have to be approximately at right angles to the roller feeding direction. If now, the delivery apparatus is to coincide approximately with the ejection direction of the folding rollers, then the circumferential forces of the angular feeding rollers will have no, or only small, components in the direction of the guide ruler along which the sheet position is guided during the angular feeding. These components therefore result from the pressure means which press the material to be folded on the feeding rollers more or less strongly according to their adjustment; these rollers or the like must thus be arranged inclined to the feeding roller axes. If, however, instead of the angular feeding rollers, only short stub-rollers or rolls are provided, the bands can lead straight out and the intermediately lying feed rollers can, nevertheless, feed in an inclined direction. If the machine is to be changed from angular feeding to delivery, then the guide ruler with the pressure means for the angular feeding rollers must first be brought out of range of the delivery path. This can, if desired, be effected at the same time as the raising of the delivery table; the ruler with the pressure means secured thereon must then be secured to parts of the delivery table instead of to the angular feeding table. For the purposes of the change, it is, moreover, necessary for the bands, if they have been stationary during the angular feeding, to be set in motion either quickly, slowly, continuously or intermittently according to the type of delivery desired. On starting delivery, the angular feeding rollers therefore can be put out of operation. However this is not necessary if the delivery table, during the working, lies in a different plane from the angular feeding table. On the other hand, on stopping, the table not being used at the time, it is not necessary that the tables should lie in two different planes, i. e. be raised or lowered; for the stationary feeding members do not smear the sheets in contradistinction to the known bands or the like rotating at right angles to the sheet feeding.

The arrangement according to the invention allows also of using a delivery mechanism and an angular feeding table at the same time adjacent one another, that is to say, delivering the sheets simultaneously according to a parallel folding method and feeding them to a transverse

folding mechanism. This is of importance where sheets are cut according to the parallel folding method and one half of the cut sheets are to be folded transversely and the other half are to remain folded only in a parallel manner. For this purpose, the sheet delivery arrangement may be so arranged that only a certain number of the bands can be raised the remainder remaining lowered beneath the feeding level of the feeding table and the guide ruler only extending over half of the angular feeding table.

In order that the invention may be fully understood, I will now describe one embodiment thereof, by way of example, by reference to the accompanying drawing, in which:—

Fig. 1 is an elevation,

Fig. 2 is a plan view of feeding mechanism embodying the invention showing the arrangement for angular feeding, and

Fig. 3 is a view corresponding to that of Fig. 1, but drawn to a larger scale of the sheet delivery arrangement according to the invention, in the operating position.

Referring to the drawing, 1 indicates the feeding table of a folding machine in the form of an inclined roller table with a laterally arranged registering ruler 2 which guide the sheets to a parallel folding system consisting of rollers 3 and fold plates 4 and deflecting members or change-over guides 5. The parallel folded sheets pass between feeding rollers 6 on the axis of which, if desired, there may be arranged longitudinal cutting tools. The sheets then pass over a guide plate 8 and a feeding roller 9 with pressure rollers 10 onto an angular feeding table consisting of rollers 12 carried in a frame 11 which rollers are driven together in the same direction and feed the parallel folded sheets along an adjustable guide ruler 13 to a transverse folding mechanism 14.

The rollers 12 are connected to the main drive means of the device by a constantly rotating clutch member 47 carried on a drive shaft 39. The member 47 is slidable on said shaft for a driving engagement with a clutch member 42 freely rotatable on said shaft. Member 42 has a hub 40 mounting a sprocket 41 carrying a chain or belt 43. The near roller 12 carries a pinion 45 and a sprocket 44 on the shaft thereof. The chain or belt 43 engages said sprocket 44 to drive said near roller 12. A suitable gear train 46 connects said near roller 12 with the remaining rollers 12 to drive all of the same in the same direction.

The inclined drive of the sheets against the guide ruler which is necessary for registering the sheets at the ruler is produced by inclined rollers or brush wheels 15 which press the sheets onto the feeding rollers 12. The rollers or brush wheels 15 are carried in a known manner in carriers 16 adjustably secured to the guide ruler 13 and are arranged adjustable as regards the inclined position of their axes with respect to the axes of the feeding rollers in order that their inclined drive can be adjusted in accordance with the quality of the paper being worked. Such an arrangement is shown and described in my prior Patent No. 1,898,794, dated February 21, 1933.

Between the feeding rollers 12 of the angular feeding table are arranged feeding bands 17 which run perpendicularly to the guide ruler 13 that is to say in the direction of ejection of the parallel folded sheets. These bands are guided over rollers 18, 19 which are carried at the free ends of arms 20, 21, which are pivotally con-

nected in pairs by a rod 22. The arms 20 are arranged on a common shaft 23 and the arms 21 on a shaft 24 which latter is provided with an adjusting lever 25 with a pin for adjusting the arms 20, 21 and consequently the feeding bands 17. Each roller 19 is provided with a pinion wheel 26 which can be brought into engagement with a corresponding pinion wheel 27 mounted on a shaft 28 and can be geared down from the drive of the folding machine in any suitable way, either with a uniform speed as, for example, by means of a change speed gear mechanism, or with an intermittent drive by means of a pawl and ratchet device. This is not fully shown in the drawing as it is known.

On adjusting the machine for transverse folding, which is illustrated in Figs. 1 and 2, the lever system 20, 21, 22 with the rollers 18, 19 and the bands 17 is so adjusted that the feeding level of the bands 17 lies underneath the feeding level of the roller table 11, 12. The sheets ejected by the rollers 9, 10 onto the angular feeding table are delivered to the feeding rollers 12 and now arrive beneath the inclined rollers or brush wheels 15. By the co-operation of the feeding rollers 12 and the inclined rollers or brush wheels 15, the sheets are fed along a guide ruler 13 to the transverse folding mechanism 14. The bands 17 do not contact with the sheets and are stationary.

If the parallel folded sheets are to be delivered, then the guide ruler with the inclined rollers or brush wheels 15 is taken off and the lever system 20, 21, 22, with the rollers 18, 19 and the bands 17, is brought into the position illustrated, by Fig. 3, in which the pinion wheels 26, are connected with the rollers 19, and are brought into engagement with the driving pinions 27 and the feeding level of the bands 17 is elevated above the feeding level of the feeding rollers 12. The parallel folded sheets ejected by the rollers 9, 10 now arrive directly on the delivery bands 17 and are fed by them to a pile plate 29 secured to the machine frame.

With an inclined arrangement of the feeding rollers 12, freely mounted pressure balls can be used for pressing the sheets on to the feeding rollers, instead of the inclined pressure rollers or brush wheels illustrated.

I claim:—

1. Sheet delivery apparatus for transverse feeding tables of folding machines, said folding machine including means for delivering sheets in one direction to said transverse feeding table, rolls on said table for moving said sheets transversely of said direction of delivery, means for driving said rolls, means on said table movable in said delivery direction, said last means normally being maintained in an inoperative position below the plane of the top surface of said rolls, means for raising said last means to an operative position above the plane of the top surface of said rolls, and means for driving said raised means to deliver sheets from said table in a direction corresponding substantially to said direction of delivery.

2. Sheet delivery apparatus for transverse feeding tables of folding machines, said folding machine including means for delivering sheets in one direction to said transverse feeding table, rolls on said table for moving said sheets transversely of said direction of delivery, means for driving said rolls, means on said table movable in said delivery direction, said last means normally being maintained in an inoperative position below the plane of the top surface of said

rolls, means for raising said last means to an operative position above the plane of the top surface of said rolls, and means for driving said raised means to deliver sheets from said table in a direction corresponding substantially to said direction of delivery, said last named driving means being operative only when said means are raised to said operative position.

3. Sheet delivery apparatus for transverse feeding tables of folding machines, said folding machine including means for delivering sheets in one direction to said transverse feeding table, rolls on said table for moving said sheets transversely of said direction of delivery, means for driving said rolls, means on said table movable in said delivery direction, said last means normally being maintained in an inoperative position below the plane of the top surface of said rolls, means for raising said last means to an operative position above the plane of the top surface of said rolls, means for driving said raised means to deliver sheets from said table in a direction corresponding substantially to said

direction of delivery, and means for disengaging said rolls from said driving means therefor.

4. Sheet delivery apparatus for transverse feeding tables of folding machines, said folding machine including means for delivering sheets in one direction to said transverse feeding table, rolls on said table for moving said sheets transversely of said direction of delivery, means for driving said rolls, means on said table movable in said delivery direction, said last means normally being maintained in an inoperative position below the plane of the top surface of said rolls, means for raising said last means to an operative position above the plane of the top surface of said rolls, means for driving said raised means to deliver sheets from said table in a direction corresponding substantially to said direction of delivery, means for disengaging said last named driving means from said raisable means when the latter are lowered to the inoperative position, and means for disengaging said rolls from said driving means therefor.

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