Nov. 3, 1942. G. A. MARTIN 2,300,625

SHEET FEEDING APPARATUS

Filed July 29, 1941 2 Sheets-Sheet 1

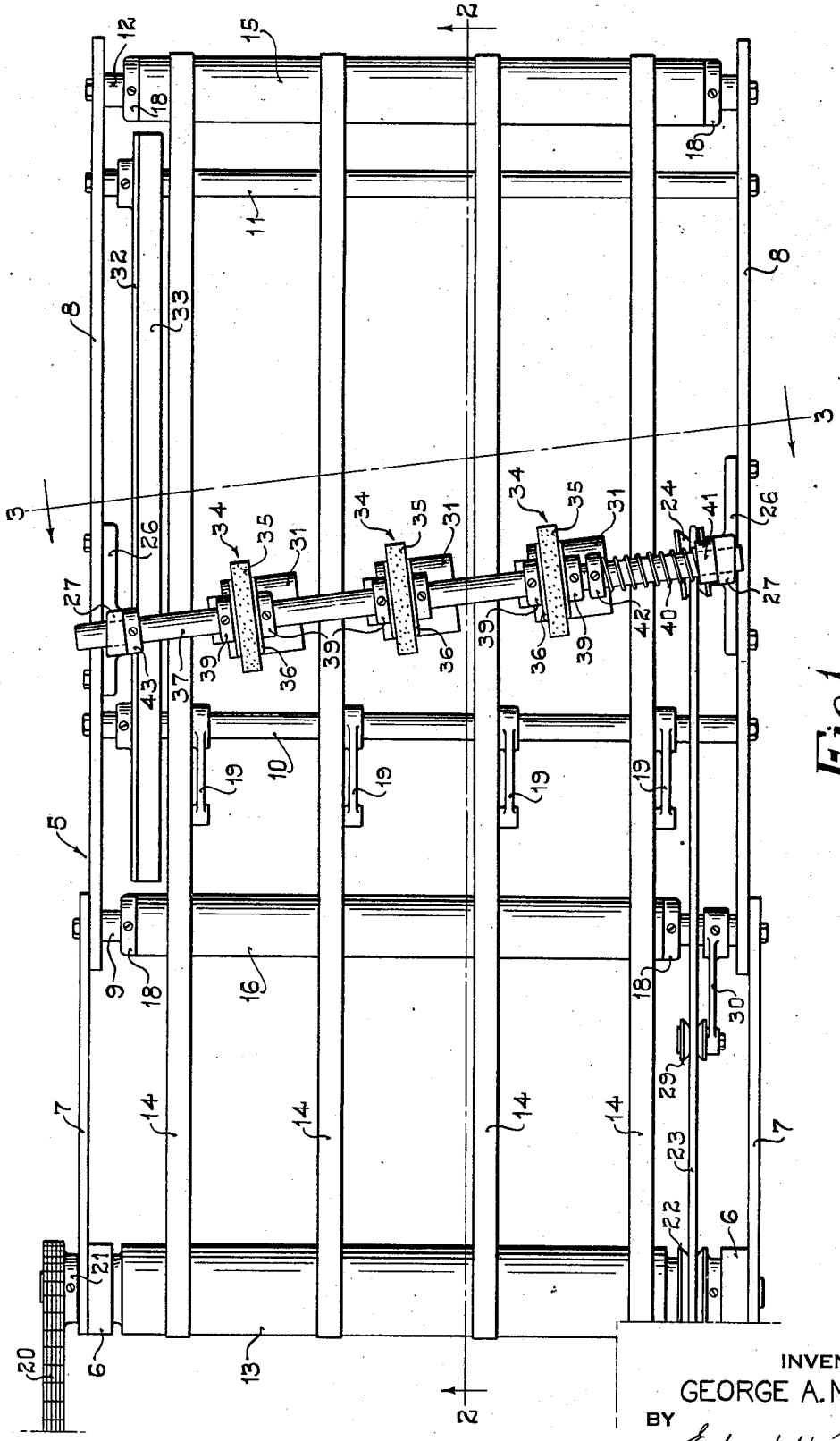


Fig. 1

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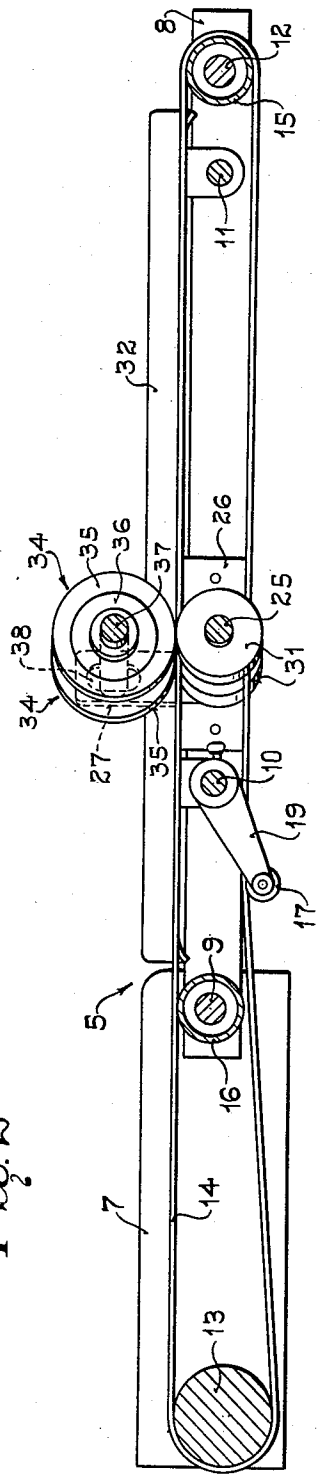


Fig. 2

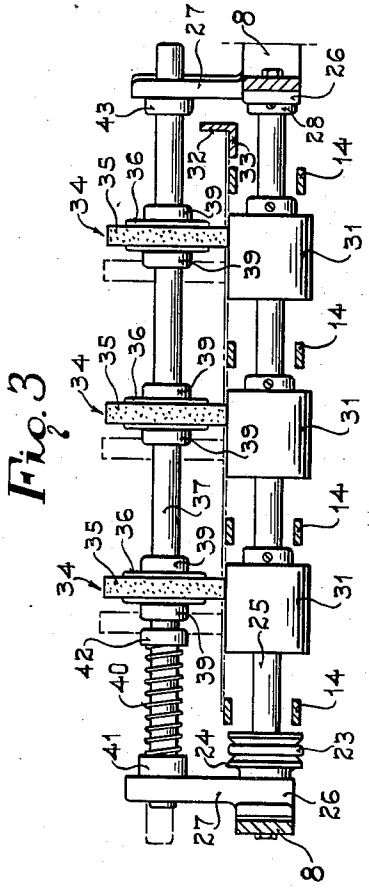


Fig. 3

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SHEET FEEDING APPARATUS

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Application July 29, 1941, Serial No. 404,534

12 Claims. (Cl. 271—49)

This invention relates to sheet feeders and more particularly to mechanism for feeding paper, cardboard, metal or other sheets from a supply thereof and side registering the sheets with respect to a printing press, coating machine, slitting machine or other instrumentality acting on such sheets.

One object of the present invention is to provide an improved mechanism for side registering paper, cardboard, metal or other sheets without interrupting the forward movement of the sheets.

Another object of the present invention is to provide a conveyor having a diagonally disposed driven roller or rollers and pressure rollers cooperating therewith for moving paper, cardboard, metal or other sheets laterally into engagement with a side guide to register the sheets, said pressure rollers through novel arrangement thereof yielding axially in a direction away from the side guide upon engagement of a sheet therewith, thus avoiding excess crowding of the sheet against the side guide which would result in buckling of the sheet or bending of the side edge thereof at the side guide.

Another object of the present invention is to provide a conveyor having a diagonally disposed driven roller or rollers and pressure rollers cooperating therewith for moving paper, cardboard, metal or other sheets laterally into engagement with a side guide to register the sheets, said pressure rollers through novel arrangement thereof yielding axially in a direction away from the side guide upon engagement of a sheet therewith, thus eliminating slipping or skidding of said pressure rollers on the sheet which would result in marking or scratching of the upper surface thereof.

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

In said drawings:

Fig. 1 is a top plan view of a conveyor and side registering mechanism embodying the present invention;

Fig. 2 is a vertical longitudinal sectional view on the line 2—2 of Fig. 1; and

Fig. 3 is a transverse vertical sectional view on the line 3—3 of Fig. 1.

Referring to the drawings, wherein like reference characters designate like parts throughout the several views, 5 indicates broadly a conveyor onto which paper, cardboard, metal or other sheets are delivered from a supply of such sheets by a sheet feeder (not shown) and advanced by said conveyor toward a printing press, coating machine, slitting machine or other instrumentality associated therewith, the conveyor being provided, in accordance with the present invention, with improved mechanism for side registering the sheets during movement imparted thereto by the conveyor. Said conveyor and side registering mechanism are preferably mounted, constructed and operated as follows.

Bolted or otherwise suitably secured to the front uprights 6 of the sheet feeder frame are side plates 7 which, in turn, have bolted or otherwise suitably secured thereto and extending forwardly thereof side members 8. The side plates 7 and the side members 8 constitute the frame of the conveyor and are connected together by stay shafts 9, 10, 11 and 12 bolted or otherwise suitably secured thereto. Journalled in suitable bearings formed in the front uprights 6 and the side plates 7 is a transversely extending feed roller 13 around which passes a plurality of tapes 14. The front portions of the tapes 14 pass around a tape roller 15, and said tapes also travel over a second tape roller 16 and suitable tape tightening rollers 17. The tape rollers 15 and 16 are journalled on the stay shafts 12 and 9, respectively, and endwise displacement of the rollers on their respective shafts is prevented by collars 18 which are secured to said shafts at opposite ends of said rollers. The tape tightening rollers 17 are journalled on arms 19 which are adjustably secured to the stay shaft 10. The feed roller 13 and the tapes 14 passing around said roller are driven from any suitable source of power by a chain 20 connected therewith and passing around a sprocket 21 which is fixed on the outwardly projecting end of said roller.

Each sheet delivered on the conveyor 5 and advanced thereby toward the machine associated therewith is moved laterally on said conveyor to side register the sheet with respect to said machine. In accordance with the present invention this side registration is effected by improved diagonally disposed means and without interrupting the forward travel of the sheets on the conveyor, and said means is preferably mounted, constructed and operated as follows.

Fixed on one end of the feed roller 13 interiorly of the adjacent front upright 6 and rotated by said feed roller is a pulley 22 around which passes a belt 23 driven by said pulley and also passing around and driving a pulley 24. This pulley 24 is fixed on and drives a shaft 25 which extends transversely of the conveyor and is disposed

diagonally of the tapes 14 and beneath the upper reaches thereof. The shaft 25 is journalled at opposite ends thereof in suitable bearings formed in brackets 26 which are bolted or otherwise suitably secured to the inner sides of the side members 8 and provided with upwardly extending portions 27 for purposes hereinafter described. Endwise displacement or movement of the diagonally disposed shaft 25 is prevented in one direction by the pulley 24 and in the opposite direction by a collar 28 which is secured to said shaft on the end thereof opposite that carrying said pulley. The belt 23 also passes over a belt tightening roller 29 journalled on an arm 30 which is adjustably secured to the stay shaft 9.

Secured to the diagonally disposed driven shaft 25 in spaced relation thereon and projecting upwardly between the tapes 14 in approximately the same plane as the upper reaches thereof are a plurality of rollers 31 which act to move each sheet advanced by the tapes 14 into engagement therewith laterally to side registry position into engagement with a side guide 32. The side guide 32 extends along the conveyor 5 at one side thereof and parallel with the tapes 14 and is provided with a laterally extending plate 33 for supporting the margins of the sheets during movement of the same along said guide. The side guide 32 is secured to and adjustable along the stay shafts 10 and 11.

Cooperating with the diagonally disposed driven rollers 31 to assist said rollers in moving the sheets laterally to side registry position are a plurality of co-axially spaced pressure rollers indicated broadly at 34 and each preferably comprised by a rubber sheet engaging ring 35 engaged over a metal center or holder 36. The pressure rollers 34 are adapted to yield axially in a direction away from the side guide 32 upon engagement of the side edge of a sheet with said side guide, thereby avoiding excess crowding of the sheet against the side guide which would cause said sheet to buckle or the side edge portion thereof to bend and ride up on the vertical face of said guide. Further, due to the axial yielding action of the pressure rollers 34, slipping or skidding of said rollers on the registered sheet is overcome with the result that marking or scratching of the upper surface of the sheet is eliminated and that wearing of the rubber rings 35 is reduced to a minimum. The pressure rollers 34 may be mounted in any suitable manner to accomplish this result but, as herein shown, said rollers are preferably rotatably mounted on a shaft 37 which extends transversely of the conveyor and is disposed diagonally of the tapes 14 above the same and in vertical alignment with the shaft 25. This shaft 37 is preferably guided for axial movement in elongated slots 38 formed in the extensions 27 of the brackets 26 to permit the pressure rollers 34 to float and rest by gravity on the driven rollers 31 for rotation thereby. The pressure rollers 34 are held in position on the shaft 37 by collars 39 which are disposed on opposite sides of said rollers and secured to said shaft.

Engaged over the shaft 37 on the end thereof opposite to the side guide 32 is an expansion spring 40 one end of which bears against a bushing 41 that is loosely carried by said shaft and bears against the inner side of the extension 27 of the adjacent bracket 26. The opposite end of the spring 40 bears against a collar 42 which is adjustably secured to the shaft 37. The spring 40 normally tends to move the shaft 37 and the pressure rollers 34 thereon axially toward the side guide 32, said movement being limited by a stop collar 43 which is adjustably secured to said shaft on the end thereof adjacent said side guide and adapted to engage the extension 27 of the adjacent bracket 26. The stop collar 43 is so adjusted that the pressure rollers 34 are normally disposed in the full line positions thereof shown in Figs. 1 and 3. The tension of the spring 40 may be regulated by loosening the collar 42 and moving it toward or away from the bushing 41, thereby regulating the axial yielding action of the pressure rollers 34 to suit various grades and kinds of sheet material.

It will thus appear that as each sheet is fed forwardly along the conveyor 5 by the tapes 14, the front edge portion of the sheet will progressively enter into the bite of the transversely spaced diagonally disposed rotating rollers 31 and 34. Upon continued rotation of the rollers 31 and 34 and due to the angular arrangement of said rollers, the sheet will be moved forwardly and laterally thereby until the side edge of the sheet engages the side guide 32. Upon engagement of the side edge of the sheet with the side guide 32, and under further thrust of said sheet against said guide by continued rotation of the rollers 31 and 34, the pressure rollers 34 are caused to move sidewise or yield axially in a direction away from the side guide 32 and against the tension of the spring 40 as shown in dotted lines in Fig. 3. Under these conditions excess crowding of the sheet against the side guide 32 is avoided, marking or scratching of the upper surface of the sheet by the pressure rollers 34 is eliminated, and wearing of the rubber rings 35 is reduced to a minimum. Engagement of the side edge of the sheet with the sheet guide 32 will be maintained by the rollers 31 and 34 during the remaining portion of the forward travel of the sheet, thus straightening and properly positioning the sheet for delivery from the conveyor to the machine associated therewith. Upon forward movement of the straightened and registered sheet out of engagement with the rollers 31 and 34, the latter rollers are returned by the expanding action of the spring 40 to their original full line positions shown in Figs. 1 and 3 determined by the stop collar 43 in readiness to act on the next sheet.

While the present invention has been described in connection with a sheet feeder, it will be readily apparent that it is equally adaptable to any situation where it is desired to straighten and side register sheets of material while they are being conveyed toward a machine or instrumentality for further action thereon.

It is therefore to be expressly understood that the present invention is not limited to the embodiment thereof herein illustrated and described or otherwise than by the terms of the appended claims.

What I claim is:

1. In a side registering mechanism having a side guide: driven means arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; rotatable pressure means arranged above and cooperating with said driven means; and means mounting said pressure means for yielding movement bodily in an axial direction away from the side guide upon engagement of the sheet with the side guide.

2. In a side registering mechanism having a

side guide: driven rotatable means arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; diagonally arranged rotatable pressure means disposed above and cooperating with said driven means; and means mounting said pressure means for axial yielding movement bodily in a direction away from the side guide upon engagement of the sheet with the side guide.

3. In a side registering mechanism having a side guide: driven rotatable means arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; a plurality of transversely spaced diagonally arranged pressure rollers disposed above and cooperating with said driven rotatable means; and means mounting said pressure rollers for axial yielding movement bodily in a direction away from the side guide upon engagement of the sheet with the side guide.

4. In a side registering mechanism having a side guide: driven rotatable means arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; a plurality of transversely spaced diagonally arranged pressure rollers disposed above and cooperating with said driven rotatable means; and means mounting said pressure rollers for axial yielding movement bodily and as a unit in a direction away from the side guide upon engagement of the sheet with the side guide.

5. In a side registering mechanism having a side guide: driven rotatable means arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; a plurality of transversely spaced diagonally arranged pressure rollers disposed above and cooperating with said driven rotatable means; and means mounting said pressure rollers for independent rotation and for axial yielding movement bodily in a direction away from the side guide upon engagement of the sheet with the side guide.

6. In a side registering mechanism having a side guide: driven rotatable means arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; a plurality of transversely spaced diagonally arranged pressure rollers disposed above and cooperating with said driven rotatable means; and means mounting said pressure rollers for independent rotation and for axial yielding movement bodily and as a unit in a direction away from the side guide upon engagement of the sheet with the side guide.

7. In a side registering mechanism having a side guide: a driven roller arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; a diagonally arranged pressure roller disposed above and cooperating with said driven roller; and means mounting one of said rollers for axial yielding movement bodily in a direction away from the side guide upon engagement of the sheet with the side guide.

8. In a side registering mechanism having a side guide: a plurality of co-axially spaced driven rollers arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; a plurality of co-axially spaced diagonally arranged pressure rollers disposed above and cooperating with said driven rollers; and means mounting said pressure rollers for axial yielding movement bodily in a direction away from the side guide upon engagement of the sheet with the side guide.

9. In a side registering mechanism having a side guide: a plurality of co-axially spaced driven rollers arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; a plurality of co-axially spaced diagonally arranged pressure rollers disposed above and cooperating with said driven rollers; and means mounting said pressure rollers for axial yielding movement bodily and as a unit in a direction away from the side guide upon engagement of the sheet with the side guide.

10. In a side registering mechanism having a side guide: a plurality of co-axially spaced driven rollers arranged diagonally of said side guide for moving a sheet laterally into engagement therewith; a plurality of coaxially spaced diagonally arranged pressure rollers disposed above and cooperating with said driven rollers; and means mounting said pressure rollers for independent rotation and for axial yielding movement bodily and as a unit in a direction away from the side guide upon engagement of the sheet with the side guide.

11. The combination with a conveyor for advancing sheets and comprising a series of laterally spaced driven tapes, and a registering device arranged adjacent one side of said conveyor and extending longitudinally of the same: of means for moving a sheet laterally against the registering device while the sheet is being advanced by the conveyor, said means comprising a plurality of driven rollers disposed diagonally across the conveyor in spaced relation and each located between a pair of said tapes with the upper portion thereof disposed substantially in the plane of the sheet supporting surfaces of the tapes, and a plurality of diagonally disposed axially yieldable pressure rollers cooperating with said driven rollers to move the advancing sheet sidewise into engagement with the registering device and thereafter yield axially in a direction away from said registering device.

12. The combination with a conveyor for advancing sheets and comprising a series of laterally spaced driven tapes, and a registering device arranged adjacent one side of said conveyor and extending longitudinally of the same: of means for moving a sheet laterally against the registering device while the sheet is being advanced by the conveyor, said means comprising a plurality of rollers disposed diagonally across the conveyor in spaced relation and each located between a pair of said tapes with the upper portion thereof disposed substantially in the plane of the sheet supporting surfaces of the tapes, a driven shaft held against axial movement on which said rollers are mounted for rotation thereby, a plurality of diagonally disposed pressure rollers arranged above the conveyor and cooperating with said first named rollers to move the advancing sheet sidewise into engagement with the registering device, a shaft guided for axial movement on which said pressure rollers are rotatably mounted in spaced relation, and a spring normally urging said last named shaft and pressure rollers thereon toward the registering device and permitting movement thereof axially away from said registering device upon engagement of the sheet with the latter.

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