Oct. 18, 1949. R. E. J. NORDQUIST ET AL 2,484,845

SHEET TREATING MACHINE

Filed May 24, 1945 2 Sheets-Sheet 1

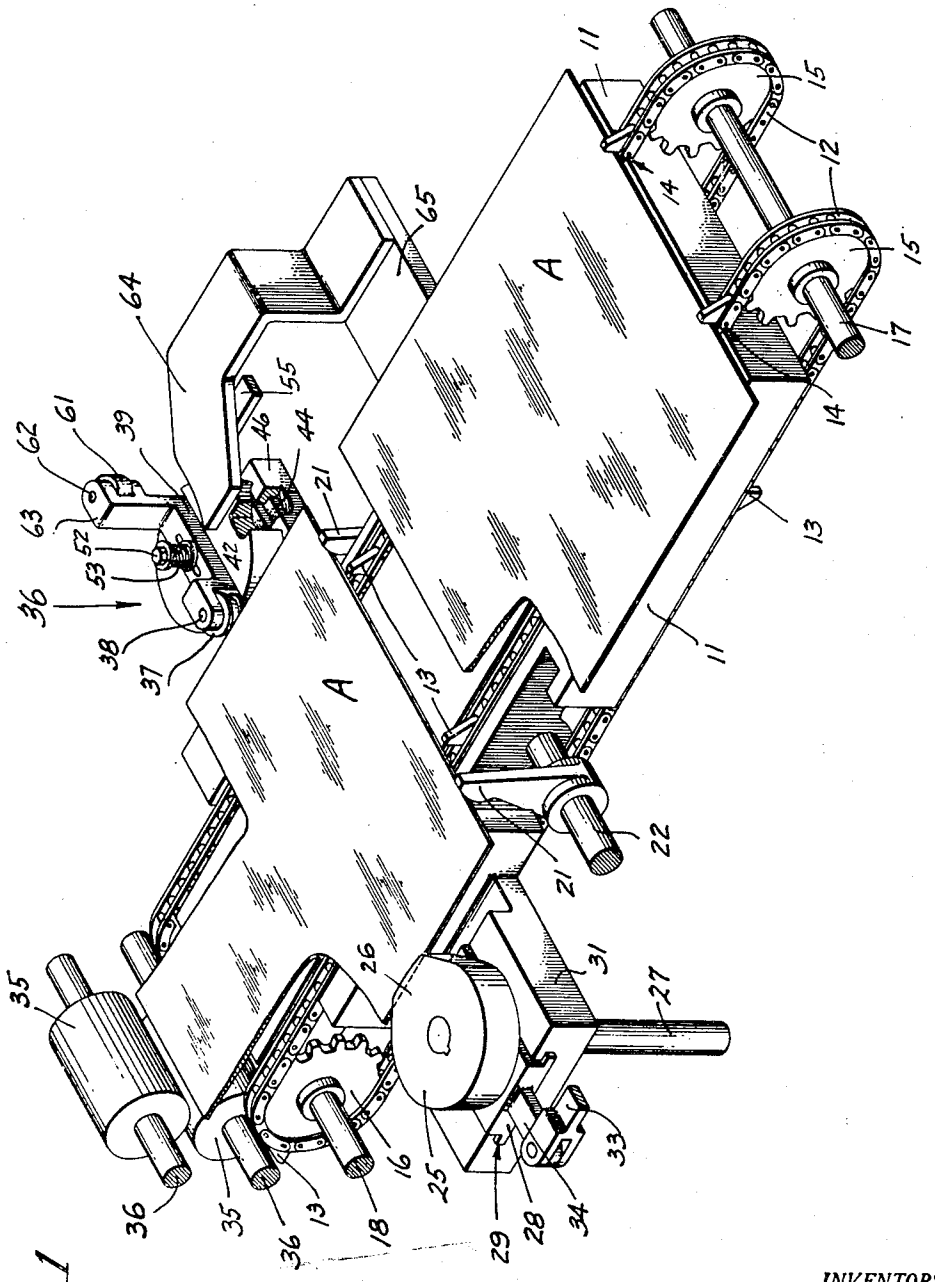


FIG. 1

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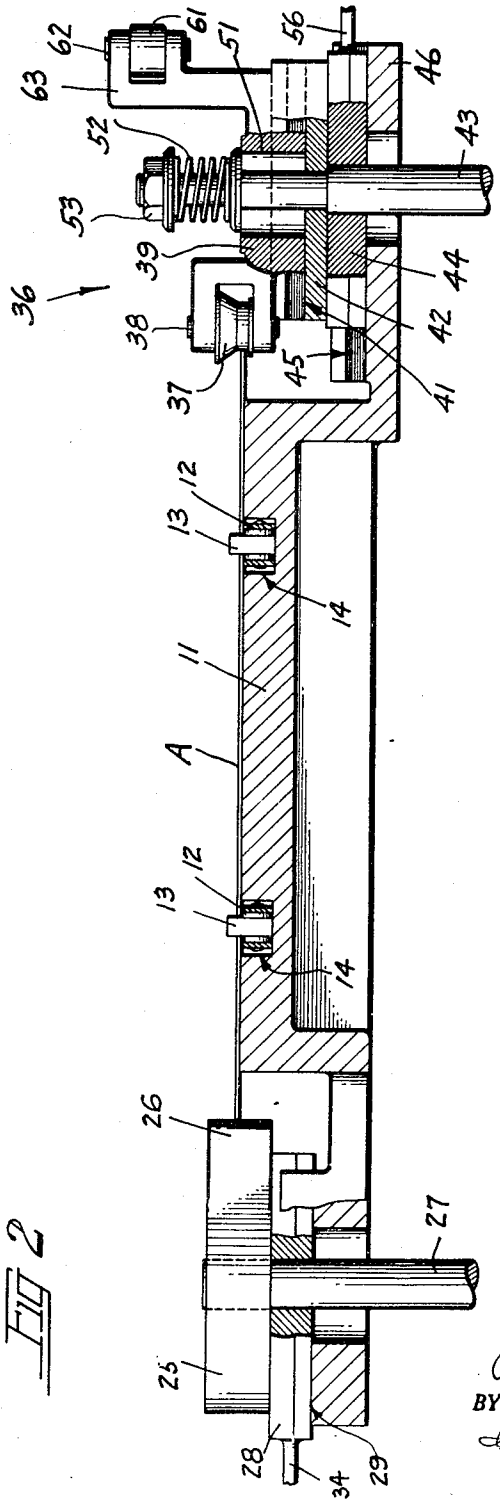


Fig 2

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SHEET TREATING MACHINE

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10 Claims. (Cl. 271—59)

1

The present invention relates to sheet gauging apparatus for machines in which sheet material is required to be located in a predetermined position for further treatment and has particular reference to rotary gauge devices for locating the sheets in proper position.

An object of the invention is the provision of gauging devices which rotate relative to the path of travel of the sheets so that the sheets will be gauged rapidly as they pass the gauging devices so as to facilitate high speed feeding and gauging of the sheets.

Another object is the provision of such gauging devices wherein the rotation of the devices is timed with the travel of the sheets so that the gauging of a plurality of sheets moving in a procession will be effected at a predetermined point on the edges of all sheets alike.

Another object is the provision of such rotating gauging devices wherein one of the devices is a positive gauge and the other a yieldable stop having a reset feature for returning the yieldable stop to gauging position for a subsequent sheet after performing a gauging operation on another or preceding sheet.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a perspective view of a sheet gauging apparatus embodying the instant invention, with parts broken away; and

Fig. 2 is an enlarged transverse section taken substantially along a plane extending through the gauging elements, with parts broken away.

As a preferred embodiment of the instant invention the drawings illustrate principal parts of a feeding mechanism including gauging apparatus for advancing and gauging sheets A of tin plate or the like sheet material into a sheet treating machine such as a printing machine, scroll shear, slitter or other machine used for preparing or converting the sheets into container or can parts.

The sheets A are advanced along a straight line path of travel across a feed table 11 by a pair of spaced and parallel endless chain conveyors 12 having feed dogs 13 secured thereto at spaced intervals along their lengths for engaging the rear transverse edge of the sheets A to propel the sheets continuously across the table. These chains travel through longitudinal grooves 14 formed in the top of the table. The chains operate over and are driven by pairs of spaced sprockets 15, 16 which are mounted on continuously rotating shafts 17, 18 disposed at the feed-in and the discharge ends respectively of the table. The shafts are rotated in any suitable manner.

2

The conveyors 12 are utilized to feed the sheet A to a place or station immediately adjacent the subsequent operation machine and at this station and while the sheets are continuously moving forward, they are gauged for proper location and alignment and are immediately advanced into the subsequent operation machine while so gauged. The sheets are first shifted away from and clear of the conveyor feed dogs 13 into a squared-up position relative to the rear or feeding edge of the sheets and then they are gauged laterally along one side edge to properly locate and align the sheets in a predetermined position before advancing into the subsequent operation machine.

With the instant gauging devices this gauging and squaring of the sheets is effected rapidly, almost momentarily, and while the sheets are traveling forward over a short distance. Such a distance will be less than two inches, including the feeding of the gauged sheets into the subsequent operation machine. These devices thus are well adapted to high speed feeding operations.

Squaring of the sheets A along their rear or feeding edges is brought about by a pair of squaring-up fingers or back gauges 21 disposed in the path of travel of the sheets. These fingers are mounted in spaced relation adjacent the conveyor chains 12, on a continously rotating cross shaft 22 which is journaled in bearings formed in the table 11. This finger shaft is rotated in any suitable manner in time with the conveyors 12 and this rotates the fingers through a circular path of travel concentric with the shaft.

Hence as a pair of feed dogs 13 of the conveyors 12 moves adjacent the squaring-up fingers 21, while advancing a sheet A across the table 11, the outer ends of the fingers travel up behind the moving sheet and engage against its rear edge. This engagement of the fingers with the sheet shifts it forwardly away from and in advance of the moving feed dogs so that the sheet is engaged only by the fingers. It is this action against the rear edge of the sheet that brings the sheet into a squared position, the two fingers serving as contact or squaring points.

With the sheet in this slightly advanced position relative to the feed dogs 13 and while it is being momentarily propelled by the squaring-up fingers 21, it is gauged laterally to complete the

proper location of the sheet for advancement into the subsequent operation machine as hereinbefore mentioned. This side gauging of the sheet is effected at a point along one edge which is a predetermined distance in advance of the rear edge of the sheet so that all sheets will be gauged alike irrespective of the length of the sheets and so that this point may be used for subsequent gauging in other machines if necessary.

This side gauging of the sheet A is brought about by a continuously rotating gauge member 25 which is disposed adjacent one side of the path of travel of the sheet across the table 11. The gauge member preferably is substantially cylindrical in shape and is formed with a rounded gauging lug or element 26 which projects from the periphery of the gauging member. This gauging member is secured to the upper end of a vertical shaft 27 journaled in a transverse slide 28 movable toward and away from the sheet A and carried in a slideway 29 formed in a bracket projection 31 formed on the table 11.

The gauge member shaft 27 is rotated rapidly in any suitable manner in time with the rotation of the squaring-up fingers 21 so that the side gauging of the sheet may be effected rapidly while the sheet is advancing in its engagement with the fingers. Once for every sheet on the conveyors 12, the rotating gauge member 25 is shifted by way of the slide 28 from a normal retracted position away from the path of travel of the sheets into a gauging position adjacent the path of travel of the sheets. This movement of the slide is effected preferably by an arm 33 having pivotal connection with a lug 34 formed on the outer end of the slide. The arm is actuated in any suitable manner in time with the travel of the conveyors 12.

Hence as soon as a sheet A is engaged by the squaring-up fingers 21 and is shifted forward into a squared-up position, the slide 28 immediately moves inwardly toward the side edge of the sheet and brings the rotating gauge member 25 into gauging position adjacent the sheet. The gauging element 26 on the rotating gauge member immediately and momentarily engages against the side edge of the sheet at the predetermined point forward of its rear edge as hereinbefore mentioned. This thereby pushes the sheet laterally into a predetermined position.

It will be observed that there is existant at this moment a three-point gauging set-up which includes the side gauging element 26 and the two back gauging or squaring-up fingers 21. It is while the sheet A is in this gauged position, that it is carried forward by the squaring-up fingers 21 into the subsequent operation machine. A pair of continuously rotating feed rollers 35 mounted on cross shafts 36 disposed adjacent the discharge end of the gauging apparatus is shown by way of example for receiving the gauged sheets and for feeding them into the subsequent operation machine.

Immediately following this gauging operation, and as the gauging element 26 rotates away from the sheet, leaving the sheet in its gauged position, the slide 28 shifts away from the sheet to bodily return the rotating gauge member 25 to its laterally retracted position clear of the sheet so that the gauging element 26 will not again engage that particular gauged sheet.

In order to control the lateral movement of the sheet during the gauging operation so that the inertia of the sheet will be checked against carrying it away from the gauge element 25, provision is made for yieldably holding the sheet against the gauge element during the gauging operation. For this purpose there is provided a yieldable stop device 36 disposed adjacent the path of travel of the sheet along the sheet side edge opposite the gauge member 25.

The gauge device 36 includes a stop roller or element 37 having its outer periphery disposed in alignment with the side edge of the moving sheet A on the conveyors 12. This roller is mounted on a pin 38 carried in lugs formed in a slide bar 39 slidably disposed in a transverse slideway 41 in a rotatable stop member 42. The stop member is mounted on the upper end of a shouldered vertical shaft 43 which is journaled in a transverse stop slide 44 movable toward and away from the sheet A and carried in a slideway 45 formed in a bracket projection 46 extending out from the table 11. This construction is similar to that described for the gauge member 25.

The vertical shaft 43 extends up through a clearance slot 51 formed in the slide bar 39 and is surrounded with a compression spring 52 interposed between the top of the slide bar and a retainer nut 53 threadedly secured to the end of the shaft. The spring frictionally and yieldably holds the slide bar 39 in place in its slideway 41 in the rotatable stop member 42. The shaft 43 and the stop member 42 mounted thereon are rotated in any suitable manner in time with and at the same speed as the gauge member 25 for cooperative action with the gauge member.

The stop member slide 44 is shifted inwardly toward the sheet from a normally retracted position away from the sheet, by an arm 55 which is similar to the arm 33. The arm 55 has a pivotal connection with a lug 56 formed on the outer end of the slide, and is actuated in any suitable manner in time with the arm 33.

Hence when the rotating gauging member 25 moves inwardly toward one edge of the sheet to effect the gauging of the sheet, the rotating stop member 42 also moves inwardly toward the opposite edge of the sheet and thus brings the stop roller 37 into engagement with the sheet simultaneously with the gauging element 26. The pressure of the gauge element 26 against the edge of the sheet pushes the sheet laterally against the resistance of the spring held slide bar 39 and thus the sheet is maintained in full engagement with the gauge element during the momentary gauging operation.

As a result of this sheet gauging operation the stop roller slide bar 39 is pushed outwardly in its slideway 41. It remains in the position in which it is left by the laterally moving sheet during the gauging operation so that it will not snap back against the gauged sheet and thereby disturb the gauged sheet position. This is the condition as the stop element 37 rotates away from the sheet with the stop member 42 after the gauging operation. Following the gauging operation the stop slide 44 moves outwardly away from the sheet into normal retracted position.

Provision is made for resetting the stop element slide bar 39 in its original position by pushing it forward in its slideway 41 in the stop member 42 so that it will be in readiness for the next following sheet A on the conveyors 12. This is effected by a cam roller 61 which is mounted on a pin 62 carried in lugs 63 formed on the slide bar 39. This cam roller is disposed on the end of the slide bar opposite the end which carries the stop roller element 37.

As the stop member 42 continues to rotate it brings the cam roller 61 into engagement with a stationary plate cam 64 which is mounted on a bracket projection 65 of the table 11. The cam roller rides along the plate cam 64 which forces the slide bar 39 back into its original position and this completes the cycle of operation of the gauging apparatus.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

We claim:

1. In a sheet gauging apparatus, the combination of means engageable with a rear edge of a sheet for continuously advancing it along a path of travel, a continuously rotatable gauge member located at one side of the path of travel of the sheet and having a radially projecting gauge element thereon for engaging a side edge of the sheet in a predetermined relation to the rear edge for locating the sheet in a gauged position, and means for continuously rotating said gauge member in time with the travel of the sheet.

2. In a sheet gauging apparatus, the combination of means engageable with a rear edge of a sheet for advancing it along a path of travel, a rotary gauge member located at one side of the path of travel of the sheet and having a gauge element thereon for engaging a side edge of the sheet in a predetermined relation to the rear edge for locating the sheet in a gauged position, and means actuated in timed relation to said sheet advancing means for bodily shifting said rotary gauge member into gauging position relative to the side edge of the sheet for the gauging operation.

3. In a sheet gauging apparatus, the combination of means engageable with a rear edge of a sheet for advancing it along a path of travel, a rotatable gauge member located at one side of the path of travel of the sheet and having a laterally projecting gauge element thereon for engaging a side edge of the sheet in a predetermined relation to the rear edge to laterally move the sheet into a gauged position, and means actuated in timed relation to said sheet advancing means for bodily shifting said rotatable gauge member into gauging position relative to the side edge of the sheet.

4. In a sheet gauging apparatus, the combination of feeding means for continuously advancing sheets, a rotatable gauge member for engaging the rear edge of each advancing sheet at spaced localities thereon for propelling the sheet out of engagement with said feeding means, and a rotary gauge member located at one side of the path of travel of the sheets and having a gauge element thereon for engaging a side edge of each sheet in a predetermined relation to its rear edge for locating each sheet in a gauged position.

5. In a sheet gauging apparatus, the combination of means for continuously advancing sheets, a rotatable back gauge for engaging the rear edge of each sheet at two spaced points while the sheet is advanced, a continuously rotatable gauge member located at one side of the path of travel of the sheets and having a gauge element thereon for engaging a side edge of each sheet in a predetermined relation to its rear edge for locating each sheet in a gauged position, means for continuously rotating said gauge member in time with said feeding devices, and means actuated in timed relation to said sheet advancing means for bodily moving said rotatable gauge member into gauging position relative to the side edge of each of said sheets in time with said feeding devices for the gauging operation.

6. In a sheet gauging apparatus, the combination of continuously operating feeding devices for advancing sheets, a pair of continuously rotating back gauges for engaging the rear edge of each moving sheet at two spaced points and for further advancing the sheets independently of said feeding devices, and a rotary gauge member located at one side of the path of travel of the sheets and having a radially projecting gauge element thereon for engaging a side edge of each sheet in a predetermined relation to its rear edge for locating each sheet in a gauged position while advancing with said back gauges.

7. In a sheet gauging apparatus, the combination of means engageable with a rear edge of a sheet for advancing it along a path of travel, a rotary gauge member located at one side of the path of travel of the sheet and having a gauge element thereon for engaging a side edge of the sheet in a predetermined relation to the rear edge for locating the sheet in a gauged position, and a rotary stop member located on an opposite side of the path of travel of the sheet and having a stop element yieldably mounted thereon for engaging said opposite side edge of the sheet in a predetermined relation to the rear edge for holding the sheet against said gauge element during the gauging operation.

8. In a sheet gauging apparatus, the combination of means engageable with a rear edge of a sheet for advancing it along a path of travel, a rotary gauge member located at one side of the path of travel of the sheet and having a gauge element thereon for engaging a side edge of the sheet in a predetermined relation to the rear edge for locating the sheet in a gauged position, means for shifting said gauge member into gauging position relative to the side edge of the sheet in time with the travel of the sheet for the gauging operation, a rotary stop member located on an opposite side of the path of travel of the sheet and having a stop element yieldably mounted thereon for engaging said opposite side edge of the sheet in a predetermined relation to the rear edge for holding the sheet against said gauge element during the gauging operation, and means for shifting said stop member into position relative to said opposite side edge of the sheet in time with the shifting of said gauge member to cooperate in the gauging operation.

9. In a sheet gauging apparatus, the combination of means engageable with a rear edge of a sheet for advancing it along a path of travel, a gauge member located at one side of the path of travel of the sheet for engaging a side edge of the sheet in a predetermined relation to the rear edge for locating the sheet in a gauged position, a rotary stop member located on an opposite side of the path of travel of the sheet, a movable element mounted on said stop member, means acting against said movable element for frictionally and yieldably holding it in position on said stop member, and a stop element carried on said movable element for engaging said opposite side edge of the sheet in a predetermined relation to the rear edge for holding the sheet against said gauge member during the gauging operation.

10. In a sheet gauging apparatus, the combination of means engageable with a rear edge of a sheet for advancing it along a path of travel, a gauge member located at one side of the path of travel of the sheet for engaging a side of the sheet in a predetermined relation to the rear edge for locating the sheet in a gauged position, a rotary stop member located on an opposite side of the path of travel of the sheet, a movable element mounted on said stop member, means acting against said movable element for frictionally and yieldably holding it in position on said stop member, a stop element carried on said movable element for engaging said opposite side edge of the sheet in a predetermined relation to the rear edge for holding the sheet against said gauge member during the gauging operation, and means disposed adjacent said stop member and engageable with the movable element yieldably carried thereon for resetting said movable element in its original position relative to said stop member after a gauging operation.

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