April 6, 1954 G. A. GIBSON, JR 2,674,456

CONVEYING AND REGISTERING MECHANISM

Filed July 29, 1950

3 Sheets-Sheet 1

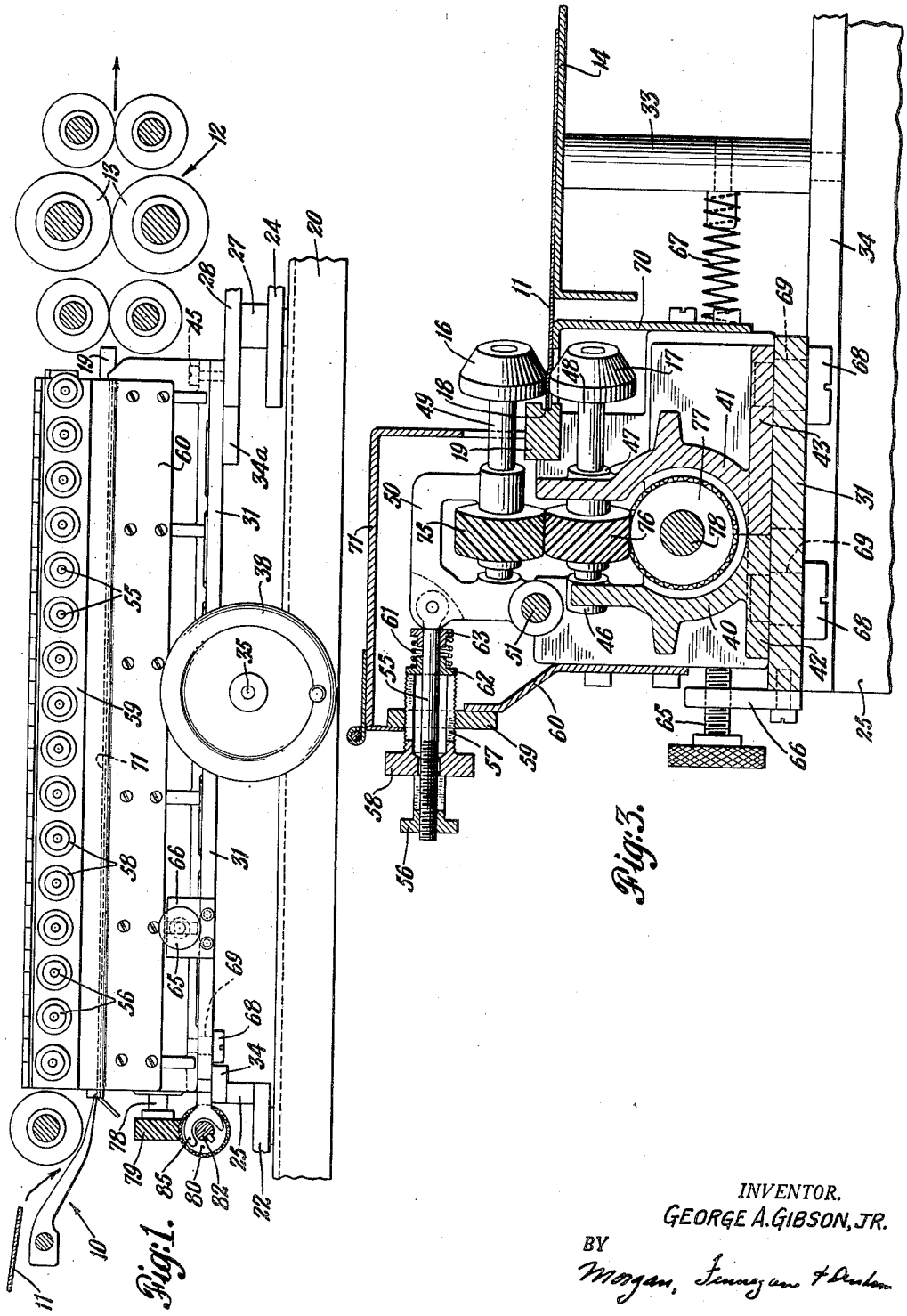


Fig. 1.

Fig. 3.

INVENTOR.
GEORGE A. GIBSON, JR.
BY
Morgan, Finnegan & Durham
ATTORNEY

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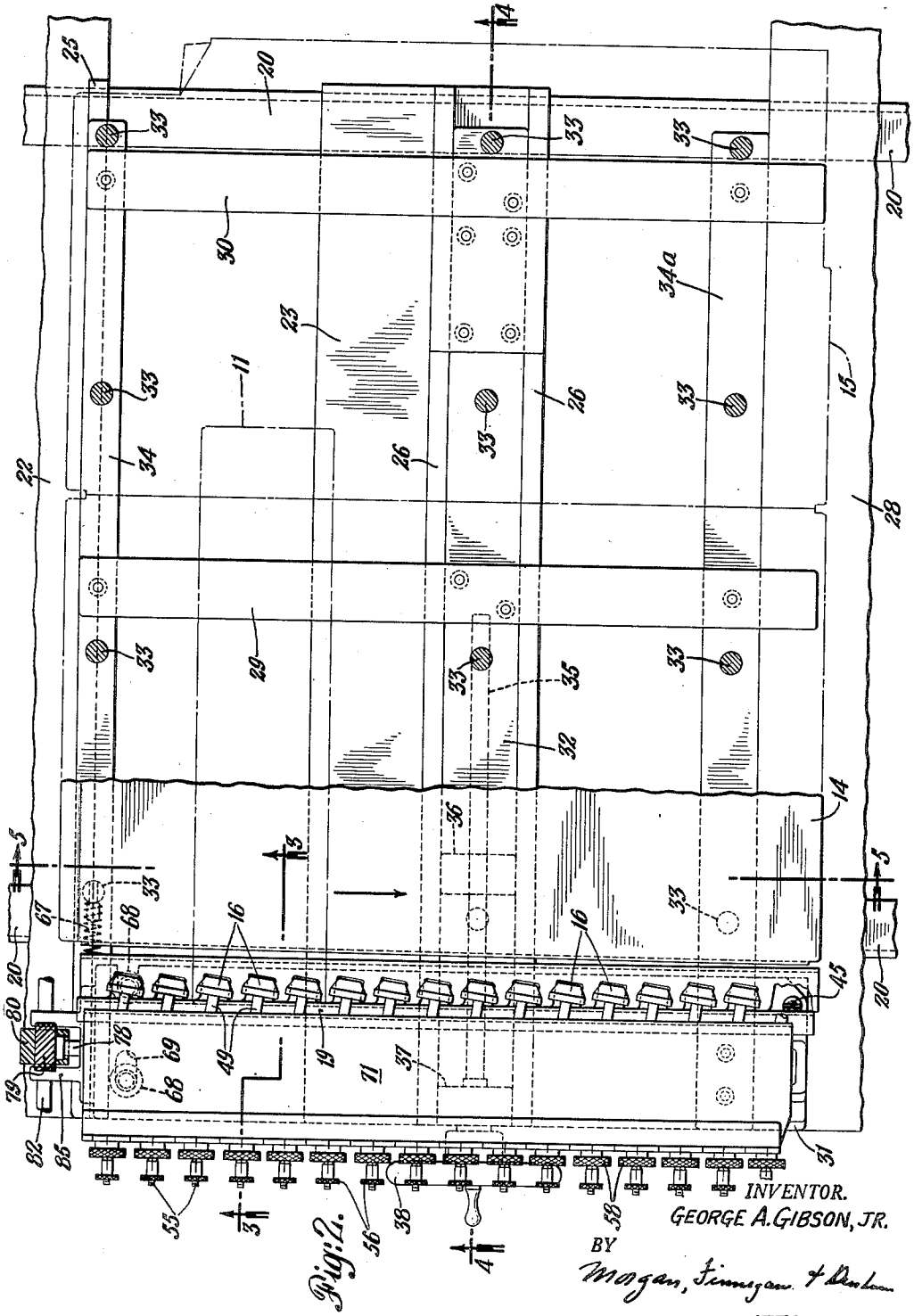


Fig. 2.

INVENTOR.
GEORGE A. GIBSON, JR.
BY
Morgan, Finnegan & Durham
ATTORNEY

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Fig. 4.

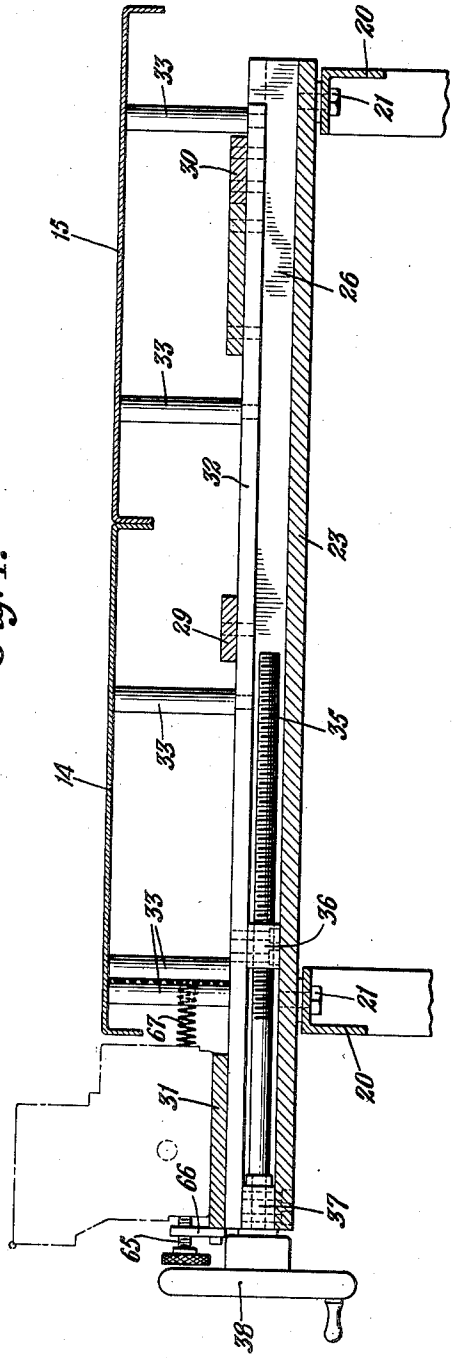
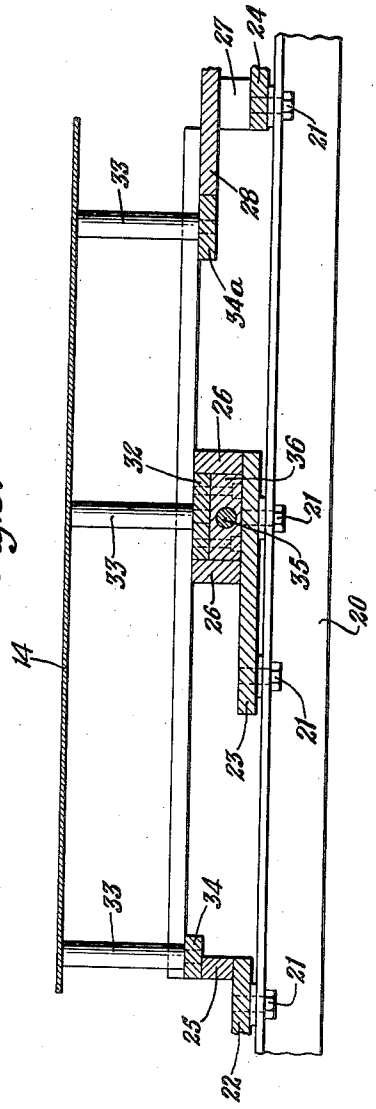


Fig. 5.



INVENTOR.
GEORGE A. GIBSON, JR.

BY
Morgan, Finnegan & Durham

ATTORNEY

Patented Apr. 6, 1954

2,674,456

UNITED STATES PATENT OFFICE

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CONVEYING AND REGISTERING MECHANISM

George A. Gibson, Jr., New York, N. Y.

Application July 29, 1950, Serial No. 176,698

14 Claims. (Cl. 271—52)

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The present invention relates to a conveying and registering mechanism for relatively flat articles such as paper, cards, or the like.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate an embodiment of the invention, and together with the description, serve to explain the principles of the invention.

The invention comprises a mechanism for conveying or forwarding flat articles such as paper, cards, or the like, which may be either ornamented or unornamented at the time of forwarding, and the mechanism likewise registers the forwarded articles to occupy a predetermined position on discharge for convenience and precision in later operations thereon. The device as herein shown and described for purposes of illustration may, for example, be adapted to receive printed or embossed card stock from a supply means, said stock being in the form of relatively long and narrow rectangular units, and to forward said units to a cutting mechanism which will cut each into a plurality of finished cards by spaced cuts lengthwise of each unit. The conveyor of the invention is adapted to register the units during forwarding by engagement at one end thereof so that each unit will enter the cutters in a fixed, predetermined position, and relatively simple and convenient means are provided in the conveyor for varying the angular relationship of the entire conveyor with respect to its place of delivery, and its transverse relationship as well, so that, assuming delivery is made to a rotary cutting mechanism, the forwarded units may be properly squared and the end trim determined without adjustment of the cutters at all.

In a device of the type described the invention also provides improved mechanism for positively engaging, forwarding and registering the stock units by handling one end thereof, so that a wide variety of stock may be handled, and even work that will not pile evenly may be fed and delivered without damage. The roller elements for engaging and forwarding the stock units are positively driven through improved driving mechanism

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which is smooth in operation, said mechanism is adapted to permit the angular and transverse adjustments in the conveyor which have been noted, and the entire driven forwarding mechanism is adapted to operate successfully upon units of small or large widths. The roller elements themselves are conveniently adjustable both as to tension with which the units are engaged, and spacing for engaging units of different thickness.

Of the drawings:

Fig. 1 is a side elevation of a typical and illustrative embodiment of the invention as viewed from the left side of Fig. 2;

Fig. 2 is a top plan view of the mechanism, certain parts of the feed table being broken away to show underlying parts;

Fig. 3 is a cross-sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a cross-sectional view taken along line 4—4 of Fig. 2; and

Fig. 5 is a cross-sectional view taken along line 5—5 of Fig. 2.

Referring now in detail to the illustrative embodiment of the invention shown in the drawings the conveying and registering mechanism of the invention may be adapted to receive relatively flat articles from any suitable feeding mechanism indicated generally by the numeral 10, which may individually feed, for example, rectangular card stock units 11 which are relatively long and narrow and are already suitably printed or otherwise ornamented. Said units are registered and conveyed to the cutting mechanism 12, which may have a plurality of spaced rotary cutting elements 13 for cutting the units 11 at spaced intervals along their lengths into finished cards. In general, the conveying mechanism of the invention comprises a flat feed table which may be formed of two table elements 14 and 15 and feeding and registering means at one side thereof comprising pairs of upper and lower driven rollers 16 and 17 respectively and a guide surface 18 in a grooved member 19 whereby the edges of units 11 are engaged, registered and forwarded along the table in the direction as indicated in Fig. 2. The entire conveyor mechanism including the feed table and forwarding and registering means are adjustable transversely of the direction of travel of the units 11, and the feeding and registering mechanism is angularly adjustable with respect to the feed table.

Turning first to a detailed description of the feed table, the main framework of the machine may comprise a pair of angle elements 20 suitably positioned on the floor or on other framework,

and secured thereto as by bolts 21 are a plurality, three as shown, of cross elements 22, 23 and 24 extending transversely of the direction of feed of the conveyor. The left hand (as seen in Fig. 5) element 22 carries a base block 25 secured thereto and extending along the length thereof, the central element carries a pair of base blocks 26 similar thereto, and the right hand element carries a similar base block 27 and another base element 28 secured thereto. The elements so far mentioned form a stationary framework upon which the conveyor mechanism is adapted to slide for transverse adjustment.

Spaced centrally and at the right hand side (Fig. 2) of the feed table are two cross members 29 and 30 respectively, and a third cross member 31 is positioned at the left hand side of the table and forms also a base member for the feeding and guiding mechanism. The cross members 29, 30 and 31 are tied together by means of an extending slider plate 32 positioned and guided between the blocks 26, and also by plates 34 and 34a. A plurality of vertical supports 33 are provided fixed to the cross members 32, 34 and 34a and support the conveyor table elements 14 and 15.

The conveyor table elements, and the base plate 31 which carries the feeding and registering mechanism, are thus supported for sliding movement transversely of the direction of feed of the machine, and adjustment of the lateral position is effected by means of an elongated screw 35 (Figs. 4 and 5) which threadedly engages a block or nut 36 secured to slider plate 32. The screw 35 is shouldered and journalled in a fixed block 37 secured to the cross element 23, and it will be apparent that rotation of hand wheel 38 will traverse the entire conveyor in a direction at right angles to the feed of articles thereacross.

Referring now in detail to the feeding and registering mechanism, the same comprises housing parts 40 and 41 secured together and extending along the length of the conveyor (direction of travel of articles), said parts being supported by their base flanges 42 and 43 respectively upon the base plate 31, and being pivotally mounted thereon by means of a pin 45 at the delivery end of the conveyor extending through an extension of flange 43 and into base plate 31. Housing parts 40 and 41 have upwardly extending portions carrying a plurality of journals 46 and 47 respectively in which are rotatably positioned shafts 48 each of which carries a lower feeding roller 17. The upper feeding rollers 16 are carried on shafts 49 rotatably mounted in suitable journals in an inverted U-shaped bracket 50 for each shaft and roller. Said brackets 50 are pivotally mounted on a shaft 51 extending lengthwise of the machine, whereby the upper rollers 16 may be raised or lowered with respect to the lower rollers 17. It will be noted that said rollers have a frusto-conical form which facilitates the entrance of the ends of card stock units 11 between them at any place along the line of rollers. The roller shafts 48 and 49 are positioned at an angle to the direction of travel of the conveyed articles so that the edges of such articles are carried over to and abutted against the guide surface 18 in grooved member 19 as they progress along the conveyor and are thus placed in predetermined position for discharge from the conveyor.

Tension and spacing adjustment means are provided for each set of rollers 16 and 17 operatively connected to the upper roller 16, and as embodied, comprise a shaft 55 pivotally connected at one end to bracket 50 and threaded at its other end to receive knurled nut 56. A sleeve 57 having a knurled flange 58 is positioned around shaft 55 and externally threaded to engage in a threaded aperture in plate 59, which is mounted on a support bracket or plate 60 which in turn is securely mounted upon an extending web portion of housing part 40. A coiled spring 61 is compressed between followers 62 and 63 about shaft 55, and it will be apparent that the spring exerts force against bracket 50 to yieldingly press upper roller 16 downwardly toward roller 17 in order to engage and hold conveyed articles at their edges between the rollers. Rollers 16 and 17 may be adjustably spaced apart in order to accommodate articles of different thicknesses by turning flange 58 with the fingers, and nut 56 provides an adjustment of the tension of spring 61, and thus the force with which it resists upward movements of roller 16.

The angular relationship of the entire roller and guide assembly which has been described is adjustable about the pivot axis 45 by means of an adjustment screw 65 threadedly engaged through a vertical plate 66 (Fig. 4) secured to base plate 31 toward the intake end of the conveyor, the screw being adapted to engage the housing part 40. The adjustment screw 65 works in opposition to a coiled spring 67 positioned between the housing part 41 and one of the upright table supports 33. Limiting movements of the assembly is effected by screws 68 through slots 69 in base plate 31 and positioned in the housing assembly 40, 41.

A continuation of the conveyor table 14—15 is provided in the angular plate 70 secured to a web of housing part 41, and the upper horizontal part of said plate is of scalloped formation to permit a portion of the periphery of each lower roller 17 to extend above said plate, so that the edges of articles supported on the conveyor table and plate 70 are positively engaged by the driven rollers. A pivotally mounted cover plate 71 may complete the housing about the roller drive and adjustment assembly.

Driving means for the rollers comprise meshing helical gears 75 and 76 fixed to shafts 49 and 48 respectively with gear 75 in mesh with a helical gear 77 fixed on drive shaft 78 which extends along the entire conveyor, it being understood that the gear drive assembly just mentioned is reproduced for each pair of rollers 16, 17. Shaft 78 at one end carries helical gear 79 which meshes with a helical gear 80 having a splined connection with main drive shaft 82, the latter being driven by any suitable means (not shown). In order to accommodate the gear driving means to pivotal and transverse movements of the roller assembly, a twin fork assembly 85 is secured to base plate 31 to engage both sides of gear 80, which thereby is caused to move along its splined connection with main drive shaft 82, remaining in constant mesh with gear 79 to drive the several rollers. The angular movement required about pivot 45 in order to properly direct the units 11 through the feeding mechanism is very small, and such movement is easily accommodated at the gears 79 and 80 by means of ordinary and usual tolerance or back-lash between the gears. That is, the gears are not in complete mesh contact, but their centers are spaced apart a very slight amount in excess of the theoretical distance upon the basis of which the gears are

cut, which provides adequate room for the small movement required.

With the conveyor construction shown and described it will be apparent that the conveyor surely and positively engages articles to be forwarded by their edges between rollers 16 and 17, register them on guide surface 18 and discharges them for instance to cutter 12 in the desired, predetermined position with respect to the cutting knives thereof. The conveyor is easily adjusted transversely for determination of the end trim, and angularly for perfect squaring with the cutter. The plurality of driven rollers positively engage, register and forward articles of quite small width, accommodate themselves to uneven surfaces, and are readily adjusted for articles of different thicknesses.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom, within the scope of the accompanying claims, without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. A conveyor and registering mechanism comprising, in combination, driven means for engaging and forwarding articles at the edges thereof, registration means to be engaged by the edges of the articles engaged by said first means, means for varying the position of said first two means transversely of the direction of movement of articles, and other independent means for moving said first and second means about a pivot in order to angularly vary the direction of movement of the articles.

2. A conveyor and registering mechanism including, in combination, supporting means for articles to be conveyed, means at one side of said first means for drivingly engaging and registering articles on said first means at their edges and forwarding the articles, means for varying the position of said first and second means transversely of the direction of movement of articles, and means for moving said second means about a pivot in order to angularly vary the direction of movement of the articles.

3. A conveyor and registering mechanism including, in combination, a supporting table for articles to be conveyed, guide means at one side of said table to be engaged by an edge of articles on said table for registering the articles, driven means adjacent said guide means for positively engaging the articles at the edge, moving them into engagement with said guide means, and forwarding them across said table, means for varying the position of said table, guide means and driven means transversely of the direction of movement of the articles, and means for moving said guide means and driven means about a pivot in order to angularly vary the direction of movement of the articles.

4. A conveyor and registering mechanism as set forth in claim 3 wherein said driven means comprises a plurality of pairs of upper and lower cooperating rollers spaced along the conveyor in the direction of movement of articles thereon.

5. A conveyor and registering mechanism as set forth in claim 3 wherein said driven means comprises a plurality of pairs of upper and lower cooperating rollers spaced along the conveyor in the direction of movement of articles thereon each said roller having a substantial portion thereof frusto-conical in shape.

6. A conveyor and registering mechanism as set forth in claim 3 wherein said driven means comprises a plurality of pairs of upper and lower cooperating rollers spaced along the conveyor in the direction of movement of articles thereon, said lower rollers being so mounted that portions of the peripheries thereof extend above the level of said supporting table.

7. A conveyor and registering mechanism as set forth in claim 3 wherein said driven means comprises a plurality of pairs of upper and lower cooperating rollers spaced along the conveyor in the direction of movement of articles thereon, said guide means comprising a member having a straight, flat surface extending along the conveyor in the direction of movement of the articles, and said rollers being mounted on horizontal axes inclined with respect to said surface.

8. A conveyor and registering mechanism as set forth in claim 3 wherein said driven means comprises a plurality of pairs of upper and lower cooperating rollers spaced along the conveyor in the direction of movement of articles thereon, one roller of each pair of said rollers being movably mounted for movement toward and away from its cooperating roller, and yieldable means biasing said rollers toward each other.

9. A conveyor and registering mechanism as set forth in claim 3 wherein said driven means comprises a plurality of pairs of upper and lower cooperating rollers spaced along the conveyor in the direction of movement of articles thereon, one roller of each pair of said rollers being movably mounted for movement toward and away from its cooperating roller, tension means biasing said rollers toward each other, means for varying the tension of said tension means, and means for varying the minimum spacement between the rollers of each said pair of rollers.

10. A conveyor and registering mechanism as set forth in claim 3 wherein said driven means comprises a plurality of pairs of upper and lower cooperating rollers spaced along the conveyor in the direction of movement of articles thereon, said rollers all being driven from a single shaft extending in the direction of movement of articles on the conveyor.

11. A conveyor and registering mechanism as set forth in claim 3 wherein said driven means comprises a plurality of pairs of upper and lower cooperating rollers spaced along the conveyor in the direction of movement of articles thereon, said rollers all being driven from a single shaft extending in the direction of movement of articles on the conveyor, said single shaft being driven from a second shaft disposed substantially normal thereto by a pair of meshing gears one connected to each said shaft, the gear on said second shaft having a splined connection therewith, and means engaging said last mentioned gear adapted to follow transverse and angular movements of said guide means and driven means.

12. A conveyor and registering mechanism comprising, in combination, an elongated guide element extending in the direction of movement of articles through the conveyor, a plurality of pairs of cooperating rollers adjacent said element said pairs being spaced from each other therealong, one roller of each said pair of rollers being pivotally mounted for movement toward and away from its cooperating roller the axis of said pivotal mounting being substantially parallel to the direction of movement of articles through the conveyor, tension means for biassing each said pivotally mounted roller toward its cooperating roller, and means for individually driving each

said roller said means comprising individual meshing gears for respective ones of the rollers in each said pair of rollers and a common shaft extending in the direction of movement of articles through the conveyor for driving all said gears.

13. A conveyor and registering mechanism as set forth in claim 12 wherein means are provided for varying the tension of said tension means and for varying the minimum spacement between the rollers of each said pair of rollers.

14. A conveyor and registering mechanism as set forth in claim 12 wherein a shaft is provided for each said roller said shafts being horizontally positioned and inclined with respect to said guide

element and said rollers each have a substantial portion thereof frusto-conical in shape.

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