March 8, 1938. F. J. COUCH 2,110,437

FEEDING DEVICE FOR IRONING MACHINES

Filed Oct. 21, 1936 3 Sheets-Sheet 1

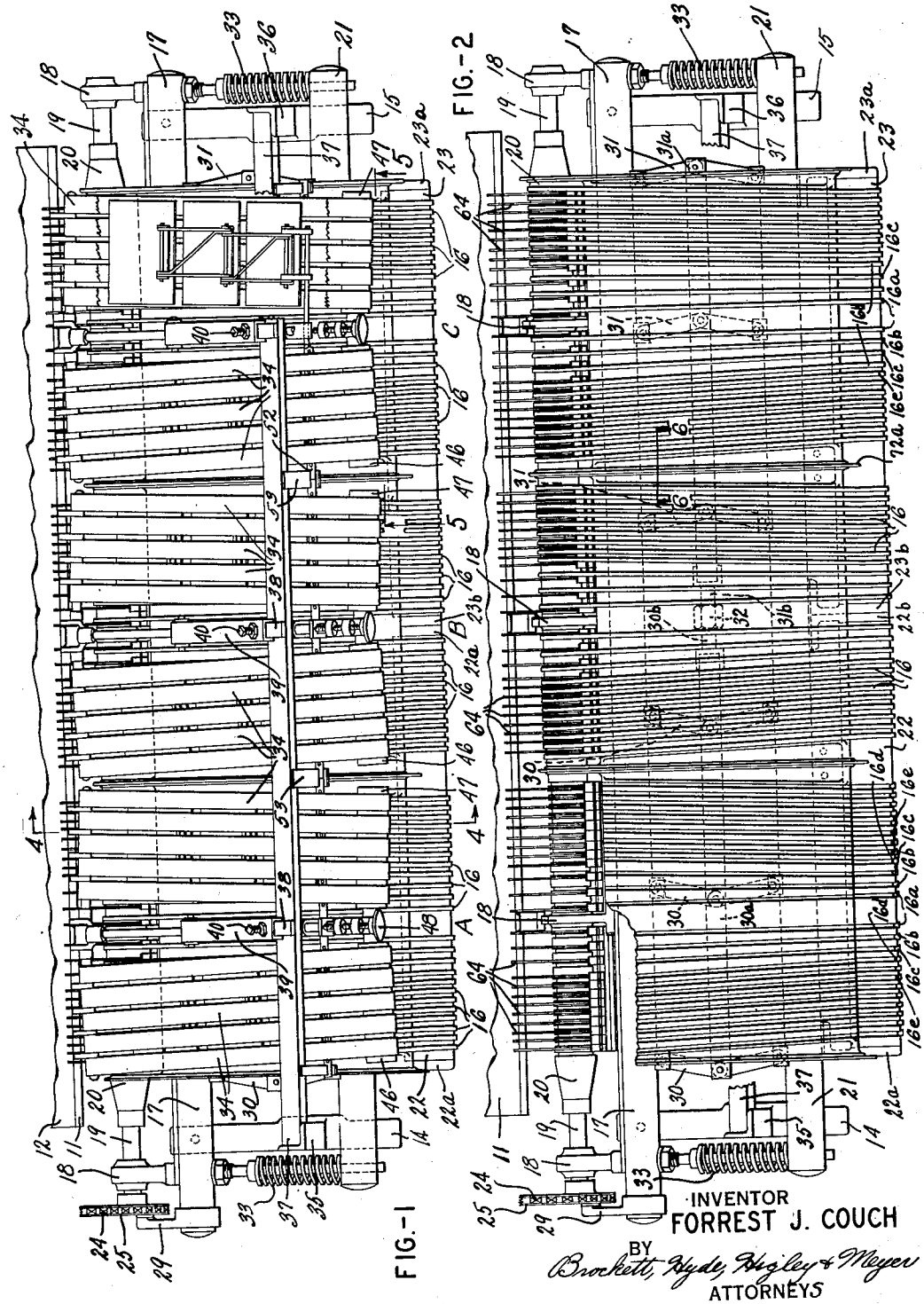


FIG. 1

FIG. 2

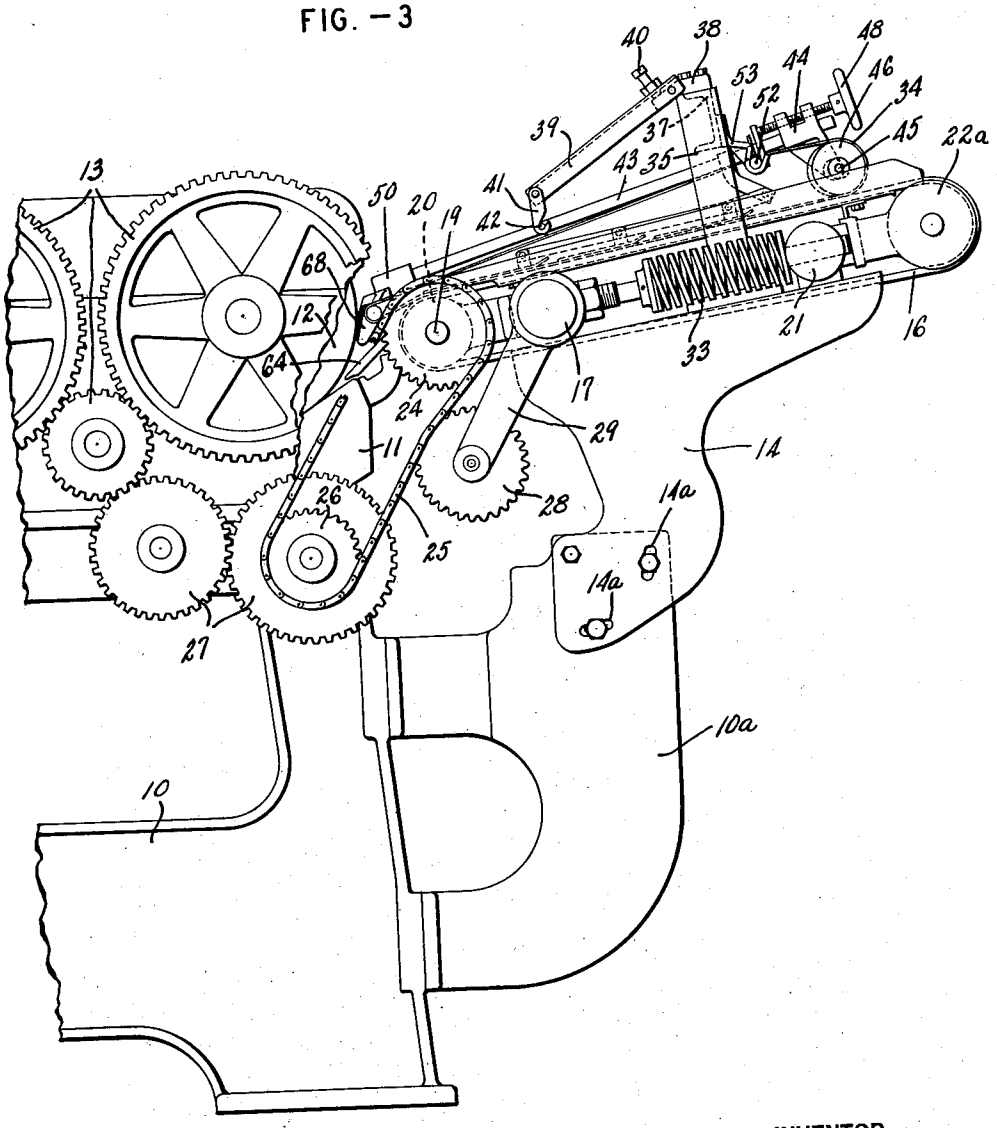
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Filed Oct. 21, 1936 3 Sheets-Sheet 2

FIG. —3



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Filed Oct. 21, 1936 3 Sheets-Sheet 3

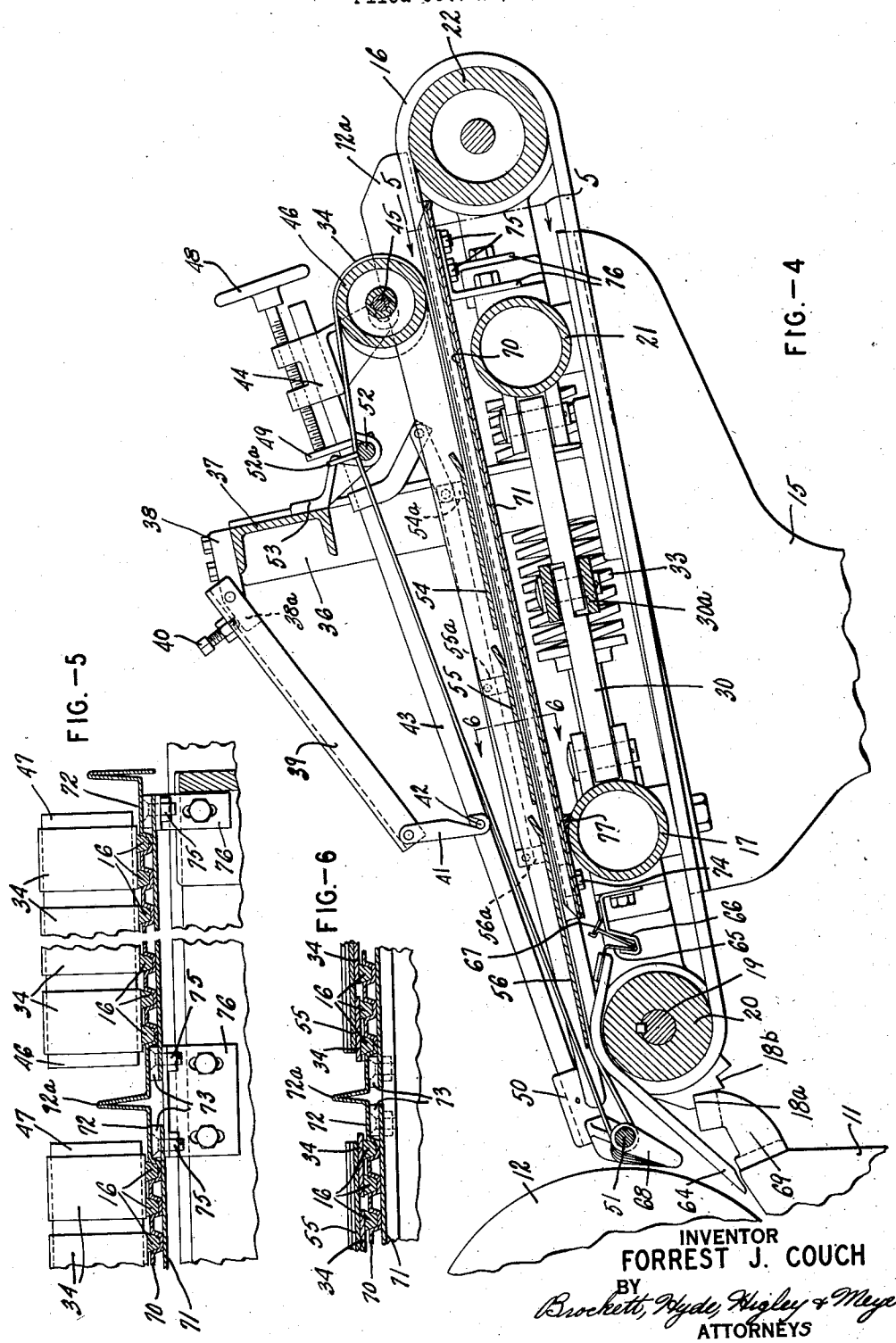


FIG.—4

FIG.—5

FIG.—6

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UNITED STATES PATENT OFFICE

2,110,437

FEEDING DEVICE FOR IRONING MACHINES

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Application October 21, 1936, Serial No. 106,846

21 Claims. (Cl. 271—45)

This invention relates to improvements in devices for feeding and spreading flat fabric articles prior to ironing the same.

One of the objects of my present invention is to provide a plurality of endless belts or ribbons arranged in side by side relationship extending in the same general direction to form a feeding lane for a flat article and in which belts on opposite sides of the longitudinal center line of the lane diverge outwardly in a novel manner so as to smooth out wrinkles in the article as it passes along the lane.

Another object of my invention is to provide feeding lanes for presenting a plurality of workpieces simultaneously to a pair of ironing members of considerable extent. More particularly, flatwork ironers are often provided with coacting roll and chest ironing members of considerable width and an object of the present invention is to provide means for feeding a plurality of articles simultaneously to such ironing members across the width of the machine. For instance, a sheet and a towel might be fed simultaneously or a plurality of towels, napkins or other flat articles might be fed simultaneously to the ironing members. To this end my invention provides a plurality of feeding lanes adapted to simultaneously feed and spread flat fabric articles and including unitary drive means for the feeding belts or ribbons and a novel arrangement of partition means between adjacent lanes to prevent the incorrect feeding of workpieces.

Another novel feature of my invention is found in the supporting and guiding means for the endless belts which move the articles along the feeding lanes.

Another object of my invention is the provision in apparatus comprising a plurality of endless belts arranged side by side and extending in the same general direction to provide a feeding lane for flat fabric articles, of novel belt tightening means by which the tension of a plurality of belts may be equally varied with a minimum of equipment and effort.

Another novel feature of my invention is the provision in apparatus comprising coacting lower and upper sets of continuous feeding belts in which the lower set of belts is positively driven and the upper set of belts is frictionally driven by contact with the lower ones, of novel means for suspending the upper belts above the lower ones, novel means for varying the tension of the upper set of belts, and novel means for providing the frictional driving engagement between the two sets of belts.

Other novel features reside in the arrangement of stripper fingers connected with each set of belts and means for quickly adjusting the feeding device in various positions relative to the coacting ironing members to which the articles are fed.

All of the above objects and novel features will be more clearly pointed out in the specification and illustrated in the drawings including the novel structural details by which my purposes are achieved. The essential features of my invention will be summarized in the claims.

In the drawings, Fig. 1 is a plan view of my novel feeding and spreading device attached to the feeding end of an ironing machine, the upper portion of the upper ribbons being broken away at the right-hand end to expose the riding plate mechanism; Fig. 2 is a plan view of the same device with the upper ribbon assembly removed and with the belts of the lower ribbon assembly broken away at the left end of the device to show the belt guide plates; Fig. 3 is an enlarged side elevation of the device; Fig. 4 is a still further enlarged sectional view taken on the line 4—4 of Fig. 1; Fig. 5 is a sectional view taken on the line 5—5 of Figs. 1 and 4; while Fig. 6 is a sectional view taken on the line 6—6 of Figs. 2 and 4.

I have illustrated my feeding device as arranged to feed flat fabric articles to an ironing machine of a well-known type comprising a base 10 on which are supported a chest 11 and a coacting ironing roll 12. Usually in such machines there is a plurality of such coacting ironing members which are driven by a train of gears indicated generally at 13.

On brackets 10*a* connected with the ironing machine base are mounted brackets 14 and 15 for supporting the feeding and spreading device. Preferably these two brackets are provided with slotted openings 14*a* where they are connected to the brackets 10*a* so as to provide a vertical adjustment, the purpose of which will be later described.

The framework for the lower belt assembly 16 comprises a tube 17 rigidly secured to the brackets 14 and 15 and extending entirely across the feeding device toward the rear end thereof. Bearing brackets 18 supported by tube 17 in turn rotatably carry the shaft 19 to which are keyed the rear belt supporting pulleys 20. Another tube 21 extending entirely across the feeding device near the front end thereof is slidably mounted on brackets 14 and 15 for free movement from front to rear thereof. Tube 21 carries brackets 22*a* and 22*b* in which is rotatably mounted the

front belt supporting pulley 22 and tube 21 also carries brackets 23a and 23b which rotatably carry the belt supporting pulley 23.

Means is provided for rotating shaft 19 so as to positively drive the lower set of belts. This drive means comprises a sprocket 24 rigid with shaft 19 and connected by chain 25 with sprocket 26 which in turn is connected by a train of gears 27 with the driving mechanism of the ironing machine. An idler sprocket 28 supported by member 29 from tube 17 provides tightening means for chain 25.

Novel means is provided for varying the distance between tubes 17 and 21 so as to vary the span between the rear belt supporting pulley 20 and the front belt supporting pulleys 22 and 23. To this end a plurality of toggles 30 are connected between tubes 17 and 21 on one side of the machine and another set of similar toggles 31 is provided on the other side of the machine. Each set of toggles breaks outwardly and the knuckles of the left-hand set are connected by a link 30a with a threaded bar 30b, while the knuckles of toggles 31 are connected by a link 31a with a threaded bar 31b. An adjusting nut 32 having right and left-hand threaded connections with bars 30b and 31b respectively controls movement of the links 30a and 31a toward or away from each other coincidentally when the nut 32 is rotated. It is thus possible to simultaneously move toggles 30 and 31 either toward a more or less straightened position to vary the span between tubes 17 and 21 and to thus equally vary the tension on the lower set of belts. Springs 33 connected between tubes 17 and 21 bias the tubes away from each other so that they follow the toggle movement alined in exact parallelism.

The belts 16 are preferably of truncated V-section as shown. It is desirable to support these belts beneath the articles fed and also to support the sides of the belts 16 to prevent a turning or twisting thereof due to the spreading action of the apparatus. To this end a plate 70 is provided beneath each half-lane of belts 16, these plates having truncated V-grooves therein corresponding to the outer side and bottom faces of belts 16 as best shown in Figs. 5 and 6. These plates are preferably welded to supporting plates 71 therebeneath and the adjacent plate sections of two lanes are connected together by a plate 72 bolted to the plates 70 of each lane and provided with a rib 72a which forms a partition between adjacent lanes. The partitions 72a prevent the feeding of an article partly on one lane and partly on another. To the front and rear of each plate 72 filler blocks 73 are welded. At the rear end of the plates bolts 74 secure the plates and filler blocks together. At the front end of the plates bolts 75 secure the plates and filler blocks together and at the same time secure the belt guide plate assembly to brackets 76 which are rigidly connected with tube 21. The rear end of the guide plate assembly floats freely supported on tube 17 by means of a strip 77 welded thereto to provide a bearing surface.

A plurality of feeding lanes A, B and C respectively, are provided in side by side arrangement so as to simultaneously feed a plurality of articles to the ironing members 11 and 12. As illustrated these lanes are of equal width and identical construction and therefore one only will be described. It will be understood, however, that the lanes need not be of the same width nor extactly the same construction. For instance, one lane might be provided much wider or narrower than the others or a plurality of lanes of varying widths might be provided depending upon the articles which it was intended to feed.

Each of the lanes then comprises a set of belts 16 riding in suitable grooves in pulleys 22 and 23 at the front end of the apparatus and in pulley 20 at the rear end thereof. These guiding grooves for belts 16 are arranged in a novel manner so as to provide for spreading of a workpiece without sufficient stretching thereof to cause lateral wrinkles. The principle involved is best illustrated by reference to belts 16b, 16c and 16d of lane A. These belts diverge outwardly toward opposite sides of the lane from the receiving toward the delivery end thereof. The belts 16b diverge from the center line at an angle considered sufficient to smooth out the wrinkles usually encountered in the central portion of the workpiece. The belts 16c farther removed from the center line diverge therefrom at a slightly greater angle than the belts 16b. They are thus enabled to take care of excess material spread laterally by the belts 16b and to cause an additional spreading action as to any portions of the workpiece lying between the belts 16b and 16c. In a similar manner the belts 16d diverge from the center line at a greater angle than the belts 16c, thus progressively carrying the excess material being spread laterally farther and farther toward the sides of the feeding lane. It is obvious that this progressive divergence of the belts farther and farther from the center line of the lane may be continued as far toward the sides thereof as desired. In fact the entire lane might be constructed in this manner. However, I find that when a certain point is reached the belts 16e may thereafter be substantially parallel to the outermost belts of the series 16b, 16c, 16d. Preferably but not necessarily one or more belts are provided adjacent the longitudinal center line of the lane substantially parallel thereto. To this end I have provided the two belts 16a parallel to the center line of the lane and on opposite sides thereof. These two belts support the central portion of the fabric while the belts to either side thereof provide the spreading action.

The upper set of belts 34 is adapted to ride upon the belts 16 in frictional contact therewith or with an article carried thereby so that the upper belts are idler belts and driven by means of the lower belts. I provide a novel supporting mechanism for this upper set of belts. Brackets 35 and 36 supported on brackets 14 and 15, respectively, carry a channel 37 extending entirely across the feeding apparatus and above it. For each of the feeding lanes there is provided a bracket 38 carried by the channel 37 and this bracket in turn pivotally supports a bracket 39, the position of which is adjustable by means of set screw 40 engaging a portion 38a of bracket 38. The opposite end of bracket 39 supports a hook 41 which engages a pin 42 on a bar 43 extending substantially above the longitudinal center line of the feeding lane. At its forward end bar 43 supports a block 44 which carries a rod 45 for rotatably supporting the belt pulleys 46 and 47. The rod 45 is bent as shown in Fig. 1 so as to support the pulleys 46 and 47 at right angles to their belts. An adjusting screw 48 passing through block 44 and engaging a stop member 49 fixed on bar 43 adjusts the position of bar 45 so as to simultaneously vary the tension of all of the belts 34. At the rear end of rod 43 is a block 50 which supports a rod 51 about which belts 34 pass at the rear end of the apparatus. Preferably the rod 51

is bent as shown to provide a belt support at right angle to the belts and the belts 34 extend rearwardly of belts 16. It will be noted that belts 34 are endless and preferably flat as shown. For supporting the upper run of belts 34 a bar 52 is supported in brackets 53 from channel 37 and is provided with pins 52a to guide the belts.

Novel means is provided to cause the lower run of belts 34 to ride upon the belts 16 to give sufficient frictional contact therewith for the feeding and spreading operation and to prevent rolling or balling up of the article fed. In the form shown plates 54, 55 and 56 are provided for each half-lane spaced from front to rear thereof. The plates are provided at their forward edges with brackets 54a, 55a and 56a, respectively. Links 57 and pins 58 pivotally connect brackets 56a and 55a. Links 59 and pin 60 pivotally connect brackets 55a and 54a. Lateral bracing is provided at 61. Links 62 pivotally connect bracket 54a with a bracket 63 rigidly mounted on bar 43. Thus the series of plates is supported in a freely floating position upon the lower run of belts 34 with horizontal movement substantially prevented but providing a limited vertical movement of each plate independently of the other plates. This accommodates various thicknesses as fabric passes through the apparatus.

Stripper fingers are provided associated with each set of belts at the rear end thereof. Associated with the lower belts are the stripper fingers 64 which ride in grooves of pulley 20 between the belts 16. The rear end of the fingers rest upon the chest 11 while the forward end of the fingers is connected in a novel manner with the frame supporting the lower belt assembly. The novel arrangement shown comprises a spring clip 65 of which one is preferably provided individual to each finger. These clips are supported in a channel-shaped member 66 extending transversely of the apparatus and may be pressed beneath a clip 67 so as to releasably hold each finger 64 in place. This makes the replacement of individual fingers easy.

The upper set of stripper fingers 68 are carried by the rod 51 and preferably the fingers are mounted at various angles to the rod 51 as shown in Fig. 4 so that the free ends thereof form a line substantially parallel with the fingers 64.

It will be obvious from the manner of suspension of the upper belt supporting framework that by varying the setting of screws 40 the upper belts may be caused to ride at adjusted distances from belts 16 and the clearance between fingers 68 and 64 may be controlled.

For the purpose of controlling the relative position between the feeding and spreading device and the ironing members 11 and 12, notches 18a and 18b are provided in the bearing brackets 18 which support the shaft 19 at the rear end of the lower belt assembly. Either of these notches may engage one or more brackets 69 connected with chest 11 and the necessary movement of brackets 14 and 15 are provided by the slotted openings 14a and 15a as previously described. With the notches 18a engaged on the brackets 69 as shown in Fig. 4 a low feed is provided, whereas with notches 18b engaged a high feed is provided.

What I claim is:

1. Apparatus of the class described comprising a frame, a plurality of positively driven endless belts on said frame extending from end to end thereof in the same general direction and having work engaging surfaces throughout their length, there being a group of said belts on each side of the longitudinal center line of said frame diverging outwardly from said center line towards the opposite sides of the frame, and a belt in each group farther from said center line diverging therefrom at a greater angle than another belt in said group nearer said center line.

2. Apparatus of the class described comprising a frame, a plurality of positively driven endless belts on said frame extending from end to end thereof in the same general direction and having work engaging surfaces throughout their length, there being a group of said belts on each side of the longitudinal center line of said frame diverging outwardly from said center line towards the opposite sides of the frame, and there being belts in each group diverging from the center line at varying angles, said angles becoming progressively larger for each belt in a series extending from the center line toward each side of the frame.

3. Apparatus of the class described comprising a frame, a plurality of positively driven endless belts on said frame extending from end to end thereof in the same general direction and having work engaging surfaces throughout their length, there being a group of said belts on each side of the longitudinal center line of said frame diverging outwardly from said center line towards the opposite sides of the frame, there being a series of belts in each group, the belts in each series progressively diverging, each at a greater angle from the center line than the belt nearer the center in the series, and belts in each group laterally outside of each series and substantially parallel to the outermost belt of the series.

4. Apparatus of the class described comprising a frame, a plurality of positively driven endless belts on said frame extending from end to end thereof in the same general direction and having work engaging surfaces throughout their length, there being at least one belt extending adjacent and substantially parallel to the longitudinal center line of said frame, there being a group of said belts on each side of said center line and diverging outwardly therefrom towards the opposite sides of said frame, and there being belts in each group diverging from the center line at varying angles, said angles becoming progressively larger for each belt in a series extending from the center toward each side of the frame.

5. Apparatus of the class described comprising a frame, a plurality of positively driven endless belts on said frame extending side by side from end to end thereof in the same general direction and having substantially continuous work engaging surfaces throughout their length, there being a group of said belts on each side of the longitudinal center line of said frame diverging outwardly from said center line towards the opposite sides of the frame, there being a series of belts in each group, the belts in each series progressively diverging each at a greater angle from the center line than the belt nearer the center in the series, and a self-contained belt unit including endless idler belts having substantially continuous work engaging surfaces throughout their length and diverging to coact with said first named belts and held firmly thereagainst in a manner to be driven by frictional contact therewith, whereby the two sets of belts grip work passing therebetween to advance the work while straightening the same laterally without stretching.

6. Apparatus of the class described comprising a plurality of work-feeding lanes arranged side by side, each lane comprising a plurality of positively driven endless belts lying in a common plane in two groups one on each side of the longitudinal center line of the lane, the belts of each group diverging from the center line of the lane in the direction of drive toward the opposite sides of the lane, and a shaft in driving relation to the belts of all of said lanes and extending the full width of the machine.

7. Apparatus of the class described comprising a plurality of work-feeding lanes arranged side by side, each lane comprising a plurality of positively driven endless belts lying in a common plane in two groups one on each side of the longitudinal center line of the lane, the belts of each group diverging from the center line of the lane in the direction of drive toward the opposite sides of the lane, a self-contained belt unit for each lane superimposed on the first named belts, each unit including endless idler belts having continuous work engaging surfaces throughout their length and diverging to correspond with the divergence of the lower belts and resting upon the latter by gravity to be driven by frictional contact therewith, and partition means between adjacent lanes whereby to prevent a workpiece being fed along portions of two different lanes.

8. Apparatus of the class described comprising a frame, a plurality of positively driven endless belts on said frame extending side by side from end to end thereof in the same general direction and having substantially continuous work engaging surfaces throughout their length, there being a group of said belts on each side of the longitudinal center line of said frame diverging outwardly from said center line towards the opposite sides of the frame, a self-contained belt unit including endless idler belts having substantially continuous work engaging surfaces throughout their length and diverging to correspond with said first named belts and held firmly thereagainst in a manner to be driven by frictional contact therewith, whereby the two sets of belts grip work passing therebetween to advance the work while straightening the same laterally without stretching, and guide means supporting said positively driven belts on the face thereof opposite the work engaging face, said guide means engaging the side edges of the belts whereby to prevent twisting of said belts during a work-feeding operation.

9. Apparatus of the class described comprising a plurality of endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a wide article, belt supporting means including pulleys at each end of said lane, a plurality of toggles operatively connected with said belt supporting means and controlling the distance between said pulleys, and means for simultaneously straightening or breaking said toggles equally.

10. Apparatus of the class described comprising a plurality of lanes arranged side by side for simultaneously feeding a plurality of workpieces, each lane comprising a plurality of endless belts extending side by side in the same general direction, belt supporting pulleys at opposite ends of the belts of each lane, rigid pulley supporting means extending across a plurality of said lanes, one adjacent each set of end pulleys, a plurality of toggles operatively connected with said pulley supporting means and controlling the distance between them, and means for simultaneously moving said toggles in toggle-straightening and in toggle-breaking directions.

11. In apparatus of the class described having a frame supporting a plurality of positively driven endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a flat article, said apparatus also including a second frame above the first frame and carrying a plurality of endless idler belts adapted to rest upon the first named set of belts to be driven by frictional contact therewith, vertically adjustable means for suspending said second named frame above said first named frame.

12. In apparatus of the class described having a frame supporting a plurality of positively driven endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a flat article, said apparatus also including a second frame above the first frame and carrying a plurality of endless idler belts adapted to rest upon the first named set of belts to be driven by frictional contact therewith, each of said frames having belt supporting members at the receiving and delivery ends thereof, stripper fingers on each frame extending outwardly beyond said delivery end belt supporting members, and means for adjusting the vertical distance between the delivery ends of said frames, whereby to adjust the clearance between said stripper fingers.

13. In apparatus of the class described having a frame supporting a plurality of positively driven endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a flat article, said belts diverging outwardly from the longitudinal center line of said lane toward the opposite sides thereof, said apparatus also including a second frame above the first frame and carrying a plurality of endless idler belts diverging to correspond with said first set of belts and adapted to rest thereon by gravity to be driven by frictional contact therewith, a belt supporting member at the delivery end of said second frame extending substantially normal to the supported belts, and stripper fingers depending from said member at varying angularities in a manner to cause the free ends of said stripper fingers to lie in a line normal to the center line of said lane.

14. In apparatus of the class described having a frame supporting a plurality of positively driven endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a flat article, said apparatus also including a second frame above the first frame and carrying a plurality of endless idler belts adapted to rest upon the first named set of belts to be driven by frictional contact therewith, belt supporting members at opposite ends of said second frame, and means carried by said second frame for varying the distance between said supporting members whereby to adjust the tension of said idler belts.

15. In apparatus of the class described having a frame supporting a plurality of positively driven endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a flat article, said apparatus also including a second frame above the first frame and carrying a plurality of endless idler belts adapted to rest upon the first named set of belts to be driven by frictional contact therewith, a plate adapted to rest upon the

upper face of the lower run of said idler belts, and a pivotal mounting for said plate at the end thereof toward the receiving end of said idler belts.

16. In apparatus of the class described having a frame supporting a plurality of positively driven endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a flat article, said apparatus also including a second frame above the first frame and carrying a plurality of endless idler belts adapted to rest upon the first named set of belts to be driven by frictional contact therewith, a plurality of plates adapted to rest upon the upper face of the lower run of said idler belts, and means for mounting said plates substantially preventing horizontal movement thereof but permitting limited vertical movement thereof.

17. In apparatus of the class described having a frame supporting a plurality of positively driven endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a flat article, said apparatus also including a second frame above the first frame and carrying a plurality of endless idler belts adapted to rest upon the first named set of belts to be driven by frictional contact therewith, a plurality of plates adapted to rest upon the upper face of the lower run of said idler belts in line from the receiving end toward the delivery end of said belts, and means for mounting said plates substantially preventing horizontal movement thereof while providing for limited vertical movement of one plate substantially independent of vertical movement of another plate.

18. In apparatus of the class described for feeding articles between ironing members of an ironing machine and having a frame supporting a plurality of positively driven endless belts arranged side by side and extending in the same general direction in a manner to form a feeding lane for a flat fabric article, said apparatus also including a second frame above said first frame and carrying a plurality of endless idler belts adapted to rest upon the first named set of belts to be driven by frictional contact therewith, adjustable support means on said ironing machine for supporting both of said frames, and positioning members on said machine and said first named frame for holding said frames in either of a plurality of positions relative to said ironing members for the presentation of articles thereto.

19. In apparatus of the class described comprising a plurality of endless belts for feeding flat fabric articles to an ironing machine and having a belt supporting pulley at the machine end of said belts, a stripper finger extending beyond said pulley on the delivery side thereof, and clip means for securing said stripper finger to said apparatus.

20. In apparatus of the class described comprising a frame supporting a plurality of endless belts for feeding flat fabric articles to an ironing machine and having belt supporting pulley means at the machine end of said belts, stripper fingers extending across said pulley means, a spring clip on each finger on the end thereof toward the receiving end of said belts, and means on said frame for removably holding said clips.

21. Apparatus of the class described comprising a frame, a plurality of positively driven endless belts on said frame extending from end to end thereof in the same general direction and having work engaging surfaces throughout their length, there being two groups of said belts each symmetrically arranged on opposite sides of the longitudinal center line of said frame and diverging outwardly from said center line progressively along their length, one of said groups having pairs of belts diverging at progressively greater angles, said angles having a common apex, and the other of said groups having pairs of belts diverging at the same angle, the apexes of the angles of said last named group of belts lying progressively farther from a given point.

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