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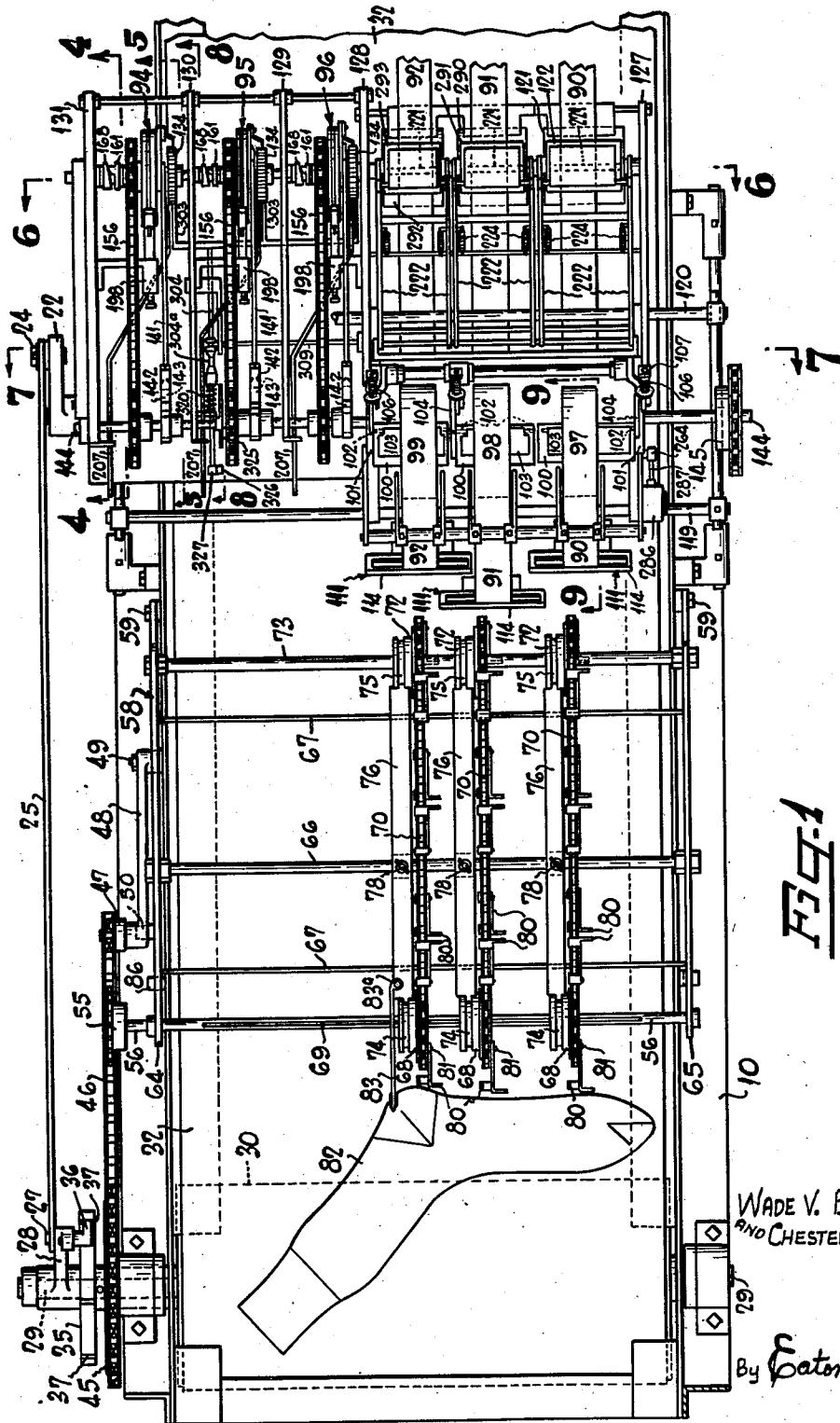
W. V. BOWMAN ET AL

2,286,458

TRANSFER APPLYING APPARATUS

Filed March 13, 1941

8 Sheets-Sheet 1



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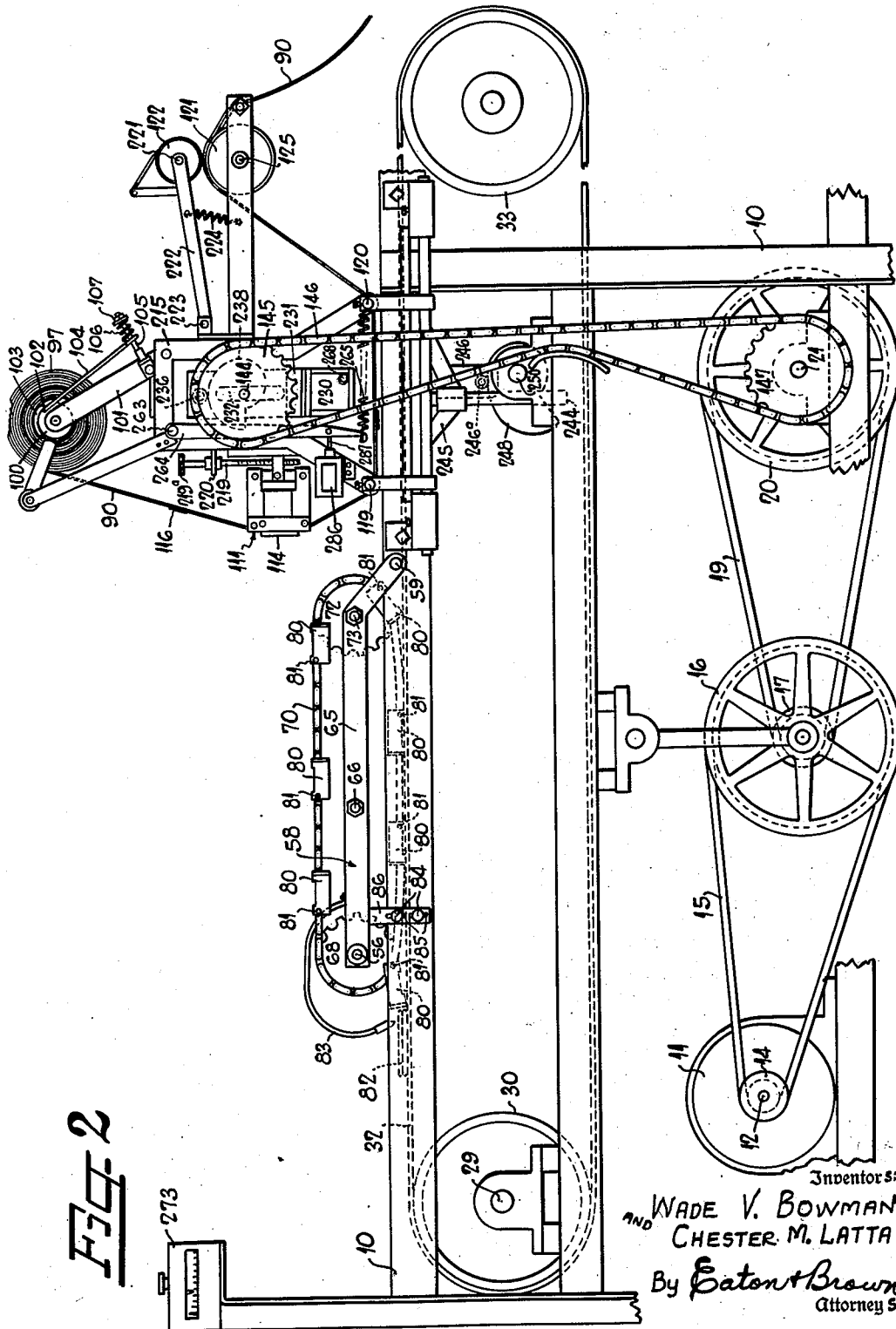
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TRANSFER APPLYING APPARATUS

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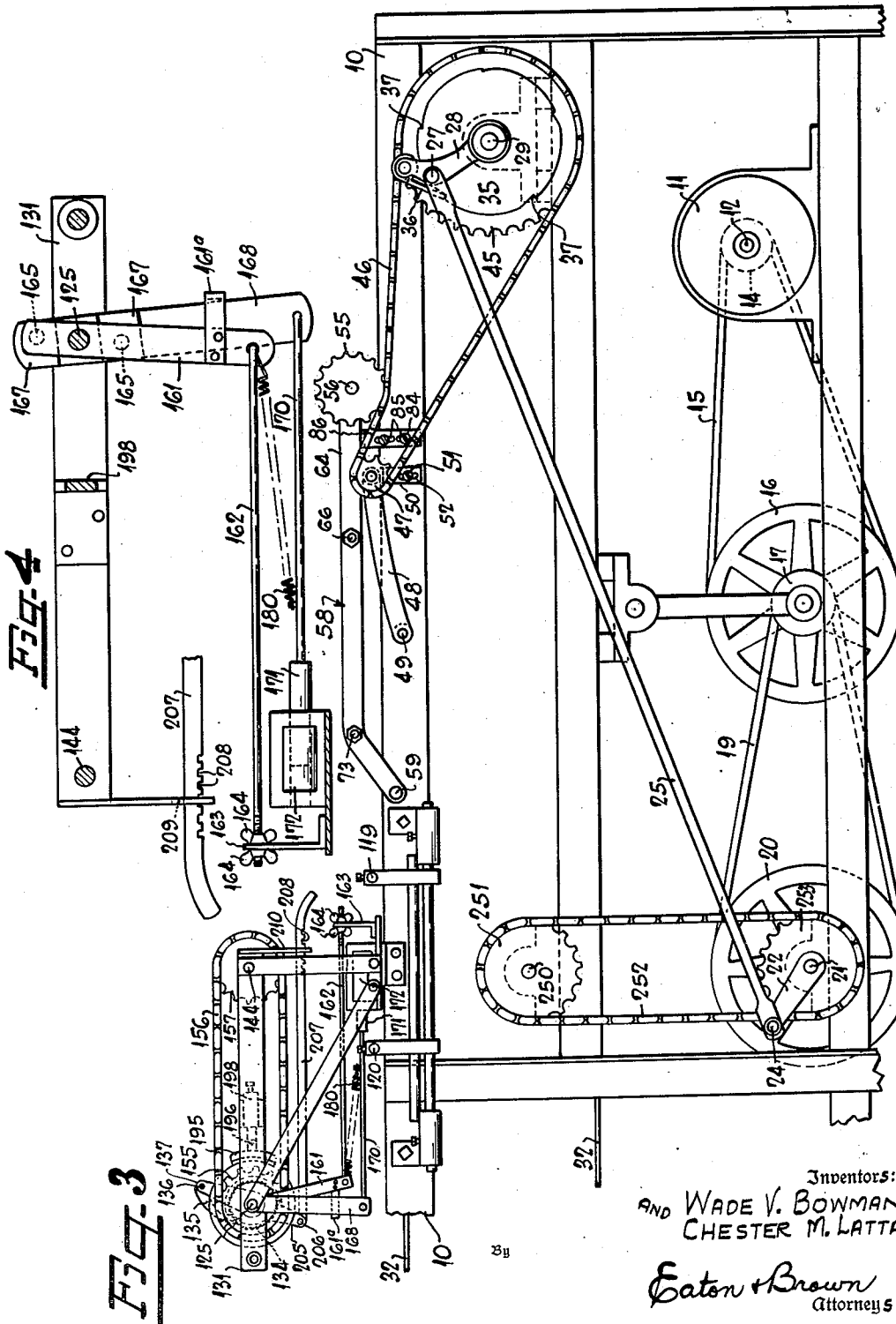
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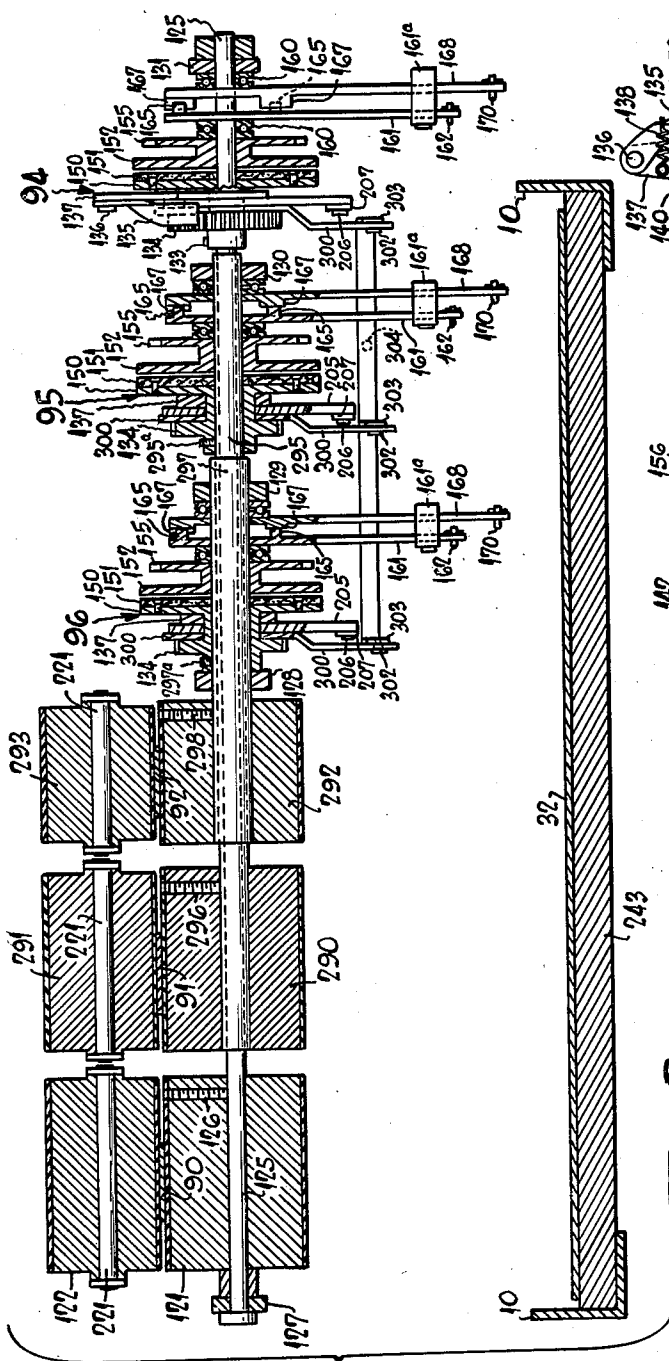


Fig. 5

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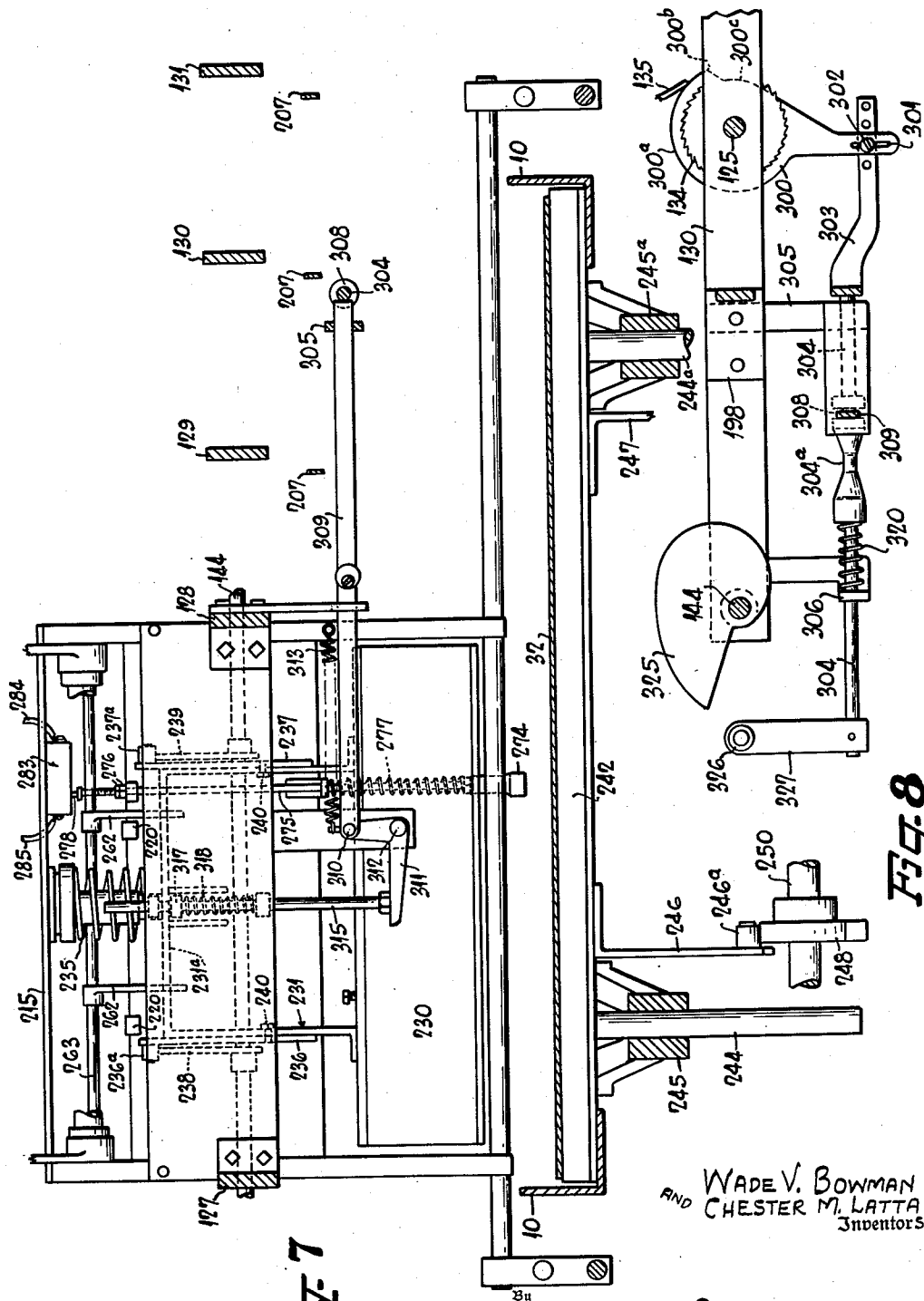


Fig. 7

Fig. 8

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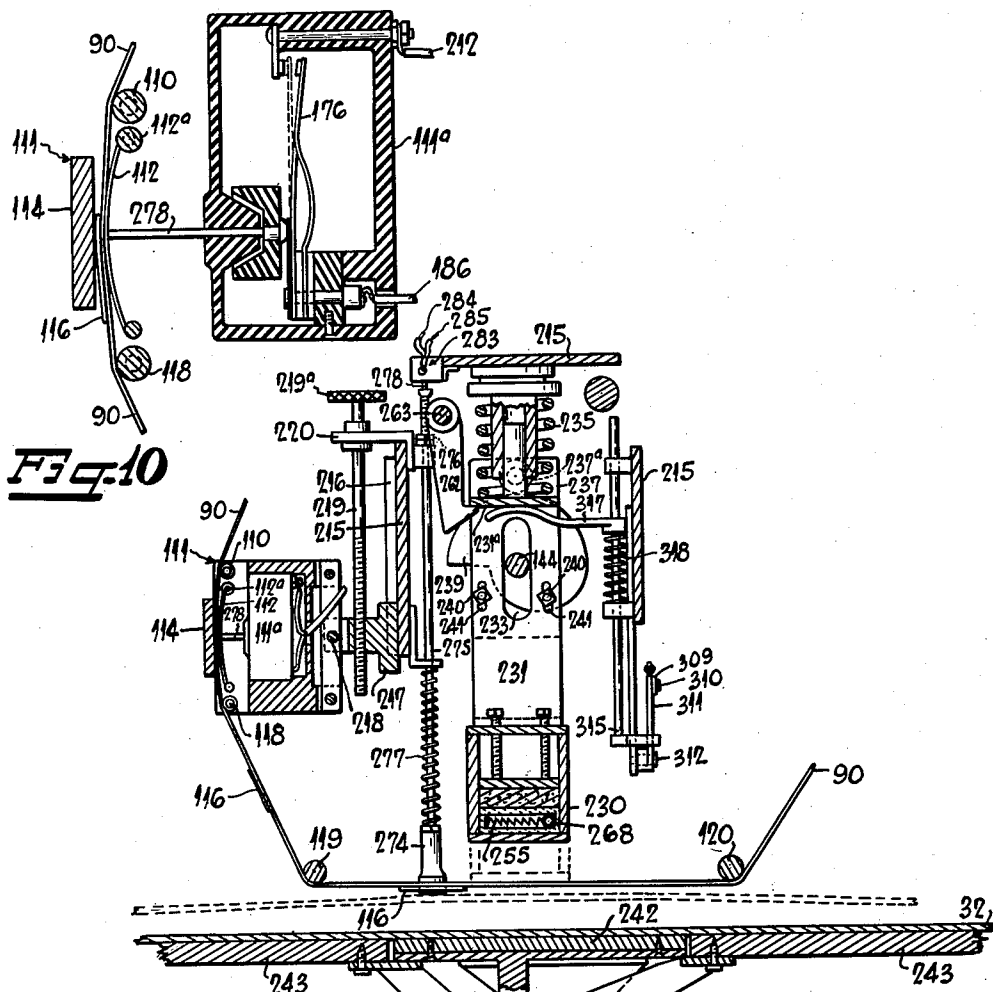
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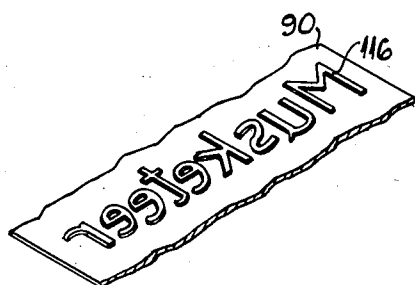
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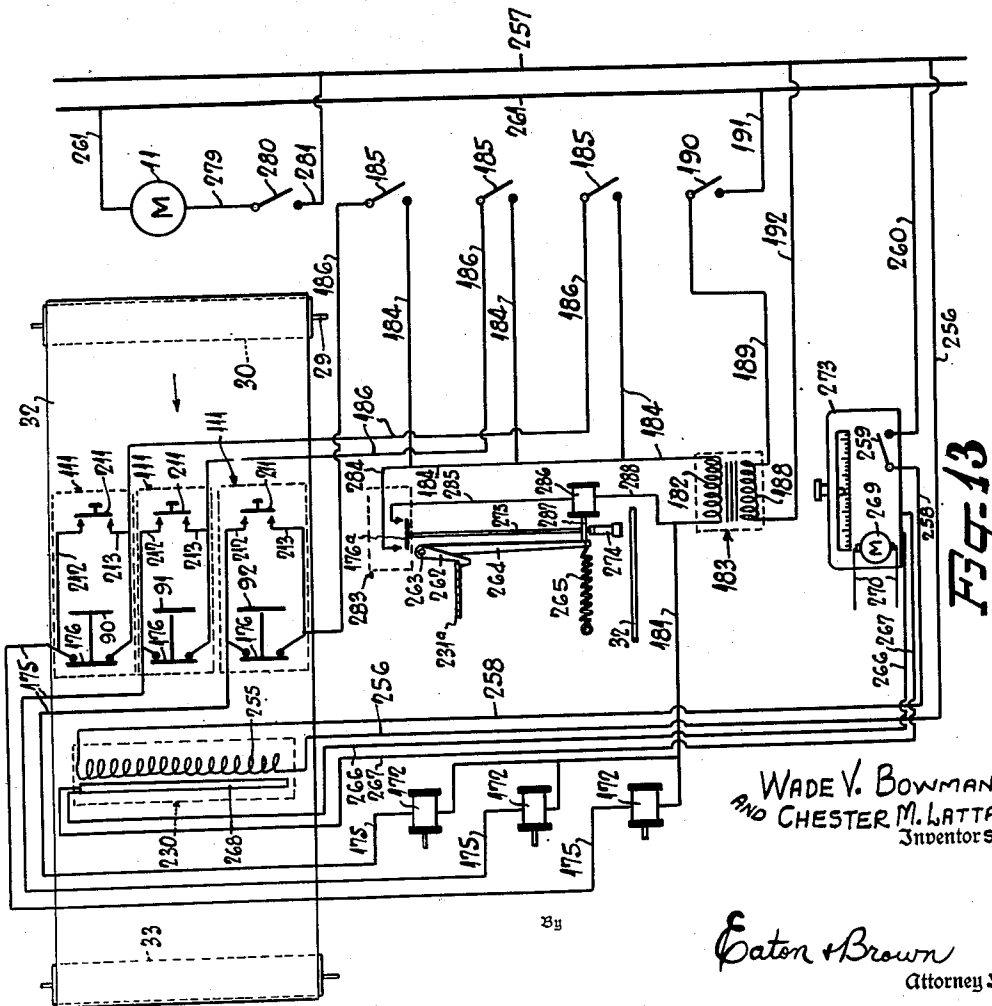
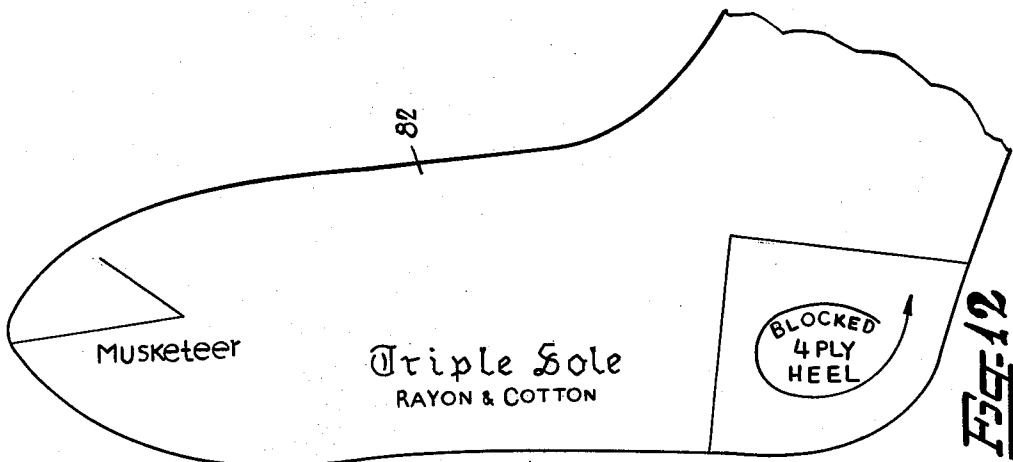
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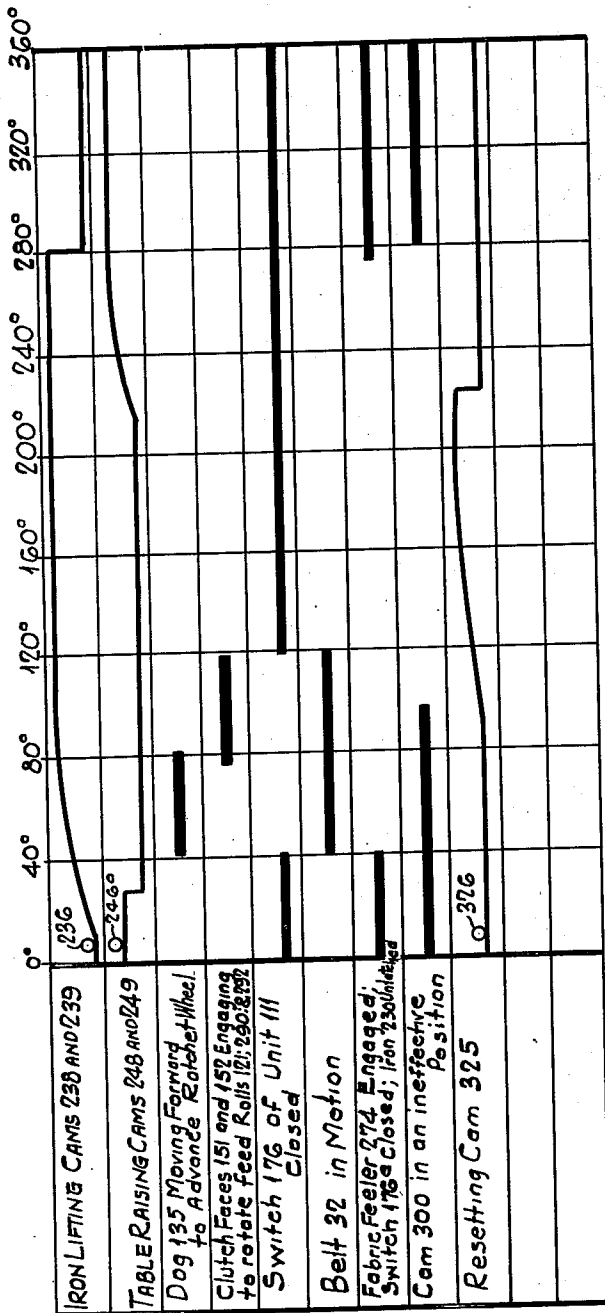


FIG. 14

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UNITED STATES PATENT OFFICE

2,286,458

TRANSFER APPLYING APPARATUS

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Application March 13, 1941, Serial No. 383,140

15 Claims. (Cl. 41—1)

This invention relates to an improved apparatus for applying transfer marks to hosiery, fabrics and the like, and more especially to a machine equipped with certain automatic features wherein the hosiery may be marked in rapid succession.

It is conventional practice to place upon the foot portion of hosiery, certain indicia such as the trade-mark, size, type of construction and the like. One of the most desirable modes of marking is to place opposite hand words in raised type on a transfer strip and then press the strip upon the hosiery by means of a heated iron, so that the type will adhere to the fabric. The letters are preferably formed of some suitable composition which will readily adhere to fabric and when subjected to heat will immediately transfer from the strip. The printed matter on the strip is usually backwards or opposite hand, but will show up in a legible manner on the hosiery after the transfer. Sometimes this type is made from a suitable composition which will readily wash from the fabric after laundering, thereby removing the indicia, which is primarily applied to the fabric for advertising and sales purposes. At other times, an indelible ink or coloring is used.

Heretofore, the method of applying these transfers to hosiery has been very slow. In fact, most concerns employ manual means altogether, which results in a lack of uniformity as well as poor production. Where two or more transfer marks have to be applied to each pair of hosiery, the operation is especially slow.

It is an object of this invention to provide a machine capable of intermittently feeding a transfer strip in timed relation to the advance of spaced pairs of hosiery or other fabrics and for causing a heating element to automatically press the strip against the hosiery to effect a transfer of the mark. Specifically the apparatus comprises the following: A conveyor belt is provided onto which pairs of hosiery are placed at predetermined spaced intervals. The conveyor belt is advanced intermittently and at the same time the strip is advanced intermittently as used. When the hosiery and mark on the strip reach a heated iron, the belt stops for a very short interval of time and is lifted slightly after which the iron is lowered against the strip and hosiery to effect the transfer of the mark from the strip to the hosiery.

It is another object of this invention to provide an apparatus of the class described having means for automatically controlling the advance of the transfer strip, so that the raised letters thereon will stop in the proper position to be applied to

the hosiery. The advancing of the strip is controlled by raised indicia thereon, which in turn serves to break a circuit and stop the strip when it has advanced to the proper position. It is therefore seen that the strip will be properly advanced each time a transfer is applied regardless of the indicia spacing used, as long as the indicia are equally spaced. This feature eliminates the possibility of poor positioning of the marking upon the fabric or hose.

It is another object of this invention to provide a transfer mechanism employing a plurality of transfer units, so that several strips can be employed for simultaneously applying a plurality of marks upon a pair of hosiery or other fabric.

It is another object of this invention to provide an apparatus of the class described having means operable upon the absence of a pair of hosiery or fabric beneath the heating element for preventing the advancing of the transfer strip and for preventing the lowering of the heating element.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

Figure 1 is a plan view of an improved apparatus for applying transfer marks to fabrics, hosiery and the like;

Figure 2 is an elevation looking at this near side of Figure 1;

Figure 3 is an elevation looking at the far side of Figure 1;

Figure 4 is a longitudinal sectional detail view taken along the line 4—4 in Figure 1, showing a portion of the clutch control for operating the tape advancing mechanism;

Figure 5 is a longitudinal sectional view taken along the line 5—5 in Figure 1, showing other portions of the tape advancing mechanism;

Figure 6 is a transverse sectional view taken along the line 6—6 in Figure 1;

Figure 7 is a transverse sectional view taken along the line 7—7 in Figure 1;

Figure 8 is a longitudinal sectional view taken along the line 8—8 in Figure 1;

Figure 9 is an enlarged longitudinal sectional view taken along the line 9—9 in Figure 1;

Figure 10 is an enlarged detail view showing how the raised letters on the transfer strip serve to break a circuit which in turn controls the advancing mechanism;

Figure 11 is an isometric view of a portion of a transfer strip showing a raised opposite hand word thereon;

Figure 12 is a plan view of a foot portion of

a stocking after the transfer marks have been applied thereto;

Figure 13 is an electrical wiring diagram for the apparatus;

Figure 14 is a timing diagram of the apparatus.

Referring more specifically to the drawings, the numeral 10 denotes a framework for supporting a transfer mechanism, said framework having mounted thereon a motor 11 (Figures 1, 2 and 3) which motor has a shaft 12 upon which is fixedly secured a pulley 14. A belt 15 is mounted upon the pulley 14 and also upon a larger pulley 16. The pulley 16 has secured to one face thereof smaller pulley 17 upon which a belt 19 is mounted, said belt being also mounted upon a larger pulley 20.

Conveyor drive

The pulley 20 is fixedly secured upon a transversely disposed shaft 21. This shaft has a crank or lever arm 22 mounted on one end thereof (Figure 3) and the free end of the arm has pivotally secured thereto as at 24, one end of a link 25. Link 25 extends upwardly from point 24 and has its upper end secured as at 27 to another lever 28, which lever is loosely mounted around a shaft 29, upon which a cylinder 30 is fixedly secured. The cylinder 30 has a belt 32 disposed therearound, which belt also is mounted around a second cylinder 33. The belt 32 is intermittently advanced to carry successive pairs of spaced hosiery, fabrics or the like beneath a transfer mechanism to be subsequently described.

The advancing means for the belt and for the cylinders 30 and 33 comprises a ratchet wheel 35 (Figure 3) which is fixedly secured to shaft 29. A dog 36 is adapted to engage notches 37 in the periphery of the ratchet wheel and advance the ratchet wheel, the cylinders 30 and 33 and the belt 32, a predetermined amount each time the shaft 21 makes a revolution. The hosiery or other fabric will be spaced apart from each other on the belt distances equal to the intermittent advance of the belt. The guiding and spacing mechanism will be described in the following paragraphs.

Fabric guiding and spacing mechanism

As the belt 32 is intermittently advanced by the mechanism previously described, it is necessary to also intermittently advance in timed relation to the belt, a suitable fabric guiding and spacing mechanism. In other words, it is very essential in the operation of the present apparatus that the objects to be marked be placed in the proper positions upon the conveyor belt so that when each object to be marked advances beneath the transfer applying mechanism, it will be in position for receiving a transfer mark from a suitable transfer strip.

This mechanism in part comprises a suitable sprocket wheel 45 which forms an integral part of the ratchet wheel 35 and which is also fixedly mounted around shaft 29 (Figures 1, 2 and 3). Upon the sprocket 45, a chain 46 is mounted, which chain is also mounted upon a smaller sprocket 47 on the free end of an arm 48, said arm being pivotally secured as at 49 to the side of framework 10. The free end of the arm 48 (see Figure 3) is adapted to rest upon a bracket 50, which, in turn, is adjustably secured to the side of the framework 10 by means of a set screw 51 penetrating a slot 52 in the upstanding leg of the bracket. The set screw 51 is threadably secured in framework 10. By raising or lowering

the bracket 50, the elevation of the sprocket 47 and intermediate portion of chain 46 can be varied to thereby remove the slack.

The chain 46 is engaged by a suitable sprocket 55, on a shaft 56. This shaft is rotatably mounted in the free end of a frame 58, which frame is pivotally secured as at 59 to the opposed sides of the framework 10. By so mounting the frame 58 the free end thereof, including the shaft 56, and sprocket 55, can be rotated upwardly in a clockwise manner in Figure 2 or in a counterclockwise manner in Figure 3 when it is desired to gain access to the top portion of the belt 32 which is disposed beneath the frame. Frame 58 comprises a pair of bars, 64 and 65, which are fastened together by an intermediate tie rod 66, and tie bars 67. The free ends of the bars 64 and 65 form the end of the frame 58 which supports the transverse shaft 56 previously described.

In the present embodiment of the invention, the shaft 56 has three sprockets 68 slidably keyed thereon, there being a key way 69 disposed longitudinally of the shaft. Upon each of these sprockets is mounted a chain 70, which chains are also mounted upon three other sprockets 72, said sprockets 72 being rotatably mounted around a stationary shaft 73, thereby providing three sets of spacing chains which are simultaneously driven. The shaft 73 has its ends mounted in side bars 64 and 65.

The hubs of sprockets 68 and 72 in each set have peripheral grooves 74 and 75 respectively therein in which the ends of a longitudinally disposed bar 76 is adapted to fit. The intermediate portion of the bar 76 is adjustably secured to the transfer shaft 66 by means of a suitable set screw 78. The purpose of the bar 76 is to hold the sprockets 68 and 72 in aligned position so that the chain 70 will travel in the proper path. If it is desired to vary the positions of the sprockets 68 and 72 of a set transversely of the belt 32, it is necessary to loosen a set screw 78 and then slide the sprockets 68 and 72 and the bar 76 laterally of the frame 58 along shafts 66, 56 and 73. Of course, the ends of the bar 76 loosely engage the grooves 74 and 75 in such a manner that the turning of the sprockets 68 and 72, will not be retarded.

Each of the chains 70 has spaced lugs 80 pivoted thereto as at 81, and these lugs are adapted to drop down onto the top side of the conveyor belt 32 in the manner shown in the left hand portion of Figures 1 and 2 to act as a guide to direct the positioning of a suitable fabric such as a pair of hose 82. The position a pair of hose is adapted to first occupy when placed upon the conveyor belt 32 is illustrated in Figure 1. Upon the continuous intermittent advance of both the conveyor belt and the chains 70, the hosiery 82 will be gripped between the chains 70 and the conveyor belt 32. When the next succeeding pair of lugs fall downwardly onto the belt, another pair of hosiery is placed in the same position as in the preceding case and this pair will likewise be advanced intermittently. In order to assist the operator in positioning the hosiery in the proper relation to the side of the belt 32, a suitable pointer 83 is provided (Figures 1 and 2). One end of the pointer indicates the position the heel of the hosiery should occupy relative to the sides of the belt. The other end of the pointer is secured to bar 76 as at 83a.

The elevation occupied by the lower portions of chains 70 relative to the top of the conveyor belt 32 may be varied by simply loosening set

screws 84 (Figures 2 and 3) which screws penetrate suitable slots 85 in brackets 86. The screws are threadably secured in framework 10 and when loosened, the frame 58 which rests thereon may likewise be raised or lowered to control the position occupied by the lower portion of the chains 70 relative to the top of the belts 32.

Transfer tape advancing mechanism

In the drawings, there are three transfer tape advancing mechanisms shown which operate simultaneously in timed relation to the advance of the conveyor belt to cause the indicia on the transfer strips to occupy the proper positions when the transfer is effected. The three advancing mechanisms are very similar in construction; therefore, a detailed description of only one will be made, but like reference characters will be applied to the others, where similar parts are employed. Three transfer strips namely 90, 91 and 92 simultaneously advance in timed relation to the travel of the belt 32 and the fabric 82 carried thereby (Figures 1, 2 and 9). The three strips 90, 91 and 92 are advanced by mechanisms broadly designated by reference characters 94, 95 and 96, respectively (see Figures 1, 2 and 6).

Strips 90, 91 and 92 emanate from rolls 97, 98 and 99 respectively, each of the rolls being mounted upon a hub or spindle 100 which is supported in stationary position by means of a bracket 101. Pivotally secured as at 102 in each of the spindles 100 are arcuate leaf members 103. Rigidly secured at one end of each member 103 as at 102 is a lever 104 (see Figure 2) the lower end of which encircles a pin 105. A compression spring 106 is confined around the pin 105 by means of a nut 107. When the nut 107 is forced downwardly onto the pin 105, the free end of arcuate leaf member 103 is rotated in a clockwise manner in Figure 2 about point 102 to thereby cause the spindle 100 to be expanded, which increases the friction offered by the spindle to the interior of the roll.

After emanating from the strip rolls 97, 98, and 99 respective strips 90, 91 and 92 pass downwardly over rollers 110 in respective switch units 111 (Figures 9 and 10). Each switch unit has mounted therein a suitable metallic member 112 of a long radius concavo-convex construction, the convex side thereof being adapted to support one side of the strip 90. The side of the strip opposite the apex of the convex side of the member 112 is supported by a rigid bar 114. By referring to Figure 11, it will be seen that the transfer strip 90 has raised letters 116 placed thereon, said letters appearing backwards or opposite hand to regular printing. These letters are spaced on the strip at equal intervals. When the raised letters 116 pass between the bar 114 and the member 112, the member 112 is forced inwardly and caused to rotate about its pivot point 112a. This inward movement of the member 112 serves to open a suitable switch, to be later described, which in turn will cause the strip advancing means to immediately stop.

While the strip is in stationary position an advanced set of letters or indicia 116 is transferred from the transfer strip 90 to the object 82. After passing between members 112 and 114, the strip 90 passes over another roller 118 within unit 116 and then downwardly beneath a transverse rod 119. From the rod 119 this strip travels in a substantially horizontal plane until it reaches another rod 120, after which the tape passes up-

wardly between drive rollers 121 and 122. The tapes 91 and 92 follow similar paths alongside strip 90, and these tapes are drawn through the apparatus by means of drive rollers 290, 291, 292 and 293 (Figure 6).

The roller tape 121 is positively driven at the proper time to cause the strip 90 to be advanced. It is seen by observing Figure 9 that the transfer marks 116 are equally spaced upon the strip 90. The purpose of the advancing mechanism is to stop each of the spaced transfer marks of each strip at the proper position between the rods 119 and 120 so that upon the actuation of a heating element, the mark can be pressed into engagement with and transferred from the tape to the fabric. The mark which is actually applied to the hosiery or fabric does not effect the stopping of the advancing mechanism for the strip. However, one of the spaced marks or letters which is on the strip subsequently to be applied to another hose effects this stopping operation.

By referring to Figures 4, 5 and 6, the detailed construction of the strip advancing mechanism can be seen. The roller 121 is fixedly secured upon a shaft 125 by means of a suitable screw 126. This shaft 125 is rotatably supported by bars 127, 128, 129, 130 and 131. Operatively secured to the right hand end of the shaft 125 (Figure 6) is the advancing unit 94 which unit advances the strip 90. The units 95 and 96 serve to advance strips 91 and 92 respectively in an identical manner.

Fixedly secured around the shaft 125 by means of screw 133 is a ratchet 134, said ratchet being adapted to have the free end of a pawl 135 engage the periphery thereof, when advancing strip 90 (Figure 5). The upper end of pawl 135 is pivoted as at 136 to the upper end of a lever 137, and the lower end of this lever is mounted for oscillation around the shaft 125. A spring 138 has one end thereof attached to the lever 137 and its other end attached to the intermediate portion of pawl 35 to serve as a means for holding the free end of the pawl in engagement with the ratchet.

The intermediate portion of the lever 137 also has pivoted thereto as at 140, one end of a link 141 (see Figure 5). The other end of the link has a yoke 142 connected thereto which encircles an eccentrically mounted disk 143, said disk being secured to a shaft 144. Shaft 144 has a sprocket 145 on one end thereof (see Figures 1 and 2), said sprocket 145 having a chain 146 disposed thereon and said chain being also disposed around a sprocket 147 which is fixedly secured on shaft 21 previously described. As shaft 21 turns to cause the belt 32 to be intermittently advanced and also to cause the guiding chains 70 for the hosiery to be intermittently advanced, the eccentric 143 will be constantly rotated by shaft 144. This rotation will effect oscillation of lever 137 and dog 135 to cause the ratchet 134 and its associated strip roller 121 to advance.

When the fabric 82 is properly positioned beneath the heating element to receive a transfer the oscillation of the dog 135 advances the strip 90 a predetermined amount upon its forward stroke; however, the amount of the advance is always less than the distance between adjacent spaced marks 116 on the strip. The additional advance of the strip necessary to place it in transfer position is supplied by a constantly rotating shaft 144 in combination with a clutch for disconnecting it from the strip advancing

rollers at the proper time. The apparatus is so timed that the dog 135 is always moving reversely on ratchet 134 when the clutch is disengaged and the transfer of the letters 116 is being effected.

The above mentioned clutch is interposed between the shaft 125 and the ratchet wheel 134. By observing Figure 6, it can be seen that the ratchet 134 of advancing mechanism 94 has integral therewith a disk 150 to which is secured a lining 151. Another disk 152 is loosely mounted around the shaft 125 and the face of this disk is adapted to engage at times, the friction lining 151 when it is desired that the forward rotation of the ratchet 134 be supplemented to advance the strip to final transfer position. The disk 152 also has integral therewith a sprocket 155 upon which a chain 156 is mounted, and this chain is also mounted upon another sprocket 157 fixedly secured around shaft 144 (Figures 5 and 6). Since the shaft 144 rotates constantly the sprocket 155 and disk 152 will be constantly rotated, but it is only when the clutch members 151 and 152 are engaged with each other that the rotation of sprockets 155 is imparted to the shaft 125 to cause the strip 90 to advance.

The clutch members 151 and 152 are adapted to be disengaged immediately upon the moving of the raised letters 116 between members 114 and 112 as shown in Figure 10. As heretofore stated, when this raised portion passes between members 112 and 114, a similar transfer portion 116 will be disposed in transfer position directly beneath a transfer iron and at a point substantially midway between the rods 119 and 120 (Figure 9). When a transfer is made the dog 135 is in a rearmost position on ratchet wheel 134. Immediately thereafter the dog moves the ratchet forwardly to advance the portion 116 from between members 112 and 114, which will permit a circuit to be closed, which in turn will cause the clutch mechanism 151 and 152 to engage each other. The clutch members will then cause the transfer strip to travel until the next spaced raised mark 116 moves between members 112 and 114 to break the circuit.

A suitable thrust bearing 160 is disposed around the shaft 126 and against the face of sprocket 155. Disposed adjacent the bearing 160 and also around the shaft 125 is a downwardly extending lever 161 (see Figure 4), the lower end of which has a link 162 connected thereto which extends longitudinally of the apparatus and has the other end thereof adjustably secured in a stationary upstanding bracket 163 by means of wing nuts 164. The upper portion of the lever 161 has projections 165 extending from one face thereof (see Figure 6) and these projections are disposed in the path of cam surfaces 167 on another lever 168. The lever 168 likewise is loosely secured around shaft 125. When the lever 168 is rotated in a clockwise manner in Figure 4, that is, when the lower end thereof moves away from the observer in Figure 6, the cam surfaces 167 engage the projections 165 and force members 152, 155, 160 and 161 to the left in Figure 6. This causes the disk 152 and friction lining 151 to become engaged thus causing the rotation of the sprocket 155 to rotate ratchet 134 and the shaft 125. By manipulating the wing nuts 164 (Figure 4), the stroke of solenoid 172 can be varied.

The lever 168 is rotated to effect the engagement of the above described clutch by means

of a suitable link 170 (see Figures 3 and 4) which link has one end thereof secured to the lower end of said lever and has its other end connected to a suitable core 171, said core 171 being slidably mounted in a solenoid coil 172.

Circuit for solenoid 172 and switch unit 111

Referring now to the wiring diagram in Figure 13, it is seen that the solenoid coil 172 has wire 175 leading therefrom to one side of a switch contact bar 176 of switch unit 111, said switch being actuated by the pivoted member 112 and the raised indicia 116 on the transfer sheet 90 (Figures 9 and 10). When the transfer indicia 116 is in the position shown in Figure 10, the switch bar 176 is open, thereby breaking the circuit to the solenoid coil 172 and allowing the solenoid core 171 to be pulled to the right in Figure 4 by means of a tension spring 180. Of course when the core 171 is pulled to the right, the lever 168 is rotated in a counter-clockwise manner until it engages stop 161a, thus permitting the clutch to become disengaged and allowing the shaft 126 and feed rolls 121 and 122 to stop. The other side of the solenoid coil 172 has a wire 181 leading therefrom, the other end of which is connected to a coil 182 of a transformer 183. From the other side of the transformer coil 182, a wire 184 leads to one side of a manual switch 185 and from the other side of the manual switch 186 leads to the other side of the switch bar 176 to complete the circuit.

Clutch stabilizer

In order to apply a constant friction to the periphery of members 150 and 151 and 152, a suitable brake shoe 195 has been provided (Figure 5). This brake shoe is pivoted as at 196 to a short shaft 197, said shaft being slidably mounted in a bracket 198. A compression spring 199 is disposed within the bracket 198 and has one end thereof engaging the end of the shaft 197, the other end of the compression spring being confined in the bracket 198 by means of an adjustable screw 200. This constant friction exerted upon the members 150, 151, and 152 serves to hold the parts 151 and 152 in the position in which they may have stopped and thereby prevents movement of the strip 90 after it is in position for receiving the heating element to transfer the lettering thereon to the fabric or hosiery.

Transfer strip advancing mechanism and heating element

As heretofore stated, one of the purposes of the dog 135 is to rack the raised portion 116 from between members 114 and 112 immediately after the transfer operation has been effected. It is evident that until this portion is racked from between these members, the switch 111 will remain open and the clutch will remain disengaged, consequently, the strip 90 cannot be advanced. However, upon the closing of the switch 111, the bar 176 will establish connection between wires 176 and 186 so that the solenoid 172 will be energized which in turn will effect the engagement of the clutch to thereby cause the shaft 126 to be rotated by the chain 156 and shaft 144 previously described.

The actuation of the heating element and the transfer of the indicia 116 from the tape 90 to the object 82 takes place while the dog 135 and arm 137 are moving in a counter-clockwise manner (Figure 5) or backwardly relative to the

ratchet wheel 134. In other words, the amount that the dog advances the ratchet 134 and the strip 90 is not sufficient to place the indicia 116 in proper position for transfer. Therefore, it is necessary to provide the above-described clutch mechanism and a second driving means comprising members 21, 144, 146 and 150 to 156 inclusive so that when the strip has been additionally advanced exactly the right amount, the solenoid 170 will be de-energized to disengage the clutch and stop the strip while the dog 135 is moving rearwardly.

Stroke adjustor for the advancing mechanism

In order to control the number of teeth in ratchet 134 which the free end of the dog 135 engages during each oscillation, a suitable cam member 205 has been provided which cam is rotatably mounted around the shaft 125 (Figure 5). The lower end of this cam member has pivoted thereto as at 206, a longitudinally disposed hand lever 207, said lever having a notched portion 208 which penetrates a slot 209 in a bracket 210. The notches 208 are adapted to selectively fit over the lower portion of slot 209 to determine the position that point 205a on cam 205 occupies relative to the free end of the dog 135. Point 205a on the cam 205 is disposed in the path of the free end of dog 135 and serves to raise this end out of engagement with the ratchet teeth during the reverse oscillation of the dog. By varying the position of the point 205a relative to the dog, the effective stroke of the dog upon its forward oscillation can be varied. It is only after the free end of the dog moves off the high portion at point 205a that the ratchet 134 is engaged.

Switch unit 111

It is seen by referring to Figure 9 that each switch assembly 111 is mounted for vertical adjustment upon a second framework 215, said framework being supported by previously described framework 10. A suitable vertical guideway or mortise 216 is provided in the framework 215 and within this guideway, a tenon slide 217 is adapted to operate. This slide has the switch assembly 111 attached thereto as at 218. Threadably penetrating the slide 217 is a vertically disposed bolt 219, the upper end of which has a knurled nut 219a thereon which is used to turn the bolt. The intermediate portion of the bolt is rotatably mounted in an angle bracket 220 which in turn is supported by the framework 215. The purpose of mounting the switch assembly 111 for vertical adjustment is to insure that the raised indicia 116 upon the strip 90 will break the switch contact exactly at the proper time to thereby insure that the transfer indicia will be positioned properly relative to the fabric 82 to which it is transferred. A jog switch 211 is provided (Figure 13) between wires 212 and 213, said wires being connected respectively to wires 175 and 186. The switch 211 is manually closed when it is desired to advance strip 90 independently of the automatic advancing means previously described. Switch 211 is connected in parallel with switch 176 and is used when threading strips 90 in the machine.

Tape drive roll mounting

Referring again to Figures 1, 2 and 6, it is seen that the top rollers 122, 291 and 293 are rotatably mounted upon transversely disposed shaft 221, the ends of said shaft being mounted in the free end of frames 222. The other end of the frames

are pivoted as at 223 to framework 215. Tension springs 224 are associated with each of the frames 222 for normally pulling the free ends thereof downwardly to cause the bottoms of the rollers 122, 291 and 293 to firmly engage the upper portions of the tapes 90, 91 and 92, and grip them against the tops of rollers 121, 290, and 292 respectively.

Belt lifting mechanism

After the transfer strip has moved to the proper position and the belt 32 has stopped, another member moves upwardly to engage the bottom of the belt to move the belt and the fabric thereon upwardly into engagement with the bottom of the strip. By providing this type of mechanism the position of the strip is not disturbed, but is allowed to remain in a substantially horizontal position during the transfer (Figures 2 and 9). This upwardly moving member comprises a table 242, which table forms a portion of the bottom 243 onto which the top layer of the belt 32 is adapted to slide. The vertically movable table member 242 has downwardly extending shafts 244 and 244a which are slidably mounted in brackets 245 and 254a respectively, said brackets being secured to the bottom portion of stationary bottom 243. Also secured to the bottom of the member 242 are brackets 246 and 247 having rollers 246a and 247a which normally rest upon the peripheries of cams 248 and 249 respectively. The cams are fixedly secured upon a transversely disposed shaft 250, said shaft 250 having a sprocket 251 mounted on one end thereof (Figure 3), upon which a chain 252 is mounted. This chain is also mounted upon a sprocket 253 which is mounted upon the shaft 21, previously described.

When the indicia 116 is in the proper position, the high side of the cams 248 and 249 serve to raise the table member 242 and the upper portion of belt 32 to dotted line position in Figure 9, after which a heating element 230 moves downwardly on the upper side of the strip 90.

Transfer mark applying mechanism

After the strip has been advanced to the transfer position, that is after a transfer indicia 116 is disposed approximately midway between rods 119 and 120 (Figures 2 and 9) another mechanism is brought into action for applying heat to the upper side of the transfer strip 90 and for pressing the strip into engagement with the fabric or a pair of hose 82 to effect the transfer operation. The necessary heat is provided by a suitable heating unit 230 which is adapted to be moved up and down in a path above the tape 90. This heating unit is supported by an inverted U-shaped bracket 231 (Figures 2, 7 and 9), said bracket having slots 232 and 233 which encircle shaft 144 previously described. The upper portions of bracket 231 have a compression spring 235 engaging the same, said compression spring having its upper end abutting the lower side of a portion of framework 215. It will also be noted that bracket 231 has associated therewith suitable plates 236 and 237 for supporting rollers 236a and 237a which rollers normally rest upon identical cams 238 and 239, respectively, and these cams in turn are fixedly secured upon shaft 144. Slots 232 and 233 also extend through plates 236 and 237 respectively. When an indicia 116 is disposed directly beneath the heating element 230, the low sides of the cams 238 and 239 are adapted to be disposed beneath the rollers 236a

and 237a, respectively to permit the heating element 230 to be lowered into engagement with the strip and fabric 82 under pressure of spring 235. Each of the plates 236 and 237 are adjustably secured to bracket 231 by means of bolts 240, which bolts penetrate vertical slots 241 in the bracket (Figures 7 and 9).

Heating element circuit

The heating element 230 has a coil 255 in the lower portion thereof (Figures 9 and 13) one end of said coil having a wire 256 leading therefrom to a wire 257, said wire 257 forming one side of the main electrical supply circuit. The other side of the coil 255 has a wire 258 leading therefrom and the other end of this wire leads to one side of switch 259 of a pyrometer 273. Leading from the other side of switch 259 is a wire 260 which is connected to a wire 261. The wire 261 constitutes the other side of the main electrical supply circuit.

Pyrometer 273 is a conventional structure which is employed for indicating and controlling temperatures at predetermined levels. Wires 266 and 267 lead from the pyrometer 273 to an electro-thermal element 268 in the iron 230. When the heat in the iron reaches the desired level, the element 268, actuates the pyrometer which in turn actuates switch 259 in a well known manner to control the current flowing through coil 255. A motor 269 is disposed in the pyrometer to actuate the same, said motor being supplied with current by wires 270. The heating element 230 is held in latched position as shown in Figures 7 and 9 by means of suitable hook latches 262, the lower ends of which engage portion 231a of bracket 231. The upper end of the latches are fixedly secured upon a transverse shaft 263. This shaft 263 is supported by the framework 215 and one end thereof has a downwardly extending lever 264 fixedly secured thereto (Figures 1 and 2). The lower end of this lever has a tension spring 265 connected thereto which normally holds members 262 in latched position.

Hosiery feeler mechanism

As pointed out in the objects of the invention, a mechanism is provided having means operable upon absence of a pair of hosiery beneath the heating unit for preventing the advancing of a transfer strip, and to prevent the lowering of the heating unit into engagement with the belt. In other words, it is very important that so much of the transfer strip be used as required. Therefore, it is necessary that the transfer strip only be advanced a distance equal to the space between the marks thereon, when pairs of hosiery or other fabric 82 are positioned beneath the iron ready to have the mark applied. Furthermore, the iron should not be lowered against the belt 32 unless a fabric is present to be marked. The structure which is employed for performing these functions is illustrated in Figures 5, 6, 7 and 9 of the drawings.

Referring particularly to Figures 7 and 9, it is seen that a feeler foot 274 is provided, the lower end of which is disposed a short distance above the top layer of belt 32. This feeler foot is supported by a vertically disposed rod 275, which rod is slidably mounted in framework 215. The upper end of the rod has suitable nuts 276 threadably secured therearound which act as a shoulder to limit the downward movement of the foot piece 274 and also serve to adjust the elevation of the foot piece 274. A compression

spring 277 normally forces the foot portion 274 downwardly and at the same time forces the nuts 276 against the framework 215 in which the rods 275 are slidably mounted.

When the upper layer of the belt 32 is moved to dotted line position, the upper surface of the belt will not be raised high enough to contact the lower surface of the foot 274; however, if a pair of hosiery or other fabric of suitable thickness is disposed on top of the belt, then this added thickness will be sufficient to raise the foot portion 274 and the rod 275 when the belt is raised. It will be further seen by referring to Figure 9 that the upper end of the rod 275 normally engages a plunger 278 which plunger serves to close switch 176a of switch assembly 283. The switch assembly 283 is very similar to the switch 111 shown in detail in Figure 10; however switch 176a is normally open and switch 176 is normally closed. In other words, the rod 275 closes switch 176a (Figure 13), when a pair of stockings or fabrics are disposed on top of the belt as it is raised against foot portion 274. Leading from one side of switch 176a is a wire 284, the other end of which leads to wire 184 previously described. From the other side of the switch 176a, a wire 285 leads to one side of a solenoid 286, said solenoid having an arm 287 extending therefrom which is connected to the lower end of the arm 264 previously described (Figures 2 and 13).

From the other side of the solenoid 286, a wire 288 leads back to wire 181, which completes the circuit. When the fabric 82 is disposed on the belt and is raised upwardly against the foot portion 274, the rod 275 is caused to close the contact switch 176a thereby making the circuit to the solenoid 286 to rotate the arm 264 to a position where the iron 230 and its associated bracket 231 will be released and permitted to move downwardly under force of the spring 235. Of course the cams 238 and 239 will control the rate of downward movement of iron 230. However, it should be understood that the solenoid 286 is actuated to perform the unlatching operation. Spring 265 is employed to relatch the iron when it raises again.

Cam control for strip advancing mechanism

By referring to Figures 5 and 6, it will be seen that each of the strip advancing mechanisms 94, 95 and 96 have associated therewith a cam 300. One cam 300 is loosely mounted around the shaft 125, another around sleeve 295, and another around sleeve 297. The lower end of each cam member has a slot 301 (Figure 5) therein normally penetrated by a shoulder screw 302, which screw is embedded in a link 303. These links converge into a single link 304 (Figure 8), said link or rod 304 being slidably mounted in brackets 305, and 306 (Figure 8). Brackets 305 and 306 are suspended from the bar 130. The intermediate portion of the rod 304 has a peripheral groove 308 therein which is adapted to receive the end of a horizontally disposed link 309. The other end of the link 309 is pivotally secured as at 310 to vertical leg of a bell crank 311, said bell crank 311 being pivoted as at 312 to the framework 215. A spring 313 normally tends to force the right hand end of link 309 into peripheral groove 308 to hold member 304 in latched position and to hold cams 300 in such a position that the oscillating pawls 135 can not engage ratchets 134. The horizontal leg of the bell crank 311 is adapted to normally support an

L-shaped member 315 (Figure 9) said L-shaped member having its vertical leg slidably mounted in framework 215. Secured to the intermediate portion of the vertical leg, is a horizontally extending leg 317, said leg extending beneath portion 231a of the bracket 231. A compression spring 318 normally tends to hold this laterally extending leg 317 in engagement with portion 231a. Upon the actuation of solenoid 286 (Figure 13) and the unlatching of the iron or heating unit 230, the bracket and iron will move downwardly, following cams 238 and 239. As the bracket 231 moves downwardly, the members 317 and 315 will likewise move downwardly to rotate the bell crank 311 in a counter-clockwise manner in Figure 7 to thereby move the right hand end of link 309 out of peripheral groove 308.

By referring to Figure 8, it is seen that a compression spring 320 normally tends to force the rod 304 to the right when the rod 304 is released, the cam members 300 are rotated in a counter-clockwise manner in Figure 5. Since the cam 300 has a high periphery 300a which is sufficient to hold the free end of dog 135 out of engagement with the ratchet 134, it is evident that the dog 135 can only engage the ratchet when point 300b has been rotated in a counter-clockwise manner a sufficient amount to permit engagement to be had, that is in a position where the low side of the cam 300 will permit the dog 135 to engage the teeth in ratchet 134, during the oscillation of lever 137. It is only when a hose or fabric 82 is present beneath the foot 274 when table 242 is raised that the cams 300 are rotated in a counter-clockwise manner as above described. When the right hand end of leg 309 (Figure 7) is released from peripheral groove 308, the rod 304 swiftly moves to the right in Figure 8 to a position where the free end of the link 309 will rest in groove 304a. After the transfer is applied, the cam 300 is returned to latched position by virtue of a suitable cam 325, which cam is fixedly secured on the shaft 144. This cam is adapted to engage a roller 326 fixed on an arm 327, said arm 327 being secured to the left hand end of the rod 304 (Figure 8). When the parts are latched in the position shown in Figure 8, the high side of the cam 325 will not engage the roller 326 until a fabric 82 contacts feeler 274 to effect an unlatching operation. It is only when the rod 304 has been permitted to move to the right in Figure 8 as a result of an unlatching of the heating unit that the cam 305 has any function. For a further understanding of the method of operation and the timing of certain elements, attention is called to Figure 14.

Motor circuit

Wire 261 leads to one side of the motor 11. From the other side of the motor, a wire 279 leads to a switch 280, which switch has leading from its other side a wire 281, said wire 281 contacting wire 257, previously described to complete the circuit.

Current is supplied to coil 188 on one side of transformer 183 from the main leads 257 and 261 by means of a circuit comprising wires 189, 191 and 192. A manually operable switch 190 is disposed between wires 189 and 181 (Figure 13).

Referring again to Figure 6, it is seen that the advancing unit 94 works in conjunction with feed rollers 121 and 122 to advance the strip 90. In a similar manner, the unit 95 works in conjunction with similar rollers 290 and 291 to advance the strip 91 and likewise the advancing unit 96

works in conjunction with rollers 292 and 293 to advance the strip 92. A ratchet 134 of the advancing unit 95 is fastened onto a hollow shaft 295 as at 295a, which shaft is telescoped over the shaft 125, and to this same shaft 295 the advancing feed roller 290 is secured by means of a suitable set screw 296. Likewise the ratchet 134 of advancing unit 96 is secured to the periphery of another hollow shaft 297 by means of set screw 297a, this shaft having the feed roller 292 secured thereto by means of set screw 298. The advancing units 94, 95 and 96 are practically identical in structure. Where a plurality of strips are simultaneously used, each employing different lengths between transfer indicia, it is necessary to have independent means for positioning these indicia relative to the fabric 82; hence separate units 94, 95 and 96 are employed. This individual adjustment could not be effected if only one unit such as 95 were employed for all three transfer strips.

Figure 12 shows the appearance of a foot of a stocking after three transfer marks have been placed thereon. The toe of the hose 82 in Figure 12 has the trade-mark "Muskeeter" printed thereon. This trade-mark is transferred from the strip 90 which has been described. The intermediate mark on the foot of the stocking namely "Triple Sole Rayon and Cotton" is simultaneously transferred from the intermediate strip 91; whereas the indicia on the heel namely "Blocked 4 ply heel" is simultaneously transferred from the strip 92. The distances between each of the above named marks vary on their respective strips; however, the spacing of each mark on its strip is uniform. It is here seen that any number of marks can be simultaneously placed on a fabric by having an individual control for each strip advancing mechanism. The fact that a number of marks are simultaneously applied to the transfer process speeds up the operation and increases the quality of work. As heretofore stated, when these transfers are placed on the stockings by manual means, the human element enters and the uniformity of the finished material is not nearly so satisfactory as when a mechanical means is employed.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the following claims.

We claim:

1. Apparatus for transferring raised indicia from a strip to a fabric, said strip having substantially equally spaced transfer indicia thereon, comprising a heating element, means for intermittently advancing spaced fabrics beneath said element, means for simultaneously advancing said strip beneath said element, means operable by one of said raised indicia for stopping the advance of the strip while the fabrics are stationary and means for successively lowering said heating element into engagement with the strip and fabrics while stopped to cause the indicia to be transferred to the fabric.

2. Apparatus for transferring indicia from a strip to a fabric, said strip having substantially equal spaced transfer indicia thereon, comprising the heating element, means for intermittently advancing spaced fabrics beneath said element, means for simultaneously advancing said strip and spaced indicia beneath said element, means

operable by one of said raised indicia for stopping the advance of the strip while the fabrics are stationary, means for successively lowering said element into engagement with a stationary fabric and the strip, and means for raising the fabric into engagement with the lower side of the heating element and into engagement with the stopped strip to cause the indicia to be transferred to the fabric.

3. Apparatus for placing indicia on hosiery and other objects by a transfer process comprising a frame, means for intermittently feeding the hosiery in spaced relation through the frame, means for supporting a roll of strip material having indicia thereon to be transferred to the hosiery, means for feeding the strip into a position proximate to the hose, means for raising the hose, electrical means controlled by the indicia on the strip for arresting the travel of the strip so as to cause an indicia thereon to be in a position ready to contact the hose, heated means for pressing the strip against the hose, means for lowering the heated means to press the strip against the hose while the hose is raised.

4. Apparatus for placing indicia on hosiery and other objects by a transfer process comprising a frame, means for intermittently feeding the hosiery in spaced relation through the frame, means for supporting a roll of strip material having indicia thereon to be transferred to the hosiery, means for feeding the strip into a position proximate to the hose, means for raising the hose, electrical means controlled by the indicia on the strip for arresting the travel of the strip so as to cause an indicia thereon to be in a position ready to contact the hose, heated means for pressing the strip against the hose, means for lowering the heated means to press the strip against the hose while the hose is raised, and means for automatically raising the heated member, lowering the stamped hose, advancing the stamped hose, advancing another hose to be stamped and again feeding the strip to present another indicia to another hose.

5. Apparatus for placing indicia on hosiery and other objects by a transfer process comprising a frame, means for intermittently feeding the hosiery in spaced relation through the frame, means for supporting a roll of strip material having indicia thereon to be transferred to the hosiery, means for feeding the strip into a position proximate to the hose, means for raising the hose, electrical means controlled by the indicia on the strip for arresting the travel of the strip so as to cause an indicia thereon to be in a position ready to contact the hose, heated means for pressing the strip against the hose, means for lowering the heated means to press the strip against the hose while the hose is raised, means for automatically raising the heated member, lowering the stamped hose, advancing the stamped hose, advancing another hose to be stamped and again feeding the strip to present another indicia to another hose, said apparatus having means for supporting an additional transfer strip, and means for feeding the second strip to present an indicia thereon to another portion of the hose, while the first-named strip is being fed to place an indicia in transfer position.

6. Apparatus for placing indicia on hosiery and other objects by a transfer process comprising a frame, means for intermittently feeding the hosiery in spaced relation through the frame, means for supporting a roll of strip material having in-

dicia thereon to be transferred to the hosiery, means for feeding the strip into a position proximate to the hose, means for raising the hose, electrical means controlled by the indicia on the strip for arresting the travel of the strip so as to cause an indicia thereon to be in a position ready to contact the hose, heated means for pressing the strip against the hose, means for lowering the heated means to press the strip against the hose while the hose is raised, said apparatus having means for supporting an additional transfer strip, and means for feeding the second strip to present an indicia thereon to another portion of the hose, while the first-named strip is being fed to place an indicia in transfer position.

7. Apparatus for placing indicia on hosiery and other objects by a transfer process comprising a frame, means for intermittently feeding the hosiery in spaced relation through the frame, means for supporting a roll of strip material having indicia thereon to be transferred to the hosiery, means for feeding the strip into a position proximate to the hose, means for raising the hose, electrical means controlled by the indicia on the strip for arresting the travel of the strip so as to cause an indicia thereon to be in a position ready to contact the hose, heated means for pressing the strip against the hose, means for lowering the heated means to press the strip against the hose while the hose is raised, and means for engaging the hosiery as it is moved through the apparatus to detect the absence or presence of a hose, and means controlled by said engaging means when a hose is not present to be engaged by the engaging means for preventing the feeding of the strip to prevent an indicia from being fed to a point below the heated means.

8. Apparatus for placing indicia on hosiery and other objects by a transfer process comprising a frame, means for intermittently feeding the hosiery in spaced relation through the frame, means for supporting a roll of strip material having indicia thereon to be transferred to the hosiery, means for feeding the strip into a position proximate to the hose, means for raising the hose, electrical means controlled by the indicia on the strip for arresting the travel of the strip so as to cause an indicia thereon to be in a position ready to contact the hose, heated means for pressing the strip against the hose, means for lowering the heated means to press the strip against the hose while the hose is raised, means for automatically raising the heated member, lowering the stamped hose, advancing the stamped hose, advancing another hose to be stamped and again feeding the strip to present another indicia to another hose, and means for engaging the hosiery as it is moved through the apparatus to detect the absence or presence of a hose, and means for preventing the feeding of the strip to prevent an indicia from being fed to a point below the heated means when a hose is not present to be engaged by the engaging means.

9. Apparatus for placing indicia on hosiery and other objects by a transfer process comprising a frame, means for intermittently feeding the hosiery in spaced relation through the frame, means for supporting a roll of strip material having indicia thereon to be transferred to the hosiery, means for feeding the strip into a position proximate to the hose, means for raising the hose, electrical means controlled by the indicia on the strip for arresting the travel of the strip so as to cause an indicia thereon to be in a posi-

tion ready to contact the hose, heated means for pressing the strip against the hose, means for lowering the heated means to press the strip against the hose while the hose is raised, means for automatically raising the heated member, lowering the stamped hose, advancing the stamped hose, advancing another hose to be stamped and again feeding the strip to present another indicia to another hose, said apparatus having means for supporting an additional transfer strip, means for feeding the second strip to present an indicia thereon to another portion of the hose, while the first-named strip is being held to place an indicia in transfer position, and means for engaging the hosiery as it is moved through the apparatus to detect the absence or presence of a hose, and means controlled by said engaging means when a hose is not present to be engaged by the engaging means for preventing the feeding of the strip to prevent an indicia from being fed to a point below the heated means.

10. Apparatus for placing indicia on hosiery and other objects by a transfer process comprising a frame, means for intermittently feeding the hosiery in spaced relation through the frame, means for supporting a roll of strip material having indicia thereon to be transferred to the hosiery, means for feeding the strip into a position proximate to the hose, means for raising the hose, electrical means controlled by the indicia on the strip for arresting the travel of the strip so as to cause the indicia thereon to be in a position ready to contact the hose, heated means for pressing the strip against the hose, means for lowering the heated means to press the strip against the hose while the hose is raised, said apparatus having means for supporting an additional transfer strip, means for feeding the second strip to present an indicia thereon to another portion of the hose, while the first-named strip is being fed to place an indicia in transfer position, means for engaging the hosiery as it is moved through the apparatus to detect the absence or presence of a hose, and means controlled by said engaging means when a hose is not present to be engaged by the engaging means for preventing the feeding of the strip to prevent an indicia from being fed to a point below the heated means.

11. Apparatus for applying transfers to hosiery, including a plurality of strips, each having raised indicia thereon to be transferred to the hosiery, means for conveying the hosiery step by step through the apparatus, means for feeding the strips to present an indicia on the strip to the hosiery, means controlled by the raised indicia on each strip for stopping travel of the strip when an indicia thereon is in position to be transferred to the hosiery, means for raising the hosiery, means for applying heat to the strips and pressing their indicia into contact with the

hosiery, and means controlled by the absence of hosiery at a given place in the apparatus for preventing feeding of the strips.

12. Apparatus for transferring indicia from a strip to a fabric comprising a stamping element, means for supporting a fabric in spaced relation to said element, means for advancing said strip between the element and the fabric support, and means controlled by the indicia on the strip for moving said element into engagement with the strip and into engagement with a fabric while on the support to thereby cause indicia to be transferred to the fabric.

13. Apparatus for transferring indicia from a strip to a fabric comprising a stamping element, means for supporting a fabric in spaced relation to said element, means for advancing said strip between the element and the fabric support, means controlled by the indicia on the strip for moving said element into engagement with the strip and into engagement with a fabric while on the support to thereby cause indicia to be transferred to the fabric, and means for removing each fabric from said support after the indicia has been transferred.

14. Apparatus for transferring indicia from a strip to a fabric, comprising normally latched stamping element, a fabric support disposed in spaced relation to said element, an electrical circuit, a solenoid disposed in said circuit for operating said latch, a normally open switch in said circuit, a fabric feeler disposed above the support and being adapted to operate said switch, means for advancing said strip between the stamping element and fabric support, means for moving said support and fabric thereon toward said feeler whereby the fabric will engage the feeler to cause the switch to be closed, the solenoid to be energized and the stamping element to be unlatched, and means for moving the unlatched element into engagement with said strip and fabric to cause the transfer of the indicia to the fabric.

15. Apparatus for transferring indicia from a strip to a fabric, said strip having substantially equally spaced raised indicia thereon, comprising a stamping element, means for supporting a fabric in spaced relation to said element, means for advancing said strip between said fabric and element a lesser distance than the space between said indicia, a second means for advancing the strip the remaining distance, means controlled by said raised indicia for rendering said advancing means ineffective when the strip has been advanced a distance equal to the space between the indicia, and means for moving said element into engagement with the strip and fabric to effect a transfer operation.

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