

Dec. 9, 1947.

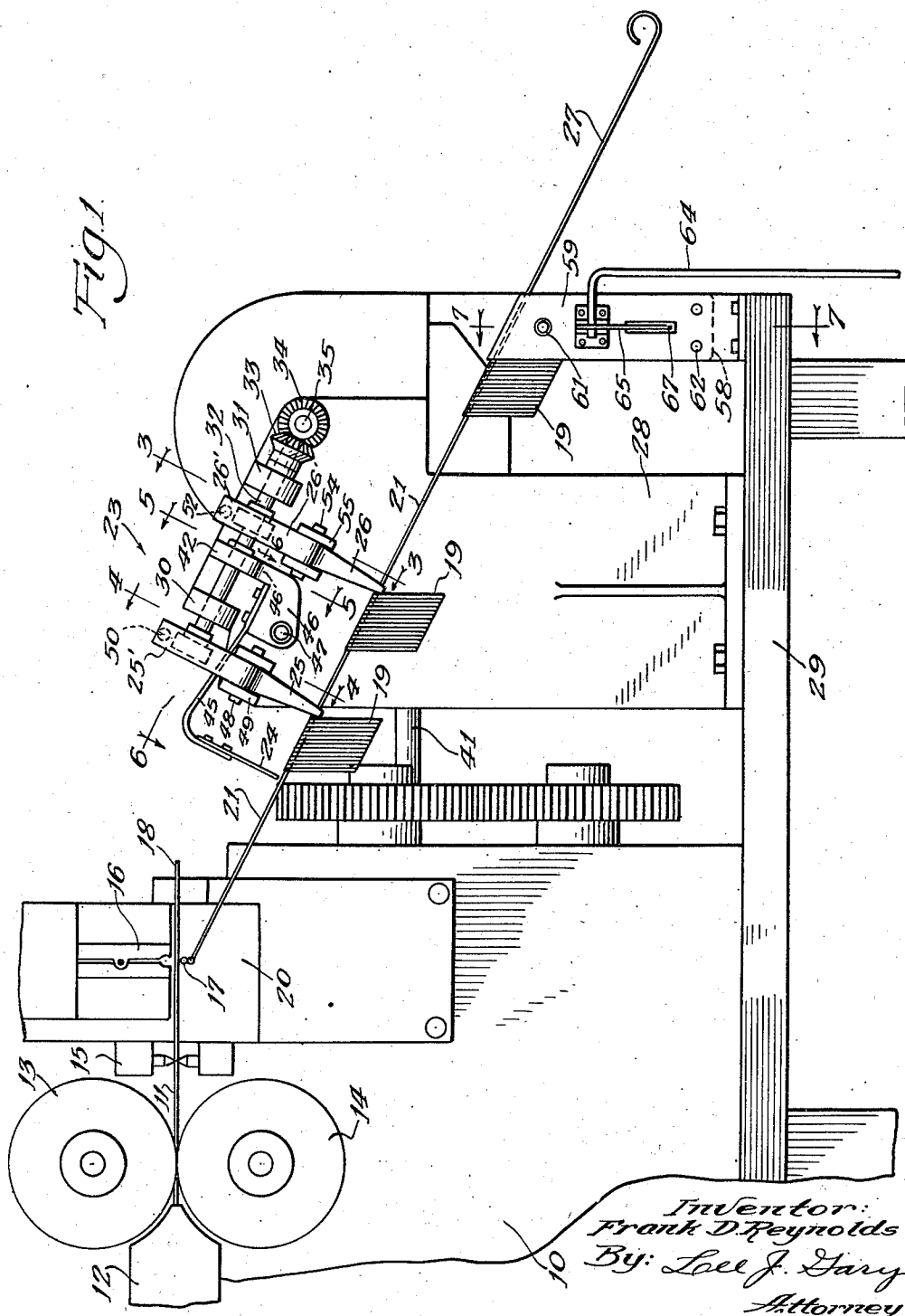
F. D. REYNOLDS

2,432,339

APPARATUS FOR DELIVERING AND GROUPING HAIR FASTENERS

Filed April 24, 1944

6 Sheets-Sheet 1



Inventor:
Frank D. Reynolds
By: Lee J. Gary
Attorney:

Dec. 9, 1947.

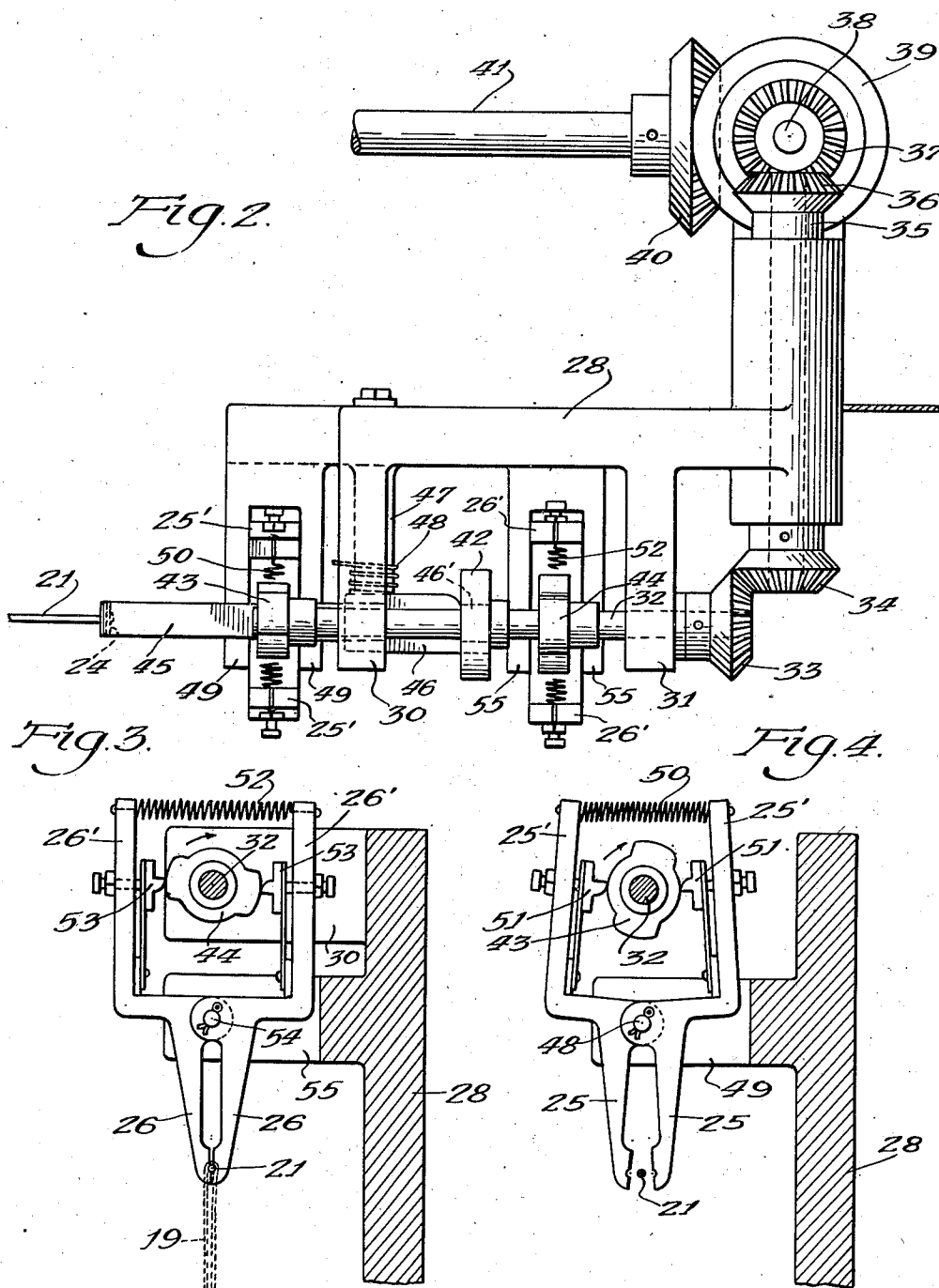
F. D. REYNOLDS

2,432,339

APPARATUS FOR DELIVERING AND GROUPING HAIR FASTENERS

Filed April 24, 1944

6 Sheets-Sheet 2



Inventor:
Frank D. Reynolds
By: Lee J. Gary
Attorney.

Dec. 9, 1947.

F. D. REYNOLDS

2,432,339.

APPARATUS FOR DELIVERING AND GROUPING HAIR FASTENERS

Filed April 24, 1944

6 Sheets-Sheet 3

Fig. 6.

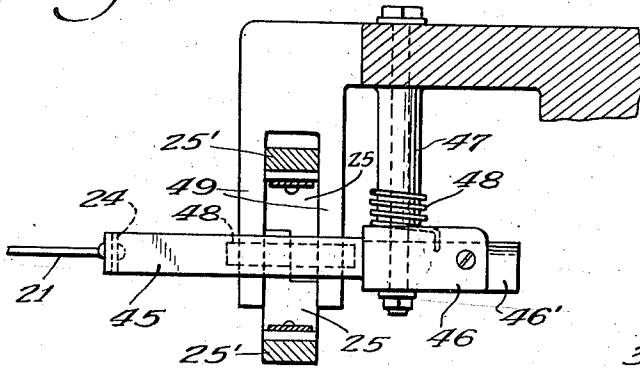


Fig. 5.

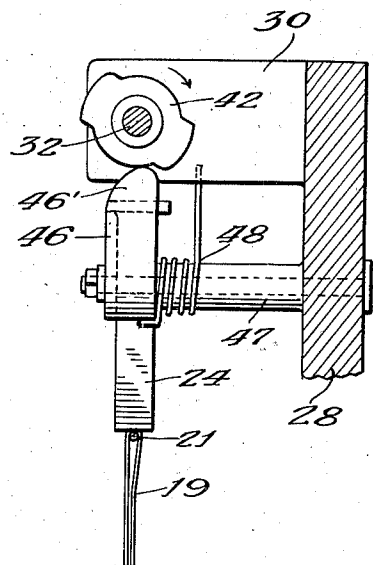
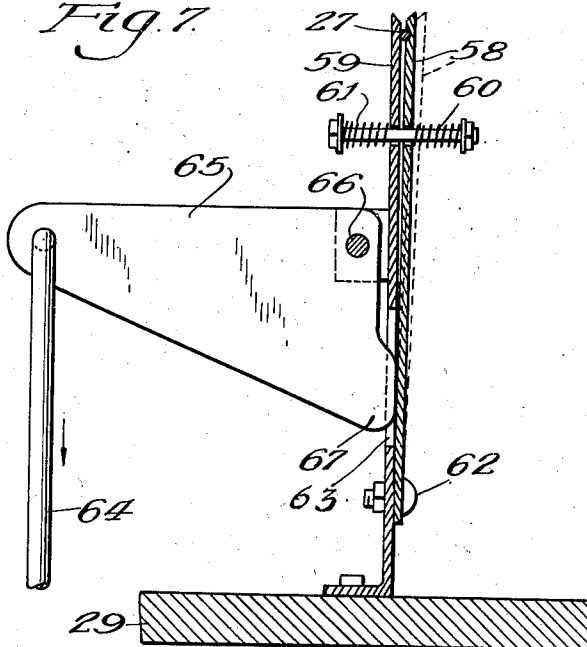


Fig. 7.



Inventor:
Frank D. Reynolds
By: Lee J. Gary
Attorney:

Dec. 9, 1947.

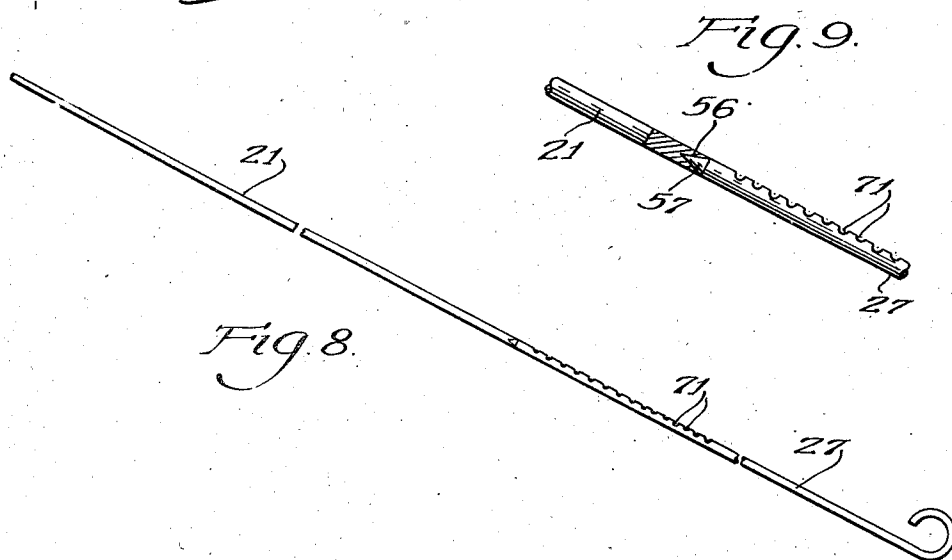
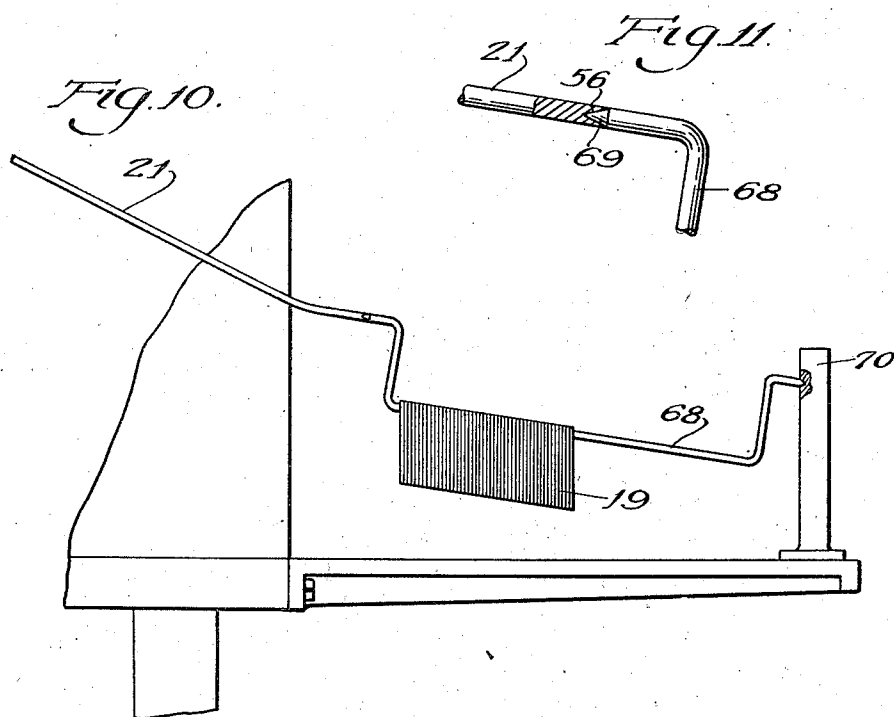
F. D. REYNOLDS

2,432,339

APPARATUS FOR DELIVERING AND GROUPING HAIR FASTENERS

Filed April 24, 1944

6 Sheets-Sheet 4



Inventor:
Frank D. Reynolds
By: Lee J. Gary
Attorney.

Dec. 9, 1947.

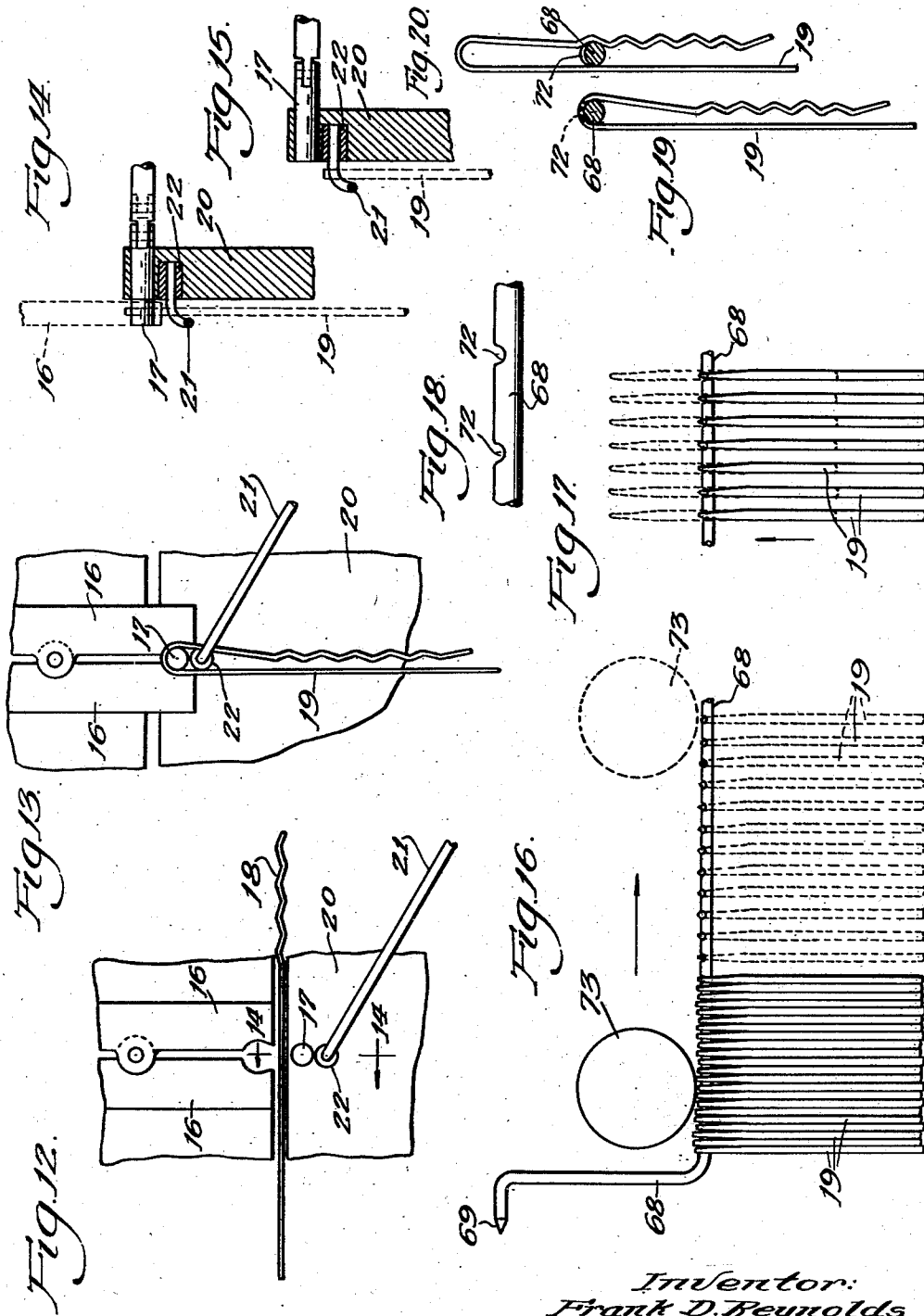
F. D. REYNOLDS

2,432,339

APPARATUS FOR DELIVERING AND GROUPING HAIR FASTENERS

Filed April 24, 1944

6 Sheets-Sheet 5



Inventor:
Frank D. Reynolds
By: Lee J. Gary
Attorney.

Dec. 9, 1947.

F. D. REYNOLDS

2,432,339

APPARATUS FOR DELIVERING AND GROUPING HAIR FASTENERS

Filed April 24, 1944

6 Sheets-Sheet 6

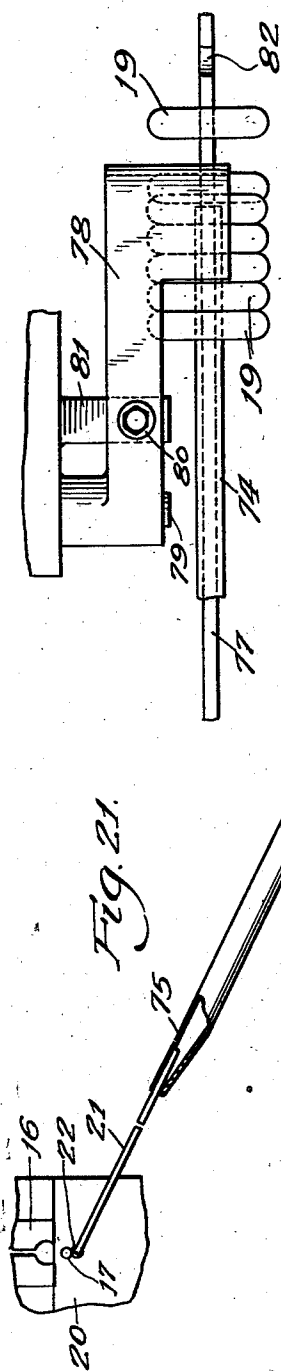


Fig. 21.

Fig. 23.

Fig. 22.

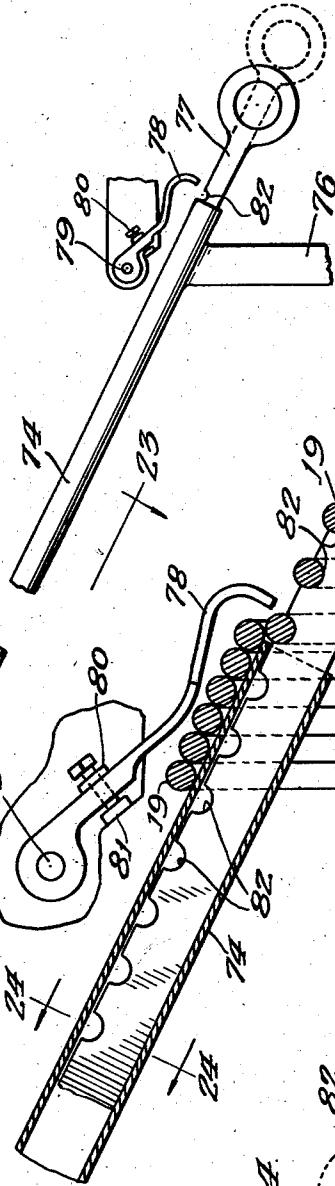
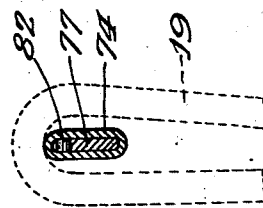


Fig. 24.



Inventor:
Frank D. Reynolds
By: Lee J. Gary
Attorney.

UNITED STATES PATENT OFFICE

2,432,339

APPARATUS FOR DELIVERING AND GROUP-
ING HAIR FASTENERS

Frank D. Reynolds, Chicago, Ill., assignor to Gay-
lord Products, Incorporated, Chicago, Ill., a
corporation of Delaware

Application April 24, 1944, Serial No. 532,426

10 Claims. (Cl. 140—87)

1

This invention relates to improvements in the manufacture of hairpins or hair gripping fasteners, and particularly to improved means in combination with a hair fastener forming machine for serially receiving and supporting the fasteners as formed in a guided and uniformly oriented manner and for thereafter delivering the fasteners in groups of predetermined number, to thereby facilitate subsequent handling and treatment of the fasteners such as for coating or other treatment.

The present invention is particularly adapted for use in combination with machines for producing hair gripping fasteners of the snap type such as for example the apparatus and fastener generally shown and described in the Goldberg and Hermsdorf United States Patent No. 1,709,938 wherein a continuous strip of advancing wire is acted on, lengths thereof are provided with desirable flattened and crimped portions, the lengths severed and thereafter substantially medially bent on a horizontally reciprocating anvil to provide a pair of opposed legs which are brought together into meeting or substantially meeting engagement, the legs being connected by an integral open loop or eye-like bend.

In the prior practice the formed hairpins were successively ejected after formation and permitted to fall into a receptacle in heterogeneous arrangement, and batches of the formed hairpins tempered in gross. These hair fasteners conventionally require varnishing, japanning or the like coating, the process of coating including the dipping of the fasteners in a bath of coating composition and thereafter passing them through a drying oven to bake the coating. In order to carry out the operations of coating and drying it was heretofore necessary to manually pick up, orient and position the pins on an "oven" wire in a predetermined number, all of which entailed considerable labor and dexterity.

In accordance with my present invention I provide means, for use in combination with a hairpin or fastener manufacturing machine of the class described, which successively receives the fasteners as formed instead of permitting them to drop into a mass of pins of heterogeneous arrangement, and which permits the collected pins to pass by gravity in a supported and uniformly oriented manner. I further provide in combination with such orderly receiving means, escapement means for causing the fasteners to be delivered in groups of predetermined number onto a collecting or "oven" wire, this oven wire permitting the fasteners to be conveniently han-

2

dled thereon and in the succeeding operational steps of tempering, dipping, and baking in a more expeditious manner and with great economy, particularly by reason of elimination of the prior requirement of manually picking up the fasteners from a heterogeneous mass and orienting and counting them.

Other objects and advantages of my invention relate to details of construction and arrangement of parts and the advantages and economies thereof which will be apparent from a consideration of the following specification and drawings wherein:

Fig. 1 is a fragmentary side elevation of a machine for the production of hair gripping fasteners illustrating the formation and delivery end of the machine and the association therewith of my novel receiving and group delivery or escapement means.

Fig. 2 is a fragmentary enlarged plan view of the escapement means illustrated in Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 1.

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is a section on the line 5—5 of Fig. 1.

Fig. 6 is a fragmentary plan view partly in section on the line 6—6 of Fig. 1.

Fig. 7 is a section on the line 7—7 of Fig. 1.

Fig. 8 is a side elevation of the receiving wire having associated therewith the form of collecting wire illustrated in Fig. 1.

Fig. 9 is an enlarged fragmentary detail partly in section illustrating the association of the adjacent ends of the two wires of Fig. 8.

Fig. 10 is a fragmentary side elevation of the receiving wire having endwise associated therewith an oven or collecting wire of another form.

Fig. 11 is a fragmentary detail partly in section showing the association of the adjacent ends of the receiving and collecting wires of Fig. 10.

Fig. 12 is a fragmentary elevation of a portion of the fastener forming machine illustrating the association of the upper end of the inclined receiving wire with fixed support means therefor immediately adjacent and below the horizontally reciprocating anvil.

Fig. 13 is a view similar to that of Fig. 12 illustrating the successive movement of the forming jaws on a length of wire, and the medial bending thereof about the anvil to provide a pair of opposed legs connected by means of an integral bend, the bend embracing the upper end of the receiving wire.

Fig. 14 is a fragmentary section on the line 14—14 of Fig. 12.

Fig. 15 is a view similar to that of Fig. 14

illustrating successive horizontal movement of the anvil.

Fig. 16 is a fragmentary elevation of a portion of a collecting or oven wire such as that shown in Fig. 10 illustrating spacing of the fasteners on the wire after being positioned thereon.

Fig. 17 is a fragmentary detail of the oven wire illustrated in Fig. 16 with the fasteners spaced thereon, further illustrating diagrammatically the positioning of the pins thereon in tensioned engagement suitable for further processing of the fasteners.

Fig. 18 is an enlarged fragmentary detail of the oven wire of Figs. 16 and 17.

Fig. 19 is a transverse section of the oven wire of Fig. 16 showing a fastener loosely supported thereon at the connecting bend thereof.

Fig. 20 is a similar section of the oven wire illustrating the tensioned engagement of the pin on the oven wire at one of the crimps thereof, similar to the dotted position of Fig. 17.

Fig. 21 is a side elevation with parts in section of another form of collecting means associated with the lower end of the receiving wire.

Fig. 22 is an enlarged fragmentary detail, partly in section of the collecting means of Fig. 21 further illustrating the telescopically engaging collecting wire thereof.

Fig. 23 is a fragmentary plan view on the line 23—23 of Fig. 22.

Fig. 24 is a section on the line 24—24 of Fig. 22.

Referring to the drawings, and particularly Fig. 1, the reference numeral 10 generally designates an end portion of a machine for operating on a continuously advancing length of wire 11 to automatically produce hair-gripping fasteners of the "snap" type such as that generally described and shown in the aforementioned Patent No. 1,709,938. The length of wire is introduced through the guide 12 and passes between the forming rolls 13 and 14 where a portion of the advancing length of wire is suitably provided with flattened and/or crimped portions and thereafter advanced to pass between the wire cutting mechanism 15, and between the forming jaws 16 and the horizontally reciprocable anvil 17, the movement of the wire, the action of the forming rolls 13 and 14, and the action of the wire cutting means 15 and the forming jaws 16 and anvil 17 being correlated through suitable driving and cam means, not shown, whereby after a predetermined length of formed wire is horizontally moved between the forming jaws 16 and the anvil 17, the cutting means 15 on the beginning of the downstroke of the forming jaws severs the advancing wire a predetermined length, and the forming jaws as they continue to move downward deform the cut length of wire substantially medially to form a pair of opposed legs connected with an integral bend, the forming jaws 16 bringing the opposed legs of the severed wire length 18 into substantially meeting engagement beneath the anvil 17 so as to form a hairpin of the fastener or gripping type, generally designated as 19, as more clearly illustrated in the detailed views of Figs. 12 and 13.

Anvil 17, as previously indicated, is adapted to reciprocate horizontally, and is projected into the path of the fastener formation upon downward movement of the forming jaws 16 and in timed relationship, and conversely upon upward movement of the jaws 16, the anvil 17 is retracted so as to cause the formed fastener to drop or be brushed off. In accordance with prior practice and apparatus, the fasteners after being

brushed off were dropped into a receptacle in heterogeneous formation and therein tempered in gross to impart to the fasteners the desired "snap" or tension quality. Such formed and tempered fasteners conventionally require further coating, such as varnishing or japanning. In order to conduct the coating operation and to subsequently dry or bake the coating on the fasteners, it was required to manually pick up individual fasteners and count and string them on an "oven" wire in groups of predetermined numbers such as, 50 or 100 fasteners, so as to facilitate the dipping operation and the subsequent oven drying or baking operation.

In accordance with the present invention, the necessity for manually picking up the individual fasteners from a heterogeneous mass and aligning and counting them and positioning them on the oven wire is substantially eliminated. This is accomplished by providing means in combination with a fastener forming machine of the class hereinbefore described which is adapted to receive the pins serially as formed to slidably support them in uniform manner so that they are delivered from the forming machine in an orderly and continuous manner. In addition, I provide in combination with such orderly receiving means, means for segregating the fasteners into groups of predetermined number and for permitting their collection on oven or subsequent treatment wire in such orderly groups.

This I accomplish by providing a fixed pin head 20 formed with an aperture through which the anvil 17 reciprocates, and immediately below the anvil 17 and closely adjacent thereto, I secure the upper end of a downwardly inclined catcher wire or receiving rail 21, the upper end portion of the rail being bent substantially parallel to anvil 17 and secured in the fixed head 20 as at 22, so that the main inclined portion of the receiving rail 21 is slightly spaced from the forward face of the support 23. Thus, as will best be seen in Figs. 12 to 15, when the length of wire 18 is deformed so as to medially bend it and to cause the legs to bend downward and extended vertically, the downward movement of the legs of the deformed length of wire not only embraces the anvil 17, but additionally embraces the upper end portion of the receiving rail 21. Upon successive retraction of the anvil 17, the formed fastener is brushed off the anvil by retraction thereof through the head 20, but instead of being merely dropped as formerly, the fastener is caught by and moves down in a guided path by gravity on the receiving rail 21.

The lower end portion of the receiving rail 21 is engaged by an escapement mechanism, generally designated as 23, comprising three stops which are opened in turn to permit a group or unit of, for example, 50 pins or fasteners to move three stations in succession in such a manner, and so timed as to never leave the receiving rail 21 unsupported by the escapement mechanism. The escapement mechanism includes a stop arm or trigger 24 adapted to intermittently seat on receiving rail 21 to temporarily arrest further downward movement of fasteners thereon after passage of a predetermined number, and a pair of clamping jaws 25 and 26 adapted to alternately engage and support spaced lower end portions of the receiving rail and to alternately open and permit by-pass of the fasteners in groups of said predetermined number, and to deliver therefrom the fasteners in such groups onto an endwise engaged and aligned collector, such as the rail 27.

These three stops, or the stop arm and pair of clamping jaws, are successively actuated by cam means including a continuously rotating cam shaft in timed relationship to the fastener formation cycle of the forming machine.

The escapement mechanism 23 is generally supported on a standard 28 endwise of the forming machine 19 on the bed 29 thereof. The standard 28 is provided with a pair of arms 30 and 31 which support the cam shaft 32 above and parallel to the inclined receiving rail 21, the cam shaft 32 being driven through gears 33 and 34, shaft 35, gears 36 and 37, shafts 38, gears 39 and 40, and the machine drive shaft 41. Thus the cam shaft 32 is driven through the machine drive shaft 41, and by suitable arrangement of the intervening gears the two are driven in timed relationship although in the present illustration, the cam shaft 32 is caused to make one revolution for every 100 pin or fastener forming cycles of the machines.

Supported on the cam shaft 32 are the three cams 42, 43 and 44, each having a pair of diametrically opposed cam lobes, the lobes of each cam being angularly spaced with respect to each other, the cams being adapted for actuation of the trigger 24 and the clamping jaws 25 and 26 respectively, in sequential relationship to each other.

The stop or trigger arm 24 comprises a portion which extends substantially perpendicular to the receiving rail 23 and is connected through the angular arm portion 45 to the cam follower lever 46, the lever 46 being pivotally supported on the arm 47 extending from the standard 28, the upwardly extending or cam follower terminal 46' of lever 46 being normally urged upwardly against the cam 42 by means of the spring 48, so that the stop arm 24 is normally held pressed against receiving rail 21 and twice in each revolution of cam shaft 32, the terminal 46' of lever 46 is depressed downwardly by the cam lobes and the stop arm 24 elevated and spaced from receiving rail 21 to permit by-pass of fasteners.

The clamping jaws 25 are pivotally engaged as at 48 between the arms 49 extending from standard 28, and include the upper arm portions 25' which embrace the cam 43, the upper arm portions 25' being normally drawn together by means of the spring 50 so as to hold the clamping jaws 25 normally spread apart and spaced out of supporting engagement with the receiving rail 21, as illustrated in Fig. 4. The inner faces of the upper arms 25' are each provided with a cam follower 51 against which the lobes of cam 43 bear twice in each revolution of the cam shaft 32 to urge the clamping jaws 25 together to support the receiving rail 21. During such supporting engagement the jaws provide a stop for passage of pins or fasteners and, conversely, when the jaws 25 are spaced, the fasteners are permitted to by-pass. In a similar manner as illustrated in Fig. 3, the clamping jaws 26 are provided with upper arm portions 26' which embrace the cam 44 and are urged together by means of the spring 52, the inner face of the arms 26' being provided with cam followers 53 against which the lobes of cam 44 act twice in each revolution of cam shaft 32 to bring the jaws 26 into supporting engagement with the rail 21 and to stop passage of fasteners 19, the jaws being pivoted as at 54 between arms 55 extending from standard 28.

As previously indicated, and for illustrative purposes, cam shaft 32 is driven, or geared to be

driven through drive shaft 41, so that it makes one revolution for each 100 fastener forming cycles, and since each of the three cams 42, 43 and 44 are provided with a pair of diametrically opposed lobes of equal arc, the stop arm 24 and the clamping jaws 25 and 26 will each be actuated to open and close twice for each revolution of cam shaft 32, or once for every 50 pin cycles. By forming each of the lobes on each of the cams with an arcuate surface of 80° extent, stop arm 24, which descends once each 50 pin cycles, remains in downwardly pressed engagement against receiving rail 21 for 100°, that is, stop arm 24 by means of pressing against receiving rail 21 will arrest downward movement of about 30 pins, during which time clamping jaws 25 are open and jaws 26 closed. Upon the closing of jaws 25 into embracing and supporting engagement with receiving rail 21, stop arm 24 is elevated to permit the 30 pins accumulated in front of it while it was depressed, together with 20 additional pins, to by-pass it and the total of 50 pins to become lodged against the closed jaws 25. At such time the cam 42 causes stop arm 24 to descend again and remain closed while cam 43 causes jaws 25 to separate and to permit the group of 50 pins to by-pass and become lodged against closed jaws 26. After passage of the 50 pins between open jaws 25 the jaws 25 close and the jaws 26 open permitting the group of 50 pins to be delivered onto the collecting rail 27.

Collecting rail 27 may be left in position to receive one or any multiple of pin groups and may be manually replaced during a 20 pin cycle during which jaws 26 are closed in pin stopping and supporting relationship with rail 21. It will, of course, be apparent that by variation of the number of cam lobes, the degree of camming caused thereby, or the timing relationship of the cam shaft 32 to the pin forming cycle, the escapement mechanism may be caused to select and successively by-pass and deliver a greater or smaller number of pins per group.

The lower terminal end of receiving rail 21 may be formed with a recess 56 to receive and engage the tapered end or point 57 of collector rail 27 so as to join the two rails in a smooth continuous path and permit delivery of the pins from receiving rail 21 to collector rail 27 when the escapement jaws 26 are in open position. As illustrated in Figs. 1 and 7, the collector rail 27 may be intermediately supported between the clamping plates 58 and 59 which are held urged together between springs 60 and 61, the plate 58 being yieldable and engaged at its lower end as at 62 to the plate 59. When it is desired to release the collector wire 27 from clamped position, the lever 64, which may be engaged to a foot pedal, not illustrated, is depressed causing rotation of the crank lever 65 about its pivot 66, and to thereby project its shoulder 67 through aperture 63 in plate 59. This urges the plate 58 outwardly so that the collector rail 27 may be withdrawn with one or more collected groups of pins thereon after which a new collector rod may be inserted in its place during the period that the clamping jaws 26 are in closed position.

Figs. 10 and 11 illustrate another form of collector rail or oven wire 68 substantially U-shaped, the terminal ends projecting laterally, this form of oven wire being conventionally employed for use in combination with a chain conveyor system which carries the pins through a coating bath and through a baking oven. This oven wire 68 is provided with tapered or pointed

ends 69, one of which engages with and seats in the socket 55 of receiving rail 21 and the other may be similarly engaged for support in a standard 70, so as to support the oven wire during its collection of pin groups from receiving rail 21. The collector rail 27 may be suitably provided with spaced notches 71, and in like manner the oven wire 68 is provided with spaced notches 72, as illustrated in Figs. 16 to 18, these respective notches being provided for facilitating of further handling of the collected pins.

Thus as illustrated in Fig. 16 by bearing a suitable rod 73 against the outer surface of the bends of the pins, or manually, the pins may be spread and one spaced in each notch, after which, as illustrated in Figs. 17 and 19, the pins in their spaced position are moved relative to the wire 68 so as to spread the legs of the pins and to cause the wire 68 to be lodged and gripped between the legs of the pins in one of the crimps thereof. When so positioned the oven or collector wire with the pins 19 in spread and clamped position, may be passed through a suitable annealing oven to impart proper snap or tension quality to the pins, and while still being retained on the same wire, the oven wires may be passed on suitable conveyors through a bath of coating and then to a drying or baking oven to deliver the pins in finished condition, ready for carding or packing in the same groups of predetermined number collected on the oven wires or collecting rails as predetermined by the escapement mechanism 23.

Figs. 21 to 24 illustrate another modified form of collector rail comprising a hollow tube 74, one end 75 of which is tapered to leave an opening sufficient to telescopically receive the lower end of collector rail 21 therein, and to provide a smooth continuous path for the downward passing pins 19. The lower end of tube 74 may be fixedly engaged and supported by a standard 76, which of necessity is required to be relatively narrow and employable when the opposed legs 19 of the pins are spaced and not in meeting engagement at any point. The tube 74 telescopically receives through its open lower end the notched rail 77.

Positioned adjacent the lower end of tube 74 and thereabove is the hooked lever 78 pivoted at 79 and retained for limited movement between the abutments 80 and 81 which limit the pivotal movement of the lever 78. The hook of lever 78 overhangs the lower end of tube 74 and is adjusted so that upon outward withdrawal of the notched bar 77 from the tube 74, the hook 78 temporarily arrests movement of the pins 19 on tube 74 but permits them to successively drop onto bar 77 and into the notches 82 thereof so that upon withdrawal of the rail 77 from the tube 74, the pins 19 are caused to be spaced longitudinally in the notches 82 to facilitate further handling for the subsequent treatment steps, as previously described with respect to the other forms of collector rails or oven wires.

I claim as my invention:

1. In a machine for acting on a continuous strip of advancing wire and for severing lengths thereof and substantially medially bending the severed lengths over a horizontally reciprocating anvil to produce a hairpin or the like fastener having a pair of opposed legs and an integral connecting bend, said anvil being journaled in a mounting support and being adapted to discharge a formed fastener upon retraction within said support, means secured to said anvil support and posi-

tioned to extend within the bend of a formed fastener for serially receiving and supporting the fasteners as formed in a guided uniformly oriented manner.

2. In a machine for acting on a continuous strip of advancing wire and for severing lengths thereof and substantially medially bending the severed lengths over a horizontally reciprocating anvil to produce a hairpin or the like fastener having a pair of opposed legs and an integral connecting bend, said anvil being journaled in a mounting support and being adapted to discharge a formed fastener upon retraction within said support, means for serially receiving and supporting the fasteners as formed thereby in a guided uniformly oriented manner, said means comprising an inclined receiving rail, the upper end thereof being fixedly supported in said mounting support adjacent said anvil and positioned thereat to extend within the confines of and adjacent to the connecting bend of a fastener upon formation thereof.

3. In a machine for acting on a continuous strip of advancing wire and for severing lengths thereof and substantially medially bending the severed lengths over a horizontally reciprocating anvil to produce a hairpin or the like fastener having a pair of opposed legs and an integral connecting bend, said anvil being journaled in a mounting support and being adapted to discharge a formed fastener upon retraction within said support, means for serially receiving and supporting the fasteners as formed thereby in a guided uniformly oriented manner, said means comprising an inclined receiving rail, the upper end thereof being fixedly engaged to said anvil support immediately below and closely adjacent said anvil and positioned thereat to extend within the confines of and adjacent to the connecting bend of a fastener upon formation thereof, and means for releasing and delivering the fasteners from said receiving rail in groups of predetermined number.

4. In a machine for acting on a continuous strip of advancing wire and for severing lengths thereof and substantially medially bending the severed lengths over a horizontally reciprocating anvil to produce a hairpin or the like fastener having a pair of opposed legs and an integral connecting bend, said anvil being journaled in a mounting support and being adapted to discharge a formed fastener upon retraction within said support, means for serially receiving and supporting the fasteners as formed thereby in a guided uniformly oriented manner, said means comprising an inclined receiving rail, the upper end thereof being fixedly engaged to said anvil support immediately below and closely adjacent said anvil and positioned thereat to extend within the confines of and adjacent to the connecting bend of a fastener upon formation thereof to thereby retain it upon being dropped by retraction of the anvil, and escapement means in supporting engagement with a lower end portion of said receiving rail for intermittently arresting downward movement of fasteners thereon and for segregating and permitting their successive delivery therefrom in groups of predetermined number.

5. In a machine for acting on a continuous strip of advancing wire and for severing lengths thereof and substantially medially bending the severed lengths over a horizontally reciprocating anvil to produce a hairpin or the like fastener having a pair of opposed legs and an integral connecting bend, said anvil being journaled in a mounting support and being adapted to discharge a formed

fastener upon retraction within said support, means for serially receiving and supporting the fasteners as formed thereby in a guided uniformly oriented manner, said means comprising an inclined receiving rail, the upper end thereof being fixedly engaged to said anvil support immediately below and closely adjacent said anvil and positioned thereat to extend within the confines of and adjacent to the connecting bend of a fastener upon formation thereof to thereby retain it upon being dropped by retraction of the anvil, escapement means in supporting engagement with a lower end portion of said receiving rail for intermittently arresting downward movement of fasteners thereon and for segregating and permitting their successive delivery therefrom in groups of predetermined number, and a separable collecting rail in aligned endwise engagement with and supported thereat by said receiving rail for collecting groups of fasteners delivered therefrom.

6. In a machine for acting on a continuous strip of advancing wire and for severing lengths thereof and substantially medially bending the severed lengths over a horizontally reciprocating anvil to produce a hairpin or the like fastener having a pair of opposed legs and an integral connecting bend, said anvil being journaled in a mounting support and being adapted to discharge a formed fastener upon retraction within said support, means for serially receiving and supporting the fasteners as formed thereby in a guided uniformly oriented manner, said means comprising an inclined receiving rail, the upper end thereof being fixedly engaged to said anvil support immediately below and closely adjacent said anvil and positioned thereat to extend within the confines of and adjacent to the connecting bend of a fastener upon formation thereof, and escapement means for segregating the fasteners on the receiving rail in groups of predetermined number and for permitting delivery therefrom to an endwise connected separable collecting rail in said group formation, said escapement means comprising a stop arm adapted to intermittently seat on said receiving rail to temporarily arrest further downward movement of fasteners thereon after passage of a predetermined number and spaced sets of clamping jaws adapted to alternately engage and support spaced lower end portions of the receiving rail and to alternately open and permit by-pass of the fasteners in said groups.

7. In a machine for acting on a continuous strip of advancing wire and for severing lengths thereof and substantially medially bending the severed lengths over a horizontally reciprocating anvil to produce a hairpin or the like fastener having a pair of opposed legs and an integral connecting bend, said anvil being journaled in a mounting support and being adapted to discharge a formed fastener upon retraction within said support, means for serially receiving and supporting the fasteners as formed thereby in a guided uniformly oriented manner, said means comprising an inclined receiving rail, the upper end thereof being fixedly engaged to said anvil support immediately below and closely adjacent said anvil and positioned thereat to extend within the confines of and adjacent to the connecting bend of a fastener upon formation thereof, and escapement means for segregating the fasteners on the receiving rail in groups of predetermined number and for permitting delivery therefrom to an endwise connected separable collecting rail in said group formation, said escapement means comprising a stop

arm adapted to intermittently seat on said receiving rail to temporarily arrest further downward movement of fasteners thereon after passage of a predetermined number and spaced sets of clamping jaws adapted to alternately engage and support spaced lower end portions of the receiving rail and to alternately open and permit by-pass of the fasteners in said groups, and cam means including a continuously rotating cam shaft for successively actuating said stop arm and said clamping jaws in timed relationship to the fastener formation cycle of said machine.

8. The combination with a gravity rail adapted to serially receive and slidably support fasteners and the like devices having a substantially closed bend or eye of means for serially forming and introducing said articles thereto and escapement means for segregating the fasteners in groups of predetermined number on said rail and for permitting their delivery therefrom in such grouped formation comprising a stop arm adapted to intermittently arrest downward movement of fasteners after by-passage of group of predetermined number, spaced sets of clamping jaws adapted to successively and alternately embrace and support the rail adjacent the lower end portion thereof and to alternately open and permit successive by-pass of grouped fastener formations, and means for successively actuating said stop arm and clamping jaws in timed relation to the serial introduction of said fasteners.

9. In a machine for bending predetermined lengths of wire over a horizontally reciprocating anvil to produce a hairpin or the like fastener having a pair of opposed legs and an integral connecting bend, said anvil being journaled in a mounting support and said fastener upon formation being discharged by the reciprocatory retraction of the anvil into said support, a downwardly inclined receiving rail for serially receiving, supporting and delivering the fasteners therefrom, the upper end of said rail being fixedly engaged to said anvil support immediately below and closely adjacent said anvil and positioned to extend within the confines of and adjacent to the connecting bend of a fastener upon formation thereof, and escapement support means for alternately engaging a lower portion of said receiving rail to provide a continuous support therefor and for permitting intermittent by-pass and delivery of said fasteners therefrom.

10. Means for handling hairpins and the like articles comprising a gravity rail adapted to serially receive and slidably support said articles, means for serially forming and introducing said articles thereto and escapement means in engagement with said rail for causing delivery of said fasteners in groups of predetermined number comprising a stop arm adapted to intermittently arrest downward movement of said articles after by-passage of a predetermined number, spaced sets of clamping jaw pairs adapted to alternately embrace and support the rail adjacent the lower end portion thereof and to alternately open and permit by-pass of said articles in group formation, cam means for actuating said stop arm and clamping jaw sets and drive means therefor in geared engagement with drive means for said article forming means and in timed relation to the serial introduction of said articles to the gravity rail.

FRANK D. REYNOLDS.

(References on following page)

2,432,339

11

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,756,605	Priest #1	Apr. 29, 1930
2,369,660	Carr	Feb. 20, 1945
1,791,764	Priest #2	Feb. 10, 1931
2,070,568	Almgren	Feb. 16, 1937

Number
1,954,791
2,334,241
1,709,938
1,326,925
1,424,473

12

Name	Date
Almgren	Apr. 17, 1934
Boedigheimer	Nov. 16, 1943
Goldberg et al.	Apr. 23, 1929
Goldberg	Jan. 6, 1920
Goldberg	Aug. 1, 1922

FOREIGN PATENTS

Number	Country	Date
434,189	Germany	Sept. 22, 1926