

Feb. 16, 1937.

J. KAHAN

2,070,737

MEANS FOR AFFIXING RHINESTONES OR THE LIKE UPON FABRICS

Filed Feb. 26, 1935

3 Sheets-Sheet 1

FIG.1.

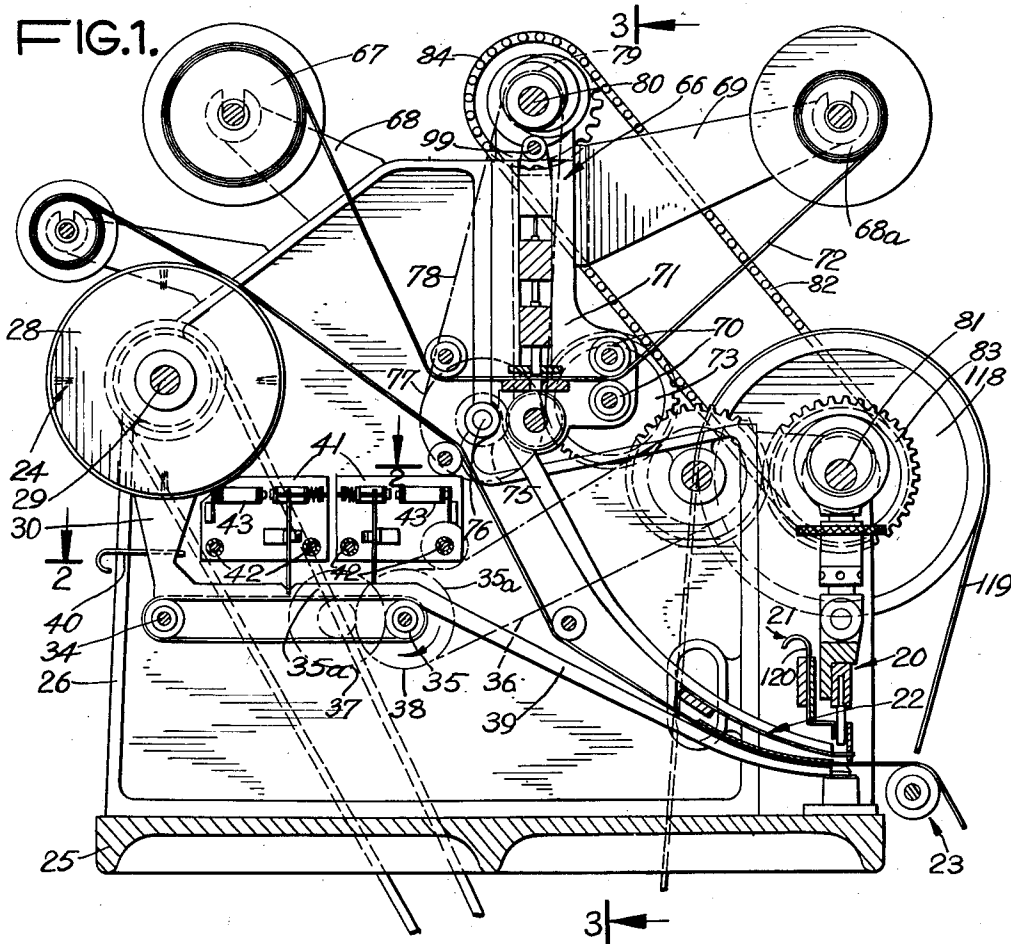


FIG.2.

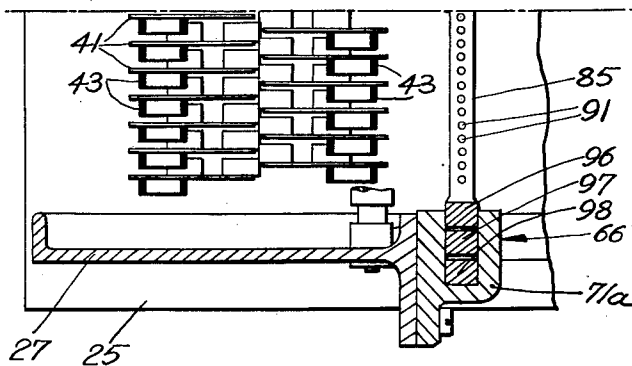
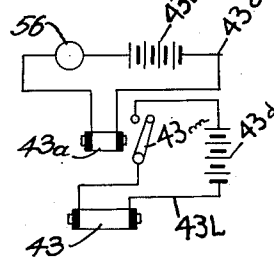


FIG.16α.



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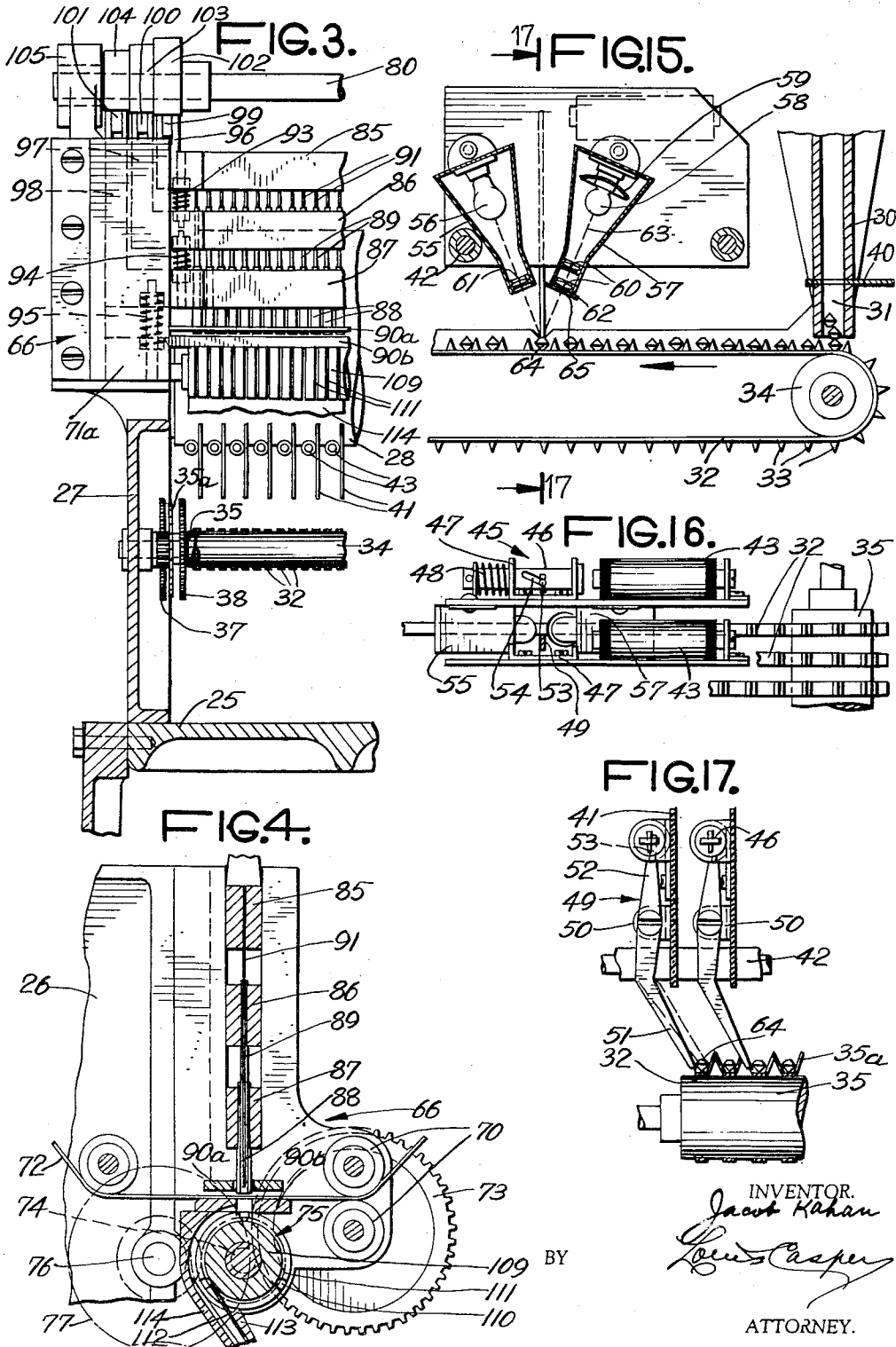
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

FIG.5. FIG.6. FIG.7. FIG.8.

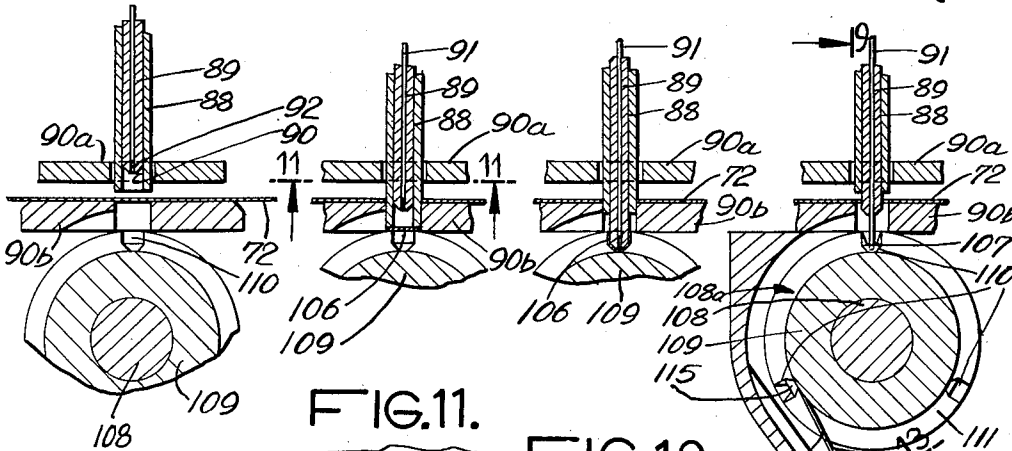


FIG.11.

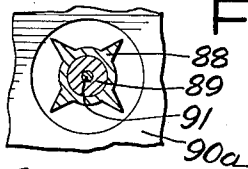


FIG.12.

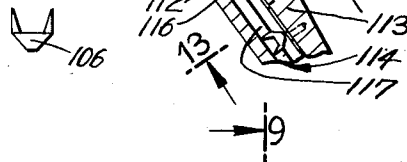
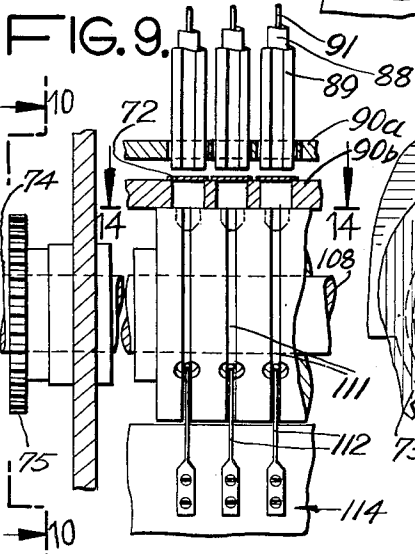


FIG.10.

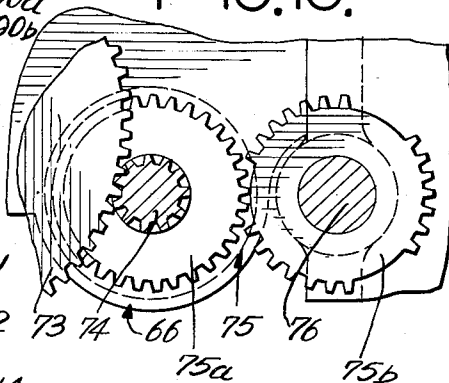


FIG.13.

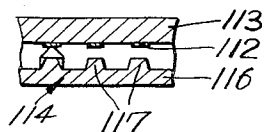
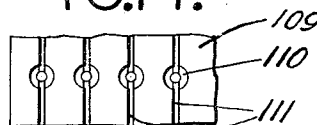


FIG.14.



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MEANS FOR AFFIXING RHINESTONES OR
THE LIKE UPON FABRICS

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Application February 26, 1935, Serial No. 8,248

10 Claims. (Cl. 29—10)

My invention relates to devices for affixing rhinestones or the like upon meshed fabrics or the like.

My invention is a continuation in part to my co-pending application Serial No. 5,155, dated Feb. 5th, 1935.

An object of the present invention is to provide improved methods of feeding rhinestones or the like to a setting die preparatory to being affixed by means of the die aforesaid upon a fabric; said methods including the utilization of an electric circuit into which are connected photo-electric cells that control the operation of electro-magnets likewise included in the circuit.

The function of the electro-magnets aforesaid will hereinafter be described.

A further object of the invention is to provide novel means for feeding bezel base caps to a setting die after being blanked, formed and then delivered to the setting die aforesaid and in the correct position preparatory to being mounted in the fabric.

A further object of the invention is to provide a machine having a multiplicity of delivery channels from which the rhinestones are delivered to a group of corresponding setting dies; and also to provide corresponding bezel base caps whereby a series of rhinestones may be affixed upon a fabric simultaneously. Means are also provided for selectively stopping the feed of rhinestones into any one or more than one of said channel feeders, thereby accomplishing two distinct objects, first, that of mounting a number of rhinestones upon a fabric simultaneously in one operation, and secondly, by reason of halting the feed of rhinestones into any one or more of the channels aforesaid to cause the jewels to be on said fabric in varied designs, such variations produced at the will of the operator as the process of affixing jewels upon the fabric proceeds and without interruption to the operation of the machine aforesaid.

Other and further objects will appear in the specification and will be specifically pointed out in the appended claims references being had to the accompanying drawings exemplifying the invention and in which—

Fig. 1 is a cross-sectional view of the machine showing in section the blanking and forming dies, also including the setting dies.

Fig. 2 is a partially diagrammatic view on a line 2—2 of Fig. 1 showing the relative position of the rhinestone expulsion magnets.

Fig. 3 is a section taken on a line 3—3 of Fig. 1 showing the blanking and forming dies.

Fig. 4 is an enlarged view of the punching and forming dies.

Fig. 5 is a view showing the relative position of parts of the blanking and forming die in a resting or inoperative position.

Fig. 6 shows the relation of parts of the blanking and forming die in the act of punching a blank or a bezel base cap.

Fig. 7 is a view showing the relation of parts while forming the bezel base cap.

Fig. 8 is a view showing the relation of parts after the bezel base cap is completed and is ejected from the forming die.

Fig. 9 is a section taken on a line 9—9 of Fig. 8.

Fig. 10 is a section taken on a line 10—10 showing the driving mechanism for the base cap forming roller.

Fig. 11 is a section taken through one of the blanking and forming dies on a line 11—11 of Fig. 6.

Fig. 12 shows a bezel base cap when completely formed.

Fig. 13 is a section taken on a line 13—13 of Fig. 8 of the base cap delivery channels.

Fig. 14 is a section taken on a line 14—14 of Fig. 9.

Fig. 15 shows the relation of parts of a photo-cell unit.

Fig. 16 is a plan view of Fig. 15.

Fig. 16^a is a diagram of the circuit including the photo-cell.

Fig. 17 is a section taken on a line 17—17 of Fig. 15.

The die 20 shown in Fig. 1 is similar to the die 19 shown in Fig. 1 of the previous application Serial No. 5,155, dated Feb. 5th, 1935. Also, stopping finger 21 of Fig. 1, is similar in design and operation of finger 126 in Fig. 20 in said former application.

Also, supporting spring mechanism 22 in Fig. 1 is similar in design and operation to Figs. 13, 16, 17 and 25 of the former application.

Referring to Fig. 1, the machine shown in the figure is supported by base plate 25. Numerals 26 and 27 are the supporting side frames. A shaft 29 projects through the drum and upon which is affixed mixing brushes 24.

A delivery channel 30 is connected to the drum 28. The said channel comprises a series of circular apertures 31. In this particular case the machine is provided with 24 such apertures extending along the bottom of the drum or container 28.

The drum or container 28 is filled with rhinestones and while the brushes revolve, the rhine-

stones are forced to drop because of gravity through the apertures 31.

Endless delivery chains or conveyors 32 having fingers 33 mounted thereon are passed over pulley 34. In this particular machine there are 24 conveyors. The conveyors aforesaid are also passed around a pulley 35. The latter pulley is rotated in the direction indicated by the arrow shown in Fig. 1 and is driven by the endless chain 36 which is located at the opposite side of the machine and upon the same shaft as the pulley 35 and which in turn is driven by the train of gears 37 and 38. The endless delivery conveyors 32 move between side guides 35^a.

The speed of the pulley 35 is so adjusted through the medium of gears 37 and 38 that one rhinestone at a time is passed over to each of the delivery channels 39 which in turn delivers the rhinestones to each respective setting die 20, the latter die forming a group of companion setting dies to correspond with the group of delivery chains or conveyors.

The operation of the dies aforesaid is explained in the former application.

A set of slidable plates 40 are mounted within the delivery channel 30 and extend outward and beyond said channel. The plates aforesaid are provided for the purpose of stopping the delivery when desired of the rhinestones into any one or more of the individual delivery chains or conveyors 32.

A set of mounting plates 41 are held in an upright position by means of the cross-rods 42. A set of electro-magnets 43 are mounted on one side of the above mentioned plates. Each of the magnets aforesaid attracts its respective armature 45 which comprises a flat member 46 mounted in a bracket 47 and is held in a retracted position by means of a spring 48. (See Fig. 16).

The bracket 47 is also mounted on the mounting plate 41. A pivoted arm 49 pivotally swings upon a bracket 50, said bracket being mounted on the mounting plate 41.

The angular end section indicated by the numeral 51 of the arm 49 extends to the level of the delivery chain 20, and the opposite end section indicated by the numeral 53 of the arm 49 terminates into a round-shaped extension 53 that fits into an inclined recess 54 of the armature 46.

On the reverse side of the mounting plate 41 is mounted a casing 55 inside of which is contained a photo-cell 56. On the opposite side of said casing is a companion casing 57 inside of which is contained an electric bulb 58 and a reflecting mirror 59. A set of lenses 60 are also set in at the base of the container 57. Likewise a lens 61 is set in at the base of the container 55.

An aperture plate 62 is mounted at the base of the casing 57. A light beam is indicated by the numeral 63 passes through the set of lenses 60 and is directed against the surface of the rhinestone 64 in a thin directional beam of light through the aperture 65 of the aperture plate 62.

When the light beam 63 strikes the reflected side of the rhinestone, it reflects light adjusted to reflect through the lens 61 and against the photo-cell 56. When the reflected light strikes said photo-cell, a circuit 43^c which includes battery 43^b is closed thus energizing the magnet 43^a. (See Fig. 16^a). The armature of said magnet when attracted causes a local circuit 43^d which includes battery 43^d to close thereby energizing magnet 43. The said magnet attracts its arma-

ture 45 which in turn actuates the arm member 49. The angular end section 51 of the arm member 49 which rests against the rhinestone 64 is moved into a position represented by the dotted lines shown in Fig. 17. The effect of such movement is to expel the rhinestone 64 that drops between the delivery chains 32.

With the further movement of the conveyor chain 32 in the direction shown by the arrow in Fig. 15, another rhinestone comes under the influence of the light beam 63. Should the beam of light aforesaid strike the polished side of the rhinestone, said rhinestone would be expelled as explained. If, however, said rhinestone takes a position on the delivery chain or conveyor with its base in an upward position, then no light is reflected therefrom against the photo-cell 56.

In this connection it will be understood that the base or the non-exposed surfaces of the rhinestones employed commercially are coated with a mirrored material to add to the brilliancy of the rhinestones. The mirrored material aforesaid on the rhinestones is protected by adding a coating of paint or varnish thereon containing gold leaf or the like. The coating aforesaid is opaque and non-reflective of light.

It was shown in the former application that the bezel base caps are delivered to a series of multiple setting dies from a drum and thence through a series of delivery channels. The foregoing channels are shaped to receive the base caps aforesaid one at a time and at the correct position preliminary to being affixed upon the fabric aforesaid.

In the present invention the bezel base caps are blanked and formed by means of a multiple die 66.

The material required for the making of the caps is delivered to the die in ribbon form between guide plates 90^a and 90^b through the medium of a set of spools 67 supported by the castings 68 of the side frames 26 and 27.

A set of take-up spools 68^a are mounted on the extension castings 69 which are also secured to the side frames 26 and 27.

A series of pulling rollers 70 are supported by the castings 71 and 71^a. The said pulling rollers pull the material 72 at the required rate of speed through the medium of the gear 73 which is turned by a shafted gear 74. A driving Geneva gear set comprising gears 75^a and 75^b is mounted on a shaft 76 which is impelled by the chain gear 77 and companion chain 78 attached thereto. The said chain is driven by chain gear 79 which is integral to the shaft 80 of the die 66.

The shaft 80 is rotated by the shaft 81 through the medium of the endless chain 82 which passes over the chain gears 83 and 84 and which is driven thereby.

The blanking and forming dies consist of flat-shaped horizontal cross-bars 85, 86, 87. The bar 87 supports a set of blanking dies 88. The bar 86 supports a set of forming dies which project through an opening 90 of the blanking die 88. The bar 85 supports a set of extruding pins 91 that protrude through an opening 92 of the forming die 89.

The bars 85, 86 and 87 are held apart through the medium of the tension springs 93, 94, 95 respectively.

Both ends of the bars 85, 86, 87 have outwardly extending projections 96, 97, 98 each of which carry rollers 99, 100, 101 respectively.

A set of cams 102, 103, 104 are mounted on 75

both ends of the shaft 80 which turns inside the bearing 105. Cams 102, 103, 104 are so set on the shaft 80 that by the turning of the shaft aforesaid the cross-bars 85, 86, 87 are operated reciprocally at a predetermined time relation.

Referring to Figs. 5, 6, 7 and 8 which show the several positions of one of the dies while in operation. The blanking die 88 first punches a blank 106 which has the cross-section appearance of the die 88 as shown in Fig. 11.

The next following operation is the forming of the cap shown in Fig. 7. In Fig. 8, blanking and forming dies 88 and 89 are shown receding to their original position shown in Fig. 5 while the expelling pin 91 drives the base cap 107 off the forming die 89. The female section 108^a of the forming die 89 comprises a roller 109, which carries three female forming grooves 110. The shaft 108 drives roller 109 that is also provided with a set of circumferential grooves 111. Inside of said grooves springs 112 are fitted. One end of said springs designated by the numeral 112 are secured against the side section 113 of the delivery channel 114. The opposite end of the spring 112 fits inside the grooves 111 and serves to expel the already formed base caps 115 off the forming groove 110 on to the delivery rack 117 which in turn delivers the caps at the right position to the setting die 20.

The method of operating the machine as described is as follows:

As already described, the rhinestones are delivered to the group of setting dies 20, one of which is shown in Fig. 1 in correct position to be set into the fabric through the medium of the photo-cell unit shown and described in Figs. 15 and 16.

The blanking and forming die 66 is timed to punch a blank, form and deliver bezel base caps to the setting die 20 at the correct position to be set into the fabric and at the same corresponding speed that the rhinestones are delivered to the setting die. The aforementioned operation means that with each rotation of the driving wheel 118 which is driven by the belt 119 by an electric motor or the like, the entire machine operation is timed to set a row of rhinestones into the fabric, and also to deliver a new set of rhinestones and bezel base caps ready for setting for the next following operation.

In the event it is desired to mount the rhinestones upon the fabric in accordance with any one of the designs as shown in Figs. 7, 8, 9 or 10 in the previous application, such arrangements are effected by varying the delivery of any designated row of rhinestones. This is accomplished by utilizing the adjustable features of the side plates 40 and the sliding fingers 120 which stop delivery of any designated row of rhinestones and corresponding row of bezel base caps.

The present disclosure constitutes an operative embodiment of the principles of my invention. It is to be understood that the structural details may be varied as desired within limits not inconsistent with the scope of the invention as claimed.

What I claim is—

1. In a machine for affixing rhinestones or the like upon a fabric in multiple design; a container for storing rhinestones, a series of delivery chains or conveyors, delivery channel means between said container and said series of delivery chains or conveyors to deposit rhinestones upon said delivery chains or conveyors; a series of photo-cell units each of which includes an electric circuit having a battery or other power source, a light

source in connection with and integral to each of said photo-cell units; expulsion magnet means operable through the medium of each of said electric circuits to cause the expulsion of rhinestones that have not fallen into their proper setting relation upon the respective conveyors with respect to a setting die adjacent to each conveyor preliminary to the delivery thereto.

2. The structure as set forth in claim 1 and means for selectively stopping the delivery of said rhinestones upon one or more of said delivery conveyors, said selectively stopping means consisting of sliding finger projections mounted upon each of the discharging apertures of the delivery conveyors aforesaid.

3. In a machine of the class described having a series of delivery chains or conveyors; a series of setting dies operating in connection with said conveyors; a series of electric circuits each having a battery or other power source connected therein; a photo-cell unit included in each of said circuits; expulsion magnet means also included in each of said circuits; each of said expulsion magnets controlled by its corresponding photo-cell unit to cause the rejection of rhinestones that had not fallen into their proper setting position upon each of said delivery chains or conveyors in advance of being delivered to said setting dies by means of delivery chains or conveyors aforesaid.

4. In a machine of the class described having means for delivering rhinestones or brilliants of similar size and cut; a delivery chain or conveyor operating in connection with said delivery means, said delivery chain or conveyor having separator fingers attached thereon; an electric circuit having a battery or other power source therein; a photo-cell unit included in said circuit; a light source operating in conjunction with said photo-cell and integral thereto; an electro-magnet included in said circuit the armature of which operates an angularly disposed arm member contiguous to said rhinestones on the delivery chain aforesaid, said angularly arm member causing the rejection of rhinestones that have failed to fall in their proper setting position upon each of the delivery chains or conveyors aforesaid.

5. In a machine of the class described having means for delivering rhinestones or brilliants of similar size and cut; an endless delivery chain or conveyor operating in connection with said delivery means; means for stopping the delivery of said rhinestones to said delivery chain or conveyor while said machine is in operation; an electric circuit having a battery or other power source therein; a photo-cell unit included in said circuit; expulsion magnet means also included in said circuit and which is controlled by said photo-cell unit contiguous to said delivery chain, said expulsion magnet means to cause the rejection of certain rhinestones that shall have been deposited upon said delivery chain; said rejected rhinestones falling to fall into their proper setting positions upon said delivery chain with respect to being set into a setting die preliminary to the delivery thereto.

6. In a machine for affixing rhinestones or the like upon a fabric having a container for storing said rhinestones; a delivery channel operating in connection with a delivery chain; said channel extending from said container to a position contiguous to said delivery chain upon which said rhinestones are deposited from said delivery channel; an electric circuit having a battery or other power source therein; a photo-cell unit and

an electro-magnet included in said circuit, an armature operating in connection with said electro-magnet, an arm member integral to said armature and positioned contiguous to said rhinestones that shall have been deposited upon said delivery chain, said armature and said associated arm member and said electric circuit to cause the rejection of said rhinestones on said delivery chain that have fallen thereon in a manner precluding a proper setting position to said rhinestones prior to delivery to a setting die preparatory to being affixed upon the fabric aforesaid.

7. In a machine of the class described having a container to hold rhinestones or the like; a series of delivery chains or conveyors in said machine, delivery channel means between said container and said series of delivery chains or conveyors that convey said rhinestones to a corresponding series of companion setting dies; means for delivering said rhinestones in proper setting position prior to the delivery thereof to said companion setting dies; die means for blanking and forming bezel base caps in said machine; means for delivering in proper setting relation, said base caps after being formed to said series of companion dies; puller roller means contained in said machine to cause fabric to travel between the companion setting dies, the prongs of said base caps being set through the mesh of said fabric and then affixed upon said rhinestones through the medium of the companion setting dies aforesaid.

8. In a machine for affixing rhinestones or the like in multiple formation upon a fabric; a series of delivery chains or conveyors in said machine; a number of multiplied electric circuits each having a power source connected therewith, the number of said circuits corresponding to the number of said conveyors; a photo-electric unit in conjunction with a light source controlling an electro-magnet included in each of said circuits; an ejector arm member operably connected with each of said electro-magnets, each of said electro-magnets controlling respectively one of said ejector arm members that is contiguous to each of said delivery conveyors; and means for stopping the delivery of said rhinestones to one or more of said delivery chains or conveyors while said machine is in operation, said stoppage of

the delivery of said rhinestones causing variations in the design of the multiple settings of rhinestones upon the fabric aforesaid.

9. In a machine of the class described having a container to hold rhinestones or the like; a series of delivery conveyor means to convey said rhinestones from said container to a corresponding series of companion setting dies; means for selectively setting the proper position of said rhinestones preparatory to being fed into said companion dies, said means consisting of a photo-electric cell in conjunction with a light source and in combination with an electro-magnetic circuit; a series of die means for blanking and forming bezel base caps in said machine; means for delivering formed base caps to said companion dies in proper setting relation to the rhinestones that have been conveyed to said dies; means for impelling a strip of fabric between said companion dies at a predetermined rate corresponding to the movement of said companion dies; and means for stopping the delivery feed of said rhinestones into one or more of said companion dies, said stoppage causing variations of design in the affixing of rhinestones on one side of said fabric, said rhinestones being held in position on said fabric by being meshed into the prongs of corresponding bezel base caps on the opposite side of the fabric aforesaid.

10. In a machine for affixing rhinestones or the like in multiple setting formation upon a fabric; a group of companion setting dies and a series of conveyors in said machine; said machine also having means contained therein for forming and delivering bezel base caps in correct time relation with the delivery of said rhinestones from said series of conveyors to said group of companion setting dies preparatory to being affixed upon said fabric; and photo-electric unit means having a light source, said photo-electric unit means included in an electric circuit having a power source, electro-magnetic means included in said electric circuit to cause the rejection of such rhinestones that shall have been deposited upon said delivery conveyor in a manner precluding proper setting position upon said companion dies preparatory to being affixed upon the fabric aforesaid.

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