W. S. ELLIOT.

MANUFACTURE OF EYELETS OR THE LIKE.

APPLICATION FILED DEC. 18, 1914.

1,188,423.

Patented June 27, 1916.

2 SHEETS—SHEET 1.

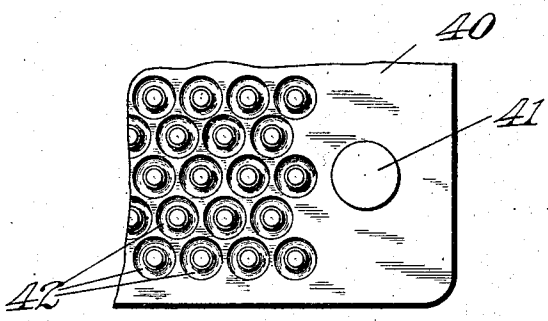

Fig. 1.

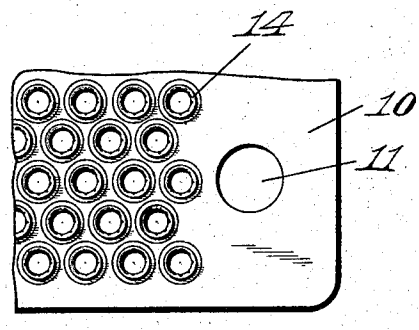

Fig. 2.

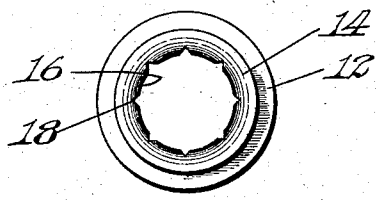

Fig. 5.

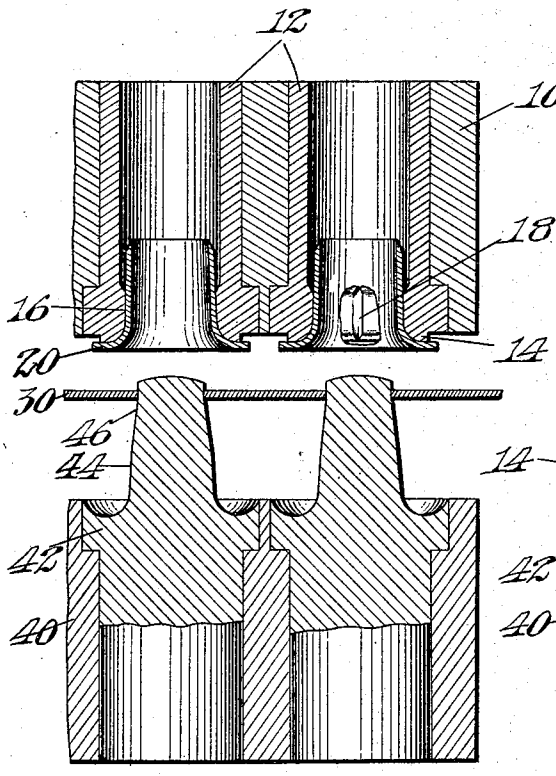

Fig. 3.

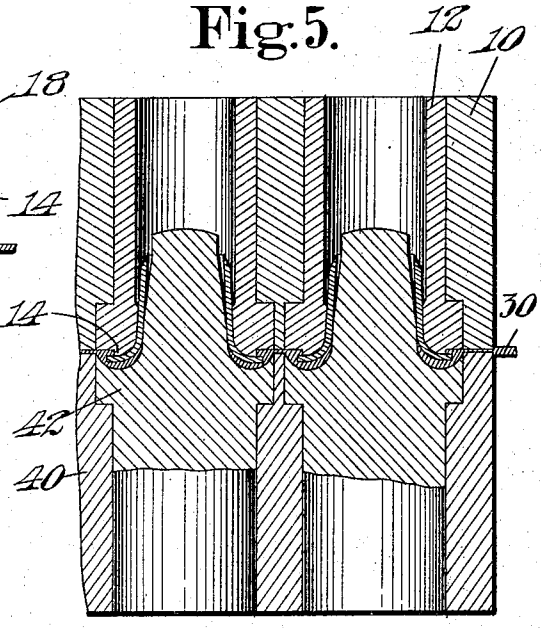

Fig. 4.

WITNESSES.

Herbert W. Kenway.

Norman C. Hussey.

INVENTOR.

William S. Elliot

By his Attorney

Nelson McDonald

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

W. S. ELLIOT.

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2 SHEETS—SHEET 2.

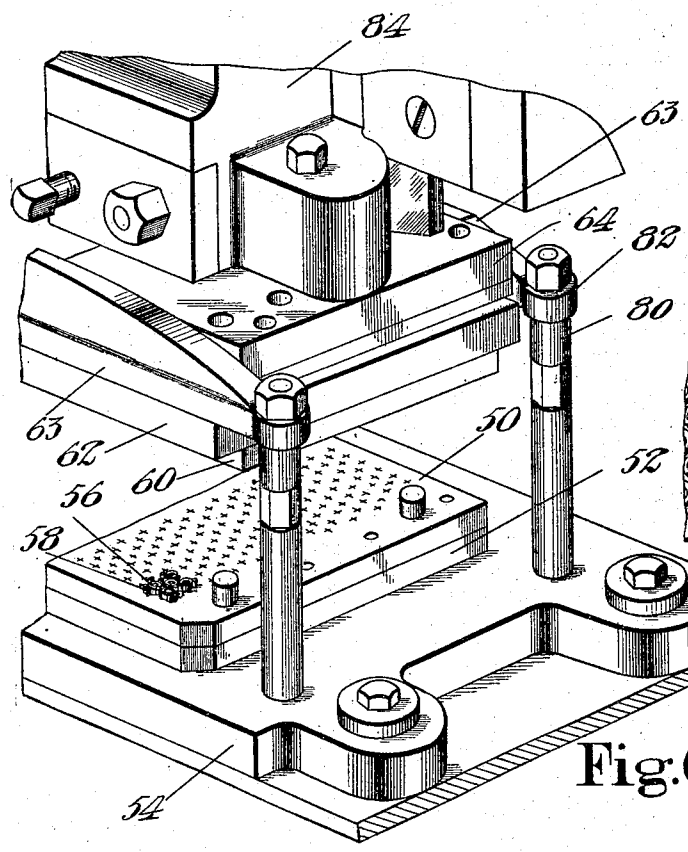

Fig.6.

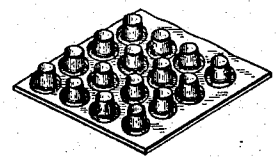

Fig.10.

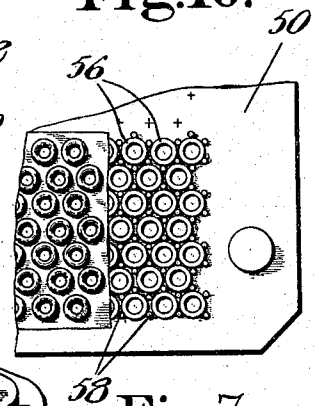

Fig.7.

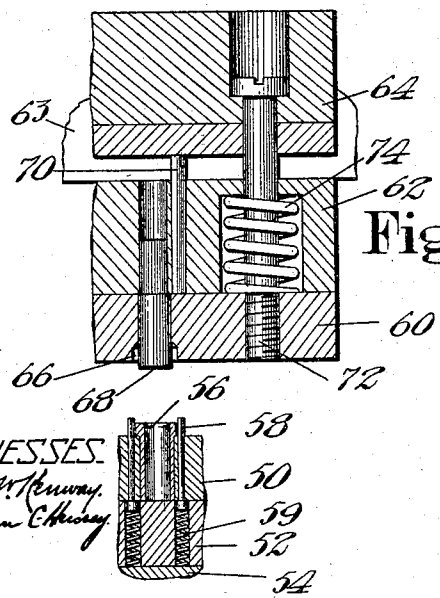

Fig.8.

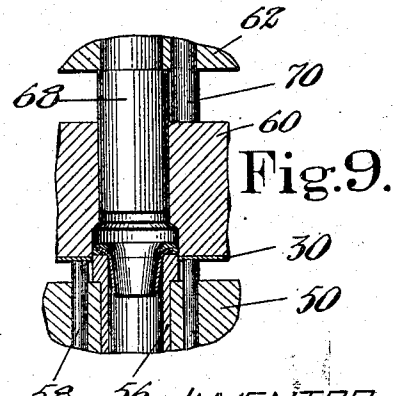

Fig.9.

WITNESSES:

Herbert W. Kenway.

Norman C. Kenway

INVENTOR.

William S. Elliot

By his Attorney

Nelson M. Howard

UNITED STATES PATENT OFFICE.

WILLIAM S. ELLIOT, OF FLORENCE, MASSACHUSETTS, ASSIGNOR TO UNITED FAST COLOR EYELET COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

MANUFACTURE OF EYELETS OR THE LIKE.

1,188,423. Specification of Letters Patent. **Patented June 27, 1916.**

Application filed December 18, 1914. Serial No. 877,982.

To all whom it may concern:

Be it known that I, WILLIAM S. ELLIOT, a citizen of the United States, residing at Florence, in the county of Hampshire and State of Massachusetts, have invented certain Improvements in the Manufacture of Eyelets or the like, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to an improved method of making eyelets or similar articles of that type which comprises a blank provided upon certain portions with a coating of celluloid or other plastic compound.

The invention also includes within its scope novel apparatus herein disclosed as adapted for carrying out certain steps of the method.

In the manufacture of covered eyelets as heretofore carried out the celluloid required to cover each individual eyelet flange has been separated from a sheet prior to or during the molding operation and it has been necessary to supply within the periphery of the eyelet all the celluloid necessary for the covering operation. In accordance with an important feature of the present invention, however, the material of the celluloid sheet is caused to flow inwardly within the periphery of the eyelet during the molding operation. By this procedure consequently the amount of waste material is substantially reduced. Moreover it becomes possible to utilize a sheet of celluloid of less thickness than has ever been practicable heretofore and this of itself effects an important reduction in the cost of manufacture.

The method of this invention may be carried out with particular advantage in covering simultaneously a large number of eyelet blanks. Under these circumstances the molding dies are so arranged that a sheet of celluloid operated upon has its material forced from the space between the dies into position to form a part of the flange, so that the thickness of the waste material remaining out of range of the dies is reduced substantially from the thickness of the original sheet, while at the same time, the part of the sheet which covers the eyelet flange is substantially increased in thickness.

In one of its aspects therefore the invention consists broadly in forcing the material of a celluloid sheet toward a plurality of adjacent centers and simultaneously molding it upon blanks located concentrically with respect to the several centers.

In carrying out the step above discussed in the manufacture of covered eyelets there is produced a sheet of celluloid in which is embedded the flange of a metallic eyelet blank while the barrel of the blank projects outwardly from the sheet. Upon one surface there appears molded in celluloid a circular ring of convex surface which surrounds an opening in the sheet while the barrel of the blank and a portion of the under side of the flange appears through an opening in the other surface. As herein shown it is proposed to mold the celluloid sheet upon a great number of eyelet blanks at the same time and the article of manufacture so produced possesses many novel and useful characteristics. It comprises a sheet of celluloid having molded on one surface a plurality of convexed projections arranged in adjacent rows, and having corresponding rows of openings in the other surface through which project the metallic barrels of the blanks. Sheets of this kind may be readily handled and transported if desired and the eyelets may be completed by being sheared or punched out of the sheet at any convenient time or place.

An important feature of the apparatus consists in so disposing the individual molding dies in their respective die plates that the celluloid located without the periphery of the completed eyelets shall be forced inwardly to form a part of the flange covering. As herein shown the eyelet holding dies are provided with a supporting ring which projects above the plane of the plate and is arranged to fit beneath and support the eyelet flange. The coöperating molding dies on the other hand are disposed with their curved flange-forming recess below the plane of the molding die plate. The portions of the two plates which are out of range of the dies consequently act to force the celluloid into range of the dies.

One very important advantage of shearing out the complete eyelets from the celluloid sheet is that such a smooth periphery is produced by the shearing that it is un-

necessary to drum or tumble the finished eyelets, as was necessary in practising the old method.

These and other features of the invention will be best understood and appreciated from the following detailed description of one manner of practising the method, of a preferred form of apparatus and of the product of the method, together with the accompanying drawings, in which,—

Figure 1 is a plan view of the molding die plate; Fig. 2 is a similar view of the blank holding die plate; Figs. 3 and 4 are sectional views showing the position of the dies respectively preliminarily to and at the conclusion of the molding operation; Fig. 5 is a plan view on an enlarged scale of one of the eyelet holding dies; Fig. 6 is a view in perspective of the shearing out apparatus; Fig. 7 is a plan view of part of the holding plate of the shearing apparatus; Fig. 8 is a sectional view of a part of the shearing out apparatus with the parts in their initial position; Fig. 9 is a similar view on an enlarged scale of the parts in the position which they occupy at the conclusion of the shearing operation, and Fig. 10 is a view in perspective of the molded celluloid sheet.

The invention is herein described as applied to the manufacture of eyelets covered with celluloid but it should be understood that this is for convenience in illustration only and that the method and apparatus may be employed in the manufacture of other articles, which are to be covered with celluloid or any plastic compound.

In order to hold the eyelet blanks during the operation of molding the covering material thereon an eyelet holding die plate is provided of the construction shown in Figs. 2 to 5. Each eyelet blank is held in an individual tubular die 12 and these dies are set with a uniform spacing in a plate 10. The plate 10 is bored and countersunk to receive the dies and also has an opening 11 for the reception of a guiding pin set in the other die member. The dies 12 each have a thick flange at their outer ends from the surface of which projects a flange supporting annular shoulder 14. This shoulder is shaped to fit beneath the flange of the eyelet blank, supporting the same out nearly to its edge and also serving to prevent the flow of celluloid beneath the eyelet flange inwardly toward the barrel. The dies 12 are provided with a portion 16 of reduced diameter which is intended to engage the eyelet barrel for about half of its length leaving the remainder free as shown in Figs. 3 and 4. In order to make allowance for slight variations in the size of the barrels of eyelet blanks the portion 16 is provided with deep longitudinal scorings 18 as shown in Figs. 3 and 5. The diameter of the reduced portion 16 is such that when the eyelet blanks 20 are forced into place they will be firmly retained by friction.

The coöperating molding die member comprises a number of individual dies 42 each having a flanged outer end recessed to give form to the flange of the completed eyelet and having a solid projecting spindle 44. At its base the spindle is shaped to fit exactly within the upper end of the barrel of the eyelet blank. Above this portion it is tapered and at its outer end is provided with a cylindrical portion 46 of reduced diameter. The dies 42 are set in a die plate 40 in concentric relation with the holding dies 14 in the plate 10. A pin 41 projecting from the plate 40 slides in the hole 11 of the plate 10 and so maintains the proper relation between the two plates. The flange forming recesses of the dies 42 are disposed below the plane of the surface of the plate 40, so that the plate may press, in the molding operation, upon the portions of the celluloid sheet.

The coöperating individual dies are so arranged in both plates that a sheet of celluloid 30 pressed between them will have its material forced into the space about the flange of the eyelet blanks so that the portions of the sheet located out of range of the dies will be substantially reduced in thickness during the molding operation. The result is that the amount of waste material remaining in the sheet after the completed eyelets have been removed therefrom is reduced to a minimum. In supplying celluloid to the action of the dies a sheet 30 is punched with holes arranged similiarly to the spindles 44. The diameter of the holes is slightly greater than the diameter of the reduced portion 46 of the spindle so that when the celluloid sheet 30 is placed upon the lower die member it will readily settle itself upon the end of the spindles as shown in Fig. 3.

The preliminary relation of the dies, the eyelet blanks and the punched celluloid sheet is shown in Fig. 3. The position of these elements at the conclusion of the molding operation is shown in Fig. 4 from which it will be apparent that the celluloid is molded over the entire upper surface of the eyelet blank and forced under the edge of the eyelet flange where it is stopped so as to form an annular shoulder by the supporting flange 14. After the molding operation has been completed the dies are separated and the sheet of celluloid is removed with the eyelet flanges embedded therein and their barrels projecting outwardly. Figs. 7 and 10 illustrate the work in this condition. The article of manufacture produced by carrying out to this point the steps of the method comprises a plastic sheet having a plurality of thickened portions connected by

thinner portions, each thickened portion having embedded therein a part of a metallic blank. This article is not herein claimed as it constitutes the subject-matter of my divisional application Serial No. 56,317, filed October 16, 1915. The eyelets are completed by being sheared out of the sheet by a pair of coöperating shearing dies illustrated in Figs. 6 to 9 of the drawing. Of these the holding die member comprises a plate 50 having a number of flanged tubes 56 set therein. The arrangement of these tubes is similar to those of the holding dies above discussed. They are, however, located slightly closer together in order to allow for the contraction of the celluloid sheet when removed from the molding dies. Surrounding each of the tubes 56 are a number of small stripping pins 58 which work freely in the plate 50 and are normally projected by springs 59 arranged in sockets in a plate 52 which underlies the plate 50.

The coöperating shearing die comprises a plate 60 having formed therein a number of recesses 66 concentrically arranged with respect to the tubes 56. The recesses 66 are of such size as to fit snugly upon the projecting ends of the tubes 56 and to coöperate with the outer edges thereof in shearing the celluloid about the flange of the eyelets. The plate 60 is loosely secured by the bolts 72 to a plate 64 and maintained between these plates is a third plate 62 in which are set a number of ejecting pins 68 one of which projects into each recess 66. A compression spring 74 arranged about each bolt 72 tends normally to move the plate 62 away from the shearing plate 60 so that the ejecting pins 68 shall be entirely out of engagement with the celluloid sheet.

In practice the shearing die plates are placed in a press of suitable construction such, for example, as is illustrated in Fig. 6. As therein shown the stationary bed plate 54 of the press has standards 80 set therein which carry yoke pieces 63. The reciprocatory head 84 of the press has secured to it the plate 64 which carries the shearing plate 60 and the ejecting plate 62. The ejecting plate 62 projects at its ends beneath the yoke pieces 63 which are so disposed that during the upward movement of the head 84 they encounter the ends of the plate 62 and move it downwardly with respect to the shearing plate 60 against the compression of the spring 74. In this manner the ejecting pins 68 are projected through the opening 66 and eject the completed eyelets which are retained by friction in these openings after the shearing operation. The head 84 comes to rest with the ejecting plate in its lowermost position as clearly shown in Fig. 8. In carrying out the shearing operation the molded celluloid plate shown in Figs. 7 and 10 is placed upon the holding die 50 with the eyelet barrels projecting into the openings in the tubes 56 and the molded eyelet flanges supported out to the point at which the shearing is to take place. The press is then started and the head 84 descends. As soon as the ejecting plate 62 is moved out of engagement with the yoke pieces 63 the ejecting pins are moved upwardly into inoperative positions as shown in Fig. 9 and in the continued downward movement of the shearing plate 60 the shearing edges of the recesses 66 coöperate with the shearing edges of the tubes 56 and shear each eyelet from the sheet 30. The head 84 is then elevated and the completed eyelets ejected.

The shearing apparatus *per se* is not claimed herein but forms the subject-matter of my co-pending application Serial No. 59,078, filed November 1, 1915. However, the novel apparatus which comprises the combination of uniformly spaced molding dies for molding a sheet of celluloid upon a plurality of blanks, with a corresponding number of shearing dies spaced closer together than the molding dies constitutes a feature of the present invention and is claimed herein.

The eyelet herein shown as produced by the method and apparatus disclosed is not herein claimed as it forms the subject-matter of my co-pending application Serial No. 792,139 filed September 27, 1913.

Having thus described my invention, I claim as new and desire to secure by Letters Patent of the United States:

1. The method of making covered eyelets which consists in embedding the flanges of a gang of metallic eyelet blanks in a sheet of celluloid, the sheet extending in uniform thickness about the embedded flanges, and subsequently separating the eyelets from the sheet by shearing the celluloid outside the peripheries of the flanges to form adjacent thereto the peripheries of the celluloid coverings of the flanges of the blanks.

2. The method of making covered eyelets which consists in forcing the material of a celluloid sheet toward a plurality of adjacent centers, simultaneously molding it upon the flanges of eyelet blanks located concentrically with respect to said centers, and then separating the complete eyelets and the sheet by shearing the celluloid outside and closely adjacent to the peripheries of the blanks.

3. The method of making covered eyelets which consists in punching a sheet of celluloid full of holes, locating the sheet between coöperating die plates by means of said holes, embedding the flange of an eyelet blank in said sheet concentrically with respect to each hole, and subsequently completing the eyelets by shearing them from the sheet.

4. The method of making covered articles

which consists in molding a sheet of celluloid to cover parts of a gang of blanks, the sheet extending in uniform thickness about the covered parts of the blanks, and forming the finished edges of the articles by shearing the covered parts out of the sheet.

5. The method of making covered articles which consists in molding celluloid upon parts of blanks and forming the exposed surfaces of the celluloid by molding, and then forming the peripheries of uniform width by shearing the celluloid outside and closely adjacent to the peripheries of the blanks.

6. The method of making covered articles which consists in supporting the flanges of a gang of metallic blanks out to within a short distance inside their peripheries and molding celluloid thereon from a sheet while so supported, then supporting the covered flanges out beyond the peripheries of the metallic flanges, and shearing the celluloid at the edges of the latter support to separate the articles from the sheet.

7. The method of making covered articles which consists in pressing a sheet of celluloid to cause it to be locally thinned and thickened, simultaneously molding the thickened portions upon parts of a gang of metallic blanks, and finally cutting the molded portions outside the blanks to form finished edges of the articles and to separate said molded portions from the sheet.

8. Apparatus for applying covering material to eyelets, comprising a die for holding an eyelet blank provided with an opening to receive the barrel of the blank, and with a supporting shoulder shaped to fit beneath and engage the flange of the blank, together with a holding and molding plate disposed with its entire surface below the supporting shoulder by a distance equal to the thickness of the coating to be applied to the under side of the flange.

9. The method of making covered articles which consists in holding a plurality of blanks in a predetermined spacing, molding a sheet of celluloid upon the blanks leaving their shanks projecting, permitting the sheet to contract and thus bring the shanks into a closer spacing, and completing the articles by shearing them from the sheet.

10. Apparatus for manufacturing covered articles comprising a plurality of uniformly spaced molding dies for molding a sheet of celluloid upon a plurality of metallic blanks, and a corresponding number of shearing dies spaced closer together than the molding dies for shearing out the covered blanks.

11. The method of making covered articles which consists in moving waste material of a sheet of celluloid into spaced blank areas to form portions which are thicker than the sheet, leaving the connected portions of the sheet of uniform thickness, simultaneously molding the portions so produced upon the articles to be covered, and finally separating the articles from the sheet and simultaneously forming finished edges of the celluloid by shearing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM S. ELLIOT.

Witnesses:
ROBERT R. MILLER,
ALEXANDER CAIRD.