John C. Rhodes.

Imp'l in the manufacture of Eyelets.

No. 119,647. Patented Oct. 3, 1871.

Fig. 1.

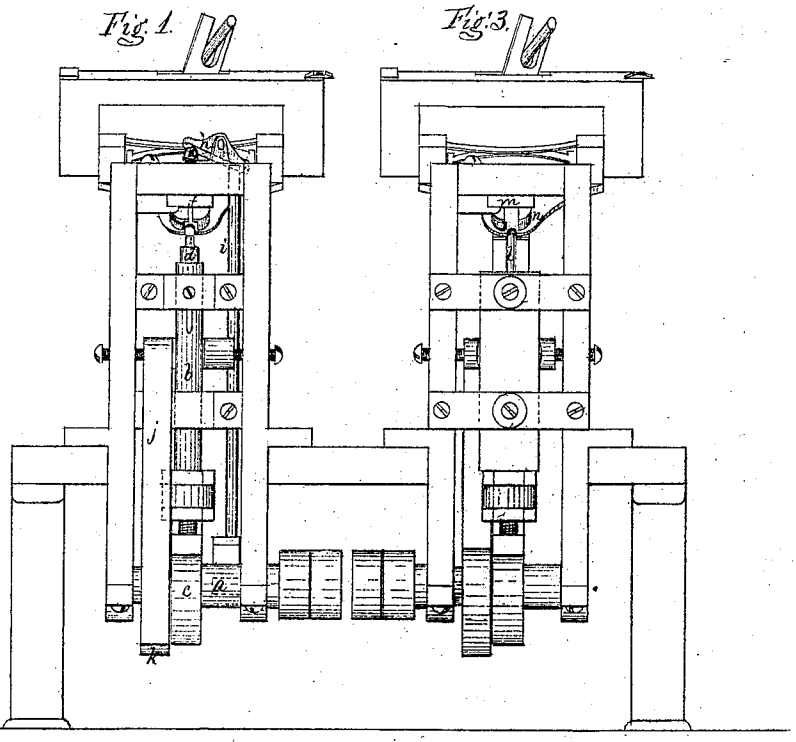


Fig. 3.



Fig. 2.

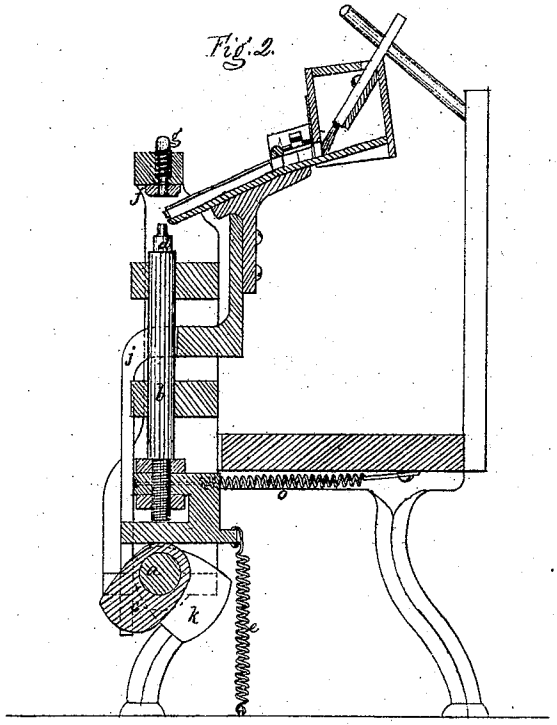
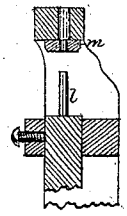
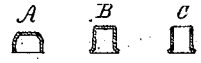


Fig. 4.





John C. Rhodes
By his Attys
Cushy Halsted & Miller

Witnesses { C. Warren Brown.
Mc. W. Frothingham.

# UNITED STATES PATENT OFFICE.

JOHN C. RHODES, OF SOUTH ABINGTON, MASSACHUSETTS.

## IMPROVEMENT IN MACHINES FOR MAKING EYELETS.

Specification forming part of Letters Patent No. 119,647, dated October 3, 1871.

*To all whom it may concern:*

Be it known that I, JOHN C. RHODES, of South Abington, in the county of Plymouth, in the State of Massachusetts, have invented a new and useful Improvement in the Manufacture of Eyelets; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My invention consists primarily in combining, with a machine to mold cup-shaped eyelet-blanks, as hereinafter set forth, a hopper with an orifice at bottom opening into a passage leading toward the molding instruments, the orifice permitting the blank to pass only in the proper position, and mechanism to agitate the hopper and cause the blanks to assume such proper position, as hereinafter more particularly set forth. The invention also consists in certain details in the arrangement and method of operation of the mechanism.

I will now describe the apparatus which I employ: The sheet metal is punched into circular pieces and formed into plain cups without flanges, by what is known as a compound or double punch, which, being so well known in the arts, needs no illustration by drawings. It will be perfectly understood from the following brief description: The punch is a hollow steel cylinder with its cutting-edge at right angles to its axis, which descends toward and into a steel matrix into which it fits. The bottom of the matrix is pierced with a central hole of a diameter equal to the external diameter of the cups to be formed, and in the punch is fitted a steel follower, which is of less diameter than the interior of the cups to be formed, said follower moving through and relatively to the cutting-punch, forcing the punched circular disks of metal through the hole in the matrix in the form of plain cups, which drop off from the follower below the matrix as the follower is withdrawn. The matrix in practice is made, preferably, somewhat conical or flaring from its upper cutting-edge to the hole through which the cups are forced by the follower. A cup formed by the described compound punch is shown at A in the drawing. At this stage any defective cups, A, are picked out from the mass, for it is at this stage, if anywhere, that imperfect eyelet-blanks are most likely to be made. These cups frequently become hardened, consequent upon the previous working of the metal, and in such case are, preferably, thoroughly annealed before introduction into the machine for further operation. They are then put in quantities into the hopper of a machine, in which they are subjected to the operation of a follower and matrix, by which the open ends of the cups are flared or expanded and the bodies are reduced in diameter and are elongated, and in which, if desired, they may also have their ends removed. A machine adapted for flaring and elongating the cups, but not for removing the ends, is shown in front elevation in Fig. 1 and in sectional elevation in Fig. 2. *a* is the shaft, to which motive power is applied. On this shaft is a cam, *c*, by which the follower *d* is raised, said follower being retracted by spring *e*, the holder *b* of the follower being located in suitable guides formed in or attached to the frame of the machine. Above the follower *d* is the stationary matrix *f*, into which the follower presses cup after cup, the form of the follower and the form of the matrix being such that the bottom or open end of the cup is flared, and preferably such that the cup is also elongated, the matrix being smaller in diameter than the outer diameter of the cup A. The compressed and flared cup is left in the matrix when the follower descends, (held there by friction,) and is discharged from the matrix, after the descent of the follower, by the action of a plunger, *g*, which is depressed against a spring by the action of a lever, *h*, operated from a cam on the shaft *a* through a rod, *i*. The hopper, which receives the cups A, I construct with one or more gateways or outlets of shape corresponding with that of the cup A, but slightly larger, enough to permit the cups to pass through, the gateway being somewhat rounded at one of its sides similarly to the rounded end of the cup, so as to insure with certainty the passage and presentation of each cup with its proper side in the right position for the action of the stretching and flanging mechanism. From the hopper the blanks slide freely down through the chute to the end of the chute, where a slight spring retains the column of cups and the end of the chute holds the end cup directly over the axis of the follower, so that as the follower rises, its point passes into the cup, after which the chute retreats, (leaving the cup on the follower,) so that the follower can rise and force the blank into the matrix. To give this movement to the hopper it is mounted on a lever, *j*, pivoted to the frame, so that it can receive a

vibratory movement which brings the end of the chute leading from the hopper over the follower *d* when in its lowest position, the chute remaining forward until the follower moves upward, taking on its end one of the cups A, the cam *k* then operating to throw the chute-end back, after which the cam *c* forces the follower upward, the forward movement of the chute being made by the action of a spring, *o*. The rise of the follower is gradual and intermittent, but its descent is abrupt, it rising first until the follower-pin enters the blank or cup, then stopping until the chute retreats, and then resuming its upward movement with the cup or blank on its point. Within the hopper a brush is arranged in any suitable manner so as to receive motion from the vibrations imparted to the hopper, and thus the cups are agitated so as to change their positions, and when in proper position they pass through gateways or a gateway formed in the lowest part of the hopper, such gateway being of such shape as to prevent egress from the hopper into the chute of any cups except such as are presented in the proper positions. The follower-pin first enters the cup and then stops until the chute retreats, and then carries the cup up into the matrix. By the operation of the mechanism thus described the cups A are changed in form so as to be in shape as represented at B in the drawing, and quantities of these blanks B may then, if desired, be placed in the hopper of a machine, shown in front elevation in Fig. 3, which machine is very similar to the machine shown in Figs. 1 and 2, except that the "former" is replaced by a punch, *l*, and the matrix by a die, *m*, shown in sectional view in Fig. 4, and the chute has attached to it a stripper, *n*, which draws off from the punch *l*, at each descent, the eyelet, through the end of which the punch has passed, to remove the end of the eyelet-blank, seen at B, this operation forming an eyelet such as is seen at C. The openings from the hopper into the chute are varied in form to suit the shape of the blanks B, which can only escape into the chute flanged end downward. The chutes of both of the machines shown are provided at their free ends each with a retaining spring which holds the eyelets from falling out, though yielding when, with the follower *d* in a cup A, or with the punch *l* in a blank B, either chute moves backward. When one and the same machine is used to elongate and flange, as at B, and also to remove the end, as at C, the end may be removed by any well-known means, such as grinding, cutting, milling, or punching.

Although I have described three different machines—namely, one for cutting out the planchet and converting it into the cup-shaped blank A, another for imparting to the blanks A the form shown at B, and the third for cutting out the closed end of blank B—I wish it to be understood that I make no claim in this application to any specific mechanism other than is to be found in the second of the aforenamed machines, that, namely, for imparting to the blank shown at A the form of that shown at B, said machine being represented by Figs. 1 and 2 of the drawing.

I claim—

1. The combination, with a machine to mold a cup-shaped eyelet-blank such substantially as that represented at A, to the shape of a finished eyelet, but with or without a bottom, as represented at B and C, of a hopper with an orifice at bottom opening into a passage or chute leading toward the molding instruments, said orifice being of such shape and dimensions as to permit the passage through it of the cup-shaped blank, when and only when said blank is right-side up in regard to the molding instruments, and mechanism to agitate said hopper or the blanks within it, in order thereby to cause said blanks to assume severally the position proper to enable them to pass through the orifice of the hopper, substantially as described.

2. The combination, with the chute, matrix, and follower, of mechanism to impart to said chute a vibratory movement, and to the follower two distinct forward movements separated by the interval of time required to retract the chute, substantially as set forth.

3. The combination of the hopper, chute, vibrating-lever J, rotating cams *c* and *k*, springs *e* and *o*, holder *b*, follower *d*, and matrix *f*, substantially as described.

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Witnesses:
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(66)