

J. BUCKLAND.
EYELET MAKING MACHINE.

No. 175,923

Patented April 11, 1876.

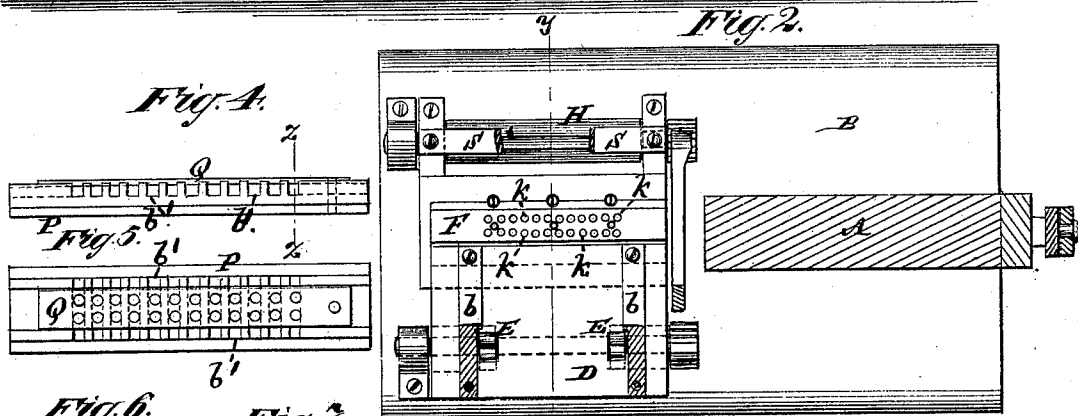
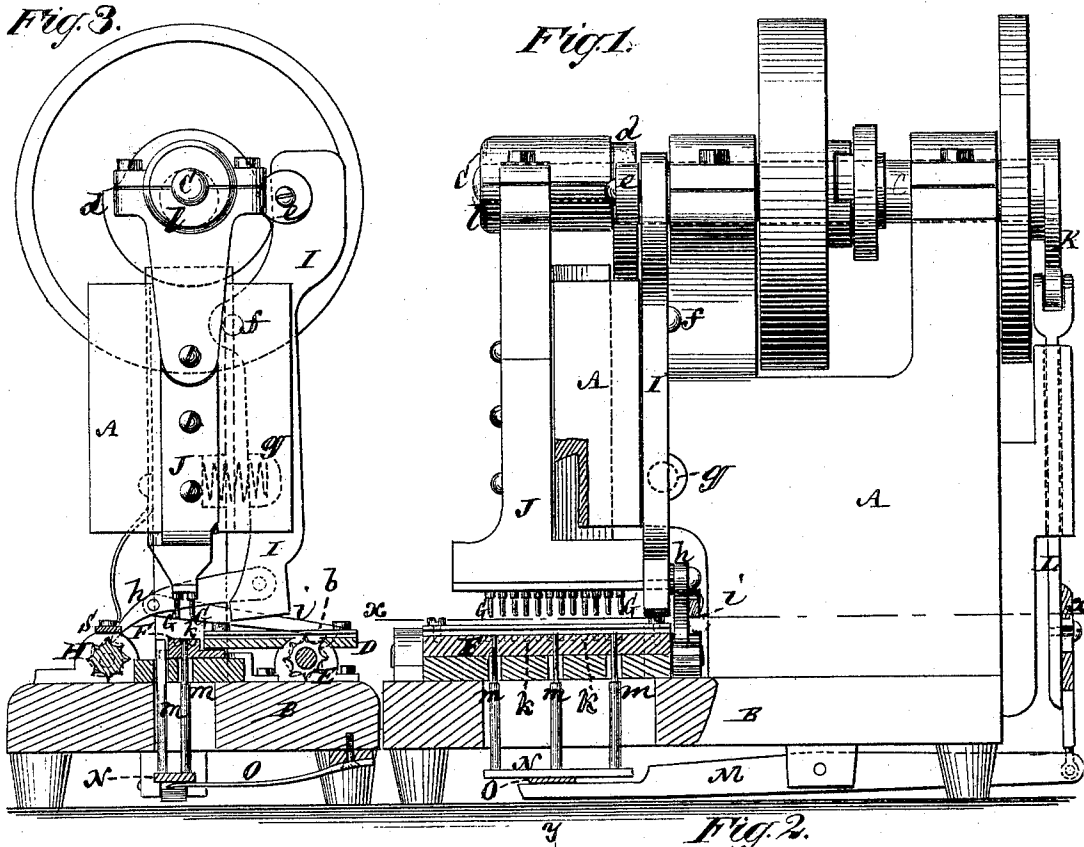


Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
Fig. 11.
Fig. 12.
Fig. 13.

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IMPROVEMENT IN EYELET-MAKING MACHINES.

Specification forming part of Letters Patent No. **175,923**, dated April 11, 1876; application filed
April 19, 1875.

To all whom it may concern:

Be it known that I, JAMES BUCKLAND, of the city and county of Hartford, in the State of Connecticut, have invented certain new and useful Improvements in Machines for Making Eyelets; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification.

This invention relates to the manufacture of eyelets from a strip or sheet of metal, which is first suitably indented to form eyelet-blanks, and the closed ends of said indented portions or eyelet-blanks afterward punched out, and the eyelets thus produced subsequently cut, stamped, or punched out from the sheet or strip. The indentations in the strip or sheet forming the eyelet-blanks are not produced at a single operation, but have their necessary size and depth given them by a succession of similar operations, or by passing the strip or sheet of metal through a succession or series of similar machines, and so that each succeeding operation makes the indentation larger and deeper. This is necessary to the proper working of the metal.

In the machine to which my improvements are here shown applied, a flat die having two or more rows of holes, and two or more holes in each row, is used, in combination with a series of simultaneously-operating punches corresponding to the holes in the die, for action on the strip or sheet of metal as it is intermittently fed between the die and punches.

The invention consists in certain novel constructions and combinations of the devices used in such machine, including lifter-pins, in combination with the dies, having eyelet-forming holes or recesses, between which said pins work, and one or more feed-rolls operating in alternate relation with the lifter-pins; likewise, a combination of a longitudinally-grooved die-holder, having upper cross-openings, a die having one or more rows of holes, and two or more holes in each row, to be used in punching out the closed ends of the eyelets, and a similarly-perforated bridge-piece.

The invention also consists in a combination,

with a feed-roll and delivery-roll for the strip, of a push pawl and drag-pawl, with ratchets on said rolls to operate both rolls simultaneously, the two pawls being connected, so that the distance between them is correctly preserved.

Figure 1 represents a partly sectional side elevation of a machine having my invention in part embodied; Fig. 2, a horizontal section of the same on the line *xx*; Fig. 3, a transverse vertical section on the line *yy*. Figs. 4, 5, 6, 7, and 8 are a side view, a plan, an end view, a transverse vertical section on the line *zz*, and a longitudinal vertical section of a combined die, die-holder, and bridge-plate or guide, used for centering the eyelet-blanks while the closed ends of the eyelets are being punched out. Figs. 9, 10, 11, and 12 are diagrams showing different forms of stock in the progress of the work. Fig. 13 is a transverse section on a larger scale of the die used in forming the eyelets.

Prior to describing the invention in detail it may here be observed that the several punches and dies for indenting the metal sheet or strip to the necessary size and depth, according to the dimensions of the eyelets to be produced, may either be worked in the same machine by substituting one set of dies and punches for another and differently-sized set of the same, or separate machines provided with the differently-sized dies and punches may be used. The same remark applies to the use of the die, die-holder, and bridge-piece used for centering the eyelet-blanks while the small ends of the eyelets are cut out.

A is the main frame of the machine, and B its bed-plate. C is a main driving-shaft, which is here arranged in the upper portion of the frame, and may be operated by any suitable means.

D is the table, over which the sheet or strip of metal is fed to the dies by the combined action of entry and delivery feed-rolls, or either, and upper bars or guides used in connection with said rolls. These rolls, which are toothed and pitched to correspond to the distances apart of the rows of punches and holes in the dies, having a transverse relation

to the feed, also serve as gages by entering within the sheet or strip, to insure the proper feed of the latter relatively to the punches and holes in the die, so that the rows of holes or indentations are uniformly spaced and the sheet or strip is held from slipping.

E E are the feed-rolls, which are constructed and arranged to enter the recesses in the back of the strip or sheet between the projections formed by the cavities or eyelet-indentations in its face, supposing the strip or sheet to have been previously more or less indented.

Along each side of the table D is an overhanging or rabbeted guide-bar, *b*, these bars being arranged at a distance apart corresponding to the width of the sheet or strip to be worked, and within which rabbeted bars the edges of the strip slide as the latter is fed by the rolls E E, thus contributing to produce a straight, steady, and easy feed of the metal strip to the die F and punches G. The delivery roll or rolls H take hold of the strip or sheet after it leaves the die and punches, the teeth or projections on said roll entering the recesses in the back of the strip or sheet between the projections formed by the cavities or eyelet indentations or holes in its face, and said roll operating in conjunction with a cross holding-down bar, S, under which the strip passes as it is being delivered by the roll H.

To insure the action in concert of the rolls E and H the same may be operated by the same combination of devices. Thus, on the shaft C is a cam, *d*, which acts on a roller, *e*, that is carried by a lever, L. This lever has its fulcrum at *f*, and is vibrated in the one direction by a spring, *g*, and in the other direction by the cam *d*. Pivoted to the lower end of said lever is a push-pawl, *h*, which, as said lever is operated, serves to give the necessary intermittent feeding action to the delivery-roll H, and pivoted to the pawl *h* is a drag-pawl, *i*, which, at the same time, actuates the feed-rolls E.

The die F is a flat one, and is supported in a detachable manner, for the convenience of renewal or repair, on the bed B, or a plate mounted thereon. This die, the face of which is on a level with the upper surface of the table D, has two or more series of holes or recesses, *k*, in it, and each row two or more of such recesses, for use in combination with a series of punches, G, corresponding to said holes or recesses. These punches have an up-and-down motion communicated to them by means of a slide, J, by which they are carried, and which is operated by an eccentric, *l*, on the shaft C. Said punches and the recesses *k* in the die are of a size to correspond with the indentations in the strip.

Each time the punches rise from their work lifter-pins *m m*, passing up through the die F, act at several points between the rows of recesses *k* upon the metal sheet, plate, or strip

under operation, to raise it (free from all liability to tear) out of the holes or recesses in the die. This operation of the lifter-pins is alternate with the action of the feed-rolls.

Various means may be employed for working said lifter-pins up and down at the proper time—as, for instance, a cam, K, on the shaft C, arranged to depress an adjustable slide, L, connected with a lever, M, which serves to lift a plate, N, carrying the lifter-pins, which afterward are depressed by a spring, O, as against the action of the cam.

The die F, apart from its being a flat one, with two or more rows of holes or recesses in it, and each row having two or more of such recesses, is otherwise of peculiar construction, as more clearly shown in Fig. 13 of the drawing. Thus, as it is necessary in the construction of said die that the same, on its upper part, should present a narrow face, and no more metal on the outside of the holes or recesses in it than the width of the space between the rows of holes, in order to provide for the indented portions in the strip overlapping the edges of the die preparatory to each fresh eyelet-forming operation, said die, which otherwise would warp in hardening, is stiffened at its base by side strips or flanges *a'*, arranged sufficiently below the upper surface of the die to receive the indentations in the strip on or over it. This construction is more clearly shown in Fig. 13 of the drawing.

After the strip or sheet of metal has had the eyelets or indentations formed in it of a sufficient size and depth, as represented in Fig. 12, said eyelets have their closed ends punched out before cutting the eyelets out of the strip.

To punch out the closed ends of the eyelets a die-holder, P, is arranged in the place of the die F. This die-holder is grooved longitudinally underneath, as at *a'*, to receive within it a die, F', perforated to correspond with the holes or recesses *k* in the die F. Said die-holder also has mounted on it, or let into a groove along its upper surface, a bridge-piece, Q, which likewise has two or more rows of holes in it, with two or more holes in each row, in line with the holes in the die beneath; and the body of the die-holder has a series of transverse openings, *b'*, cut through its top, and extending from side to side, in line with the transverse arrangement of holes in the bridge-piece and die. The holes in the bridge-piece Q serve to center the eyelet formations on the strip while the small or closed ends of the eyelets are cut out by the punches which are carried by the slide J, and are arranged to correspond with the holes in the bridge-piece and die.

The punched ends of the eyelets may pass out through the die F', but, if lifted by the punches, will be prevented from interfering with a continuance of the work by the punchings passing out through the sides or ends of the transverse openings *b'* in the die-holder.

This construction of the die-holder is not only simple and cheap, and provides for a removal of the die, but it makes the die and die-holder self-clearing.

I claim—

1. The lifter-pins *m*, in combination with the dies having eyelet-forming holes or recesses, between which said pins work, and one or more feed-rolls, for operation in alternate relation with the lifter-pins, essentially as described.

2. The combination of the longitudinally-grooved die-holder *P*, having upper cross-openings *b'*, the die *F'*, having one or more rows of holes, and two or more holes in each

row, and a similarly-perforated bridge-piece, *Q*, essentially as and for the purpose herein set forth.

3. The combination, with either entering feed-roll *E* and delivery-roll *H*, of the push-pawl *h* and the drag-pawl *i*, arranged to operate simultaneously both rolls by their ratchets or teeth, the one pawl being pivoted to the other pawl, and both pawls actuated by the same lever or device *I*, essentially as and for the purpose herein set forth.

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