V. J. BUNET.

AUTOMATIC MACHINE FOR PLACING AND FIXING ROLLERS IN METAL TUBES OR EYELETS.

APPLICATION FILED APR. 5, 1911.

1,062,765.

Patented May 27, 1913.

3 SHEETS—SHEET 1.

Fig. 1.

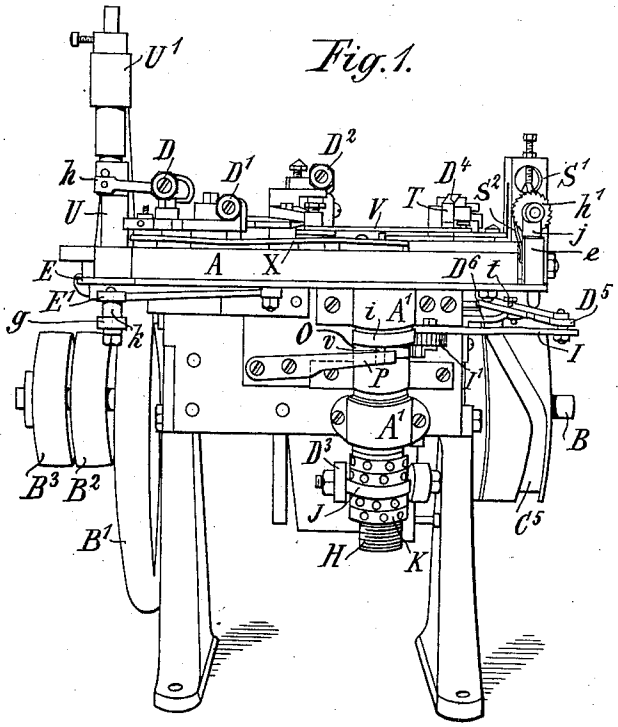

Fig. 2.

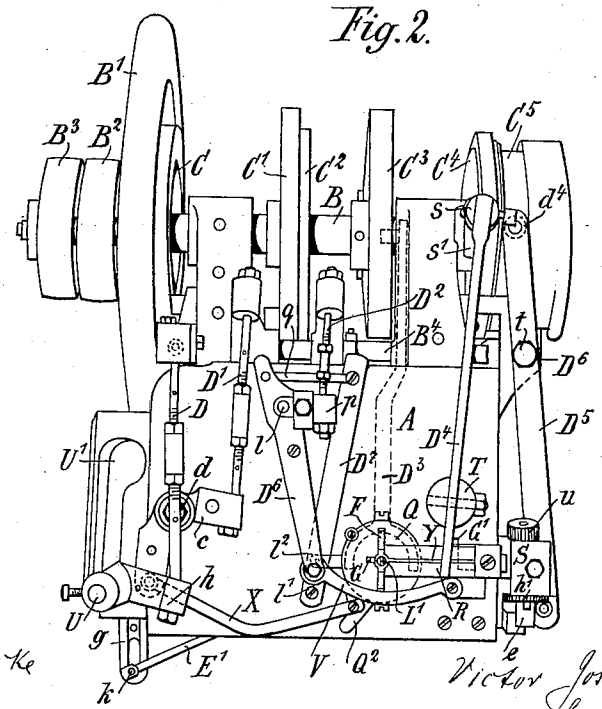

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Fig. 3.

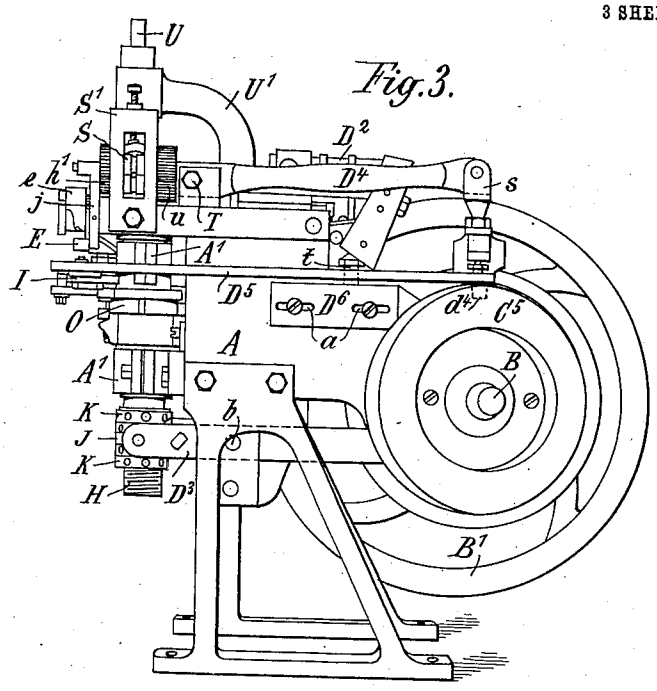


Fig. 4.

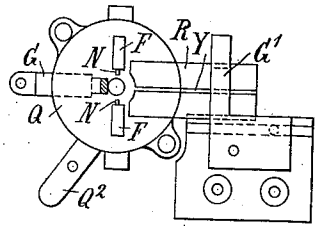


Fig. 8.

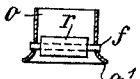


Fig. 9.

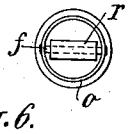


Fig. 7.

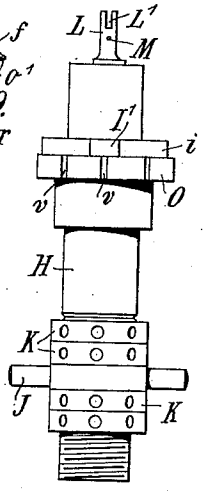


Fig. 5.

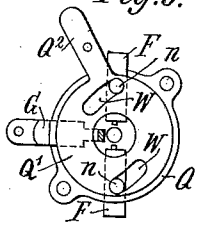
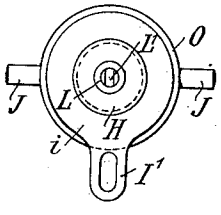


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 10.

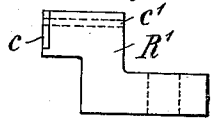
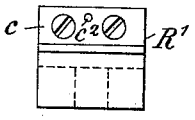


Fig. 12.



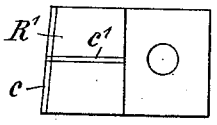


Fig. 11.

Fig. 15.

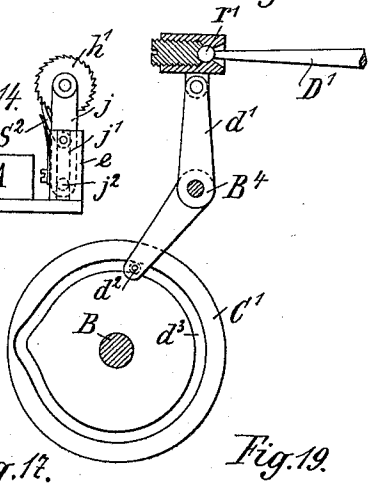


Fig. 13.

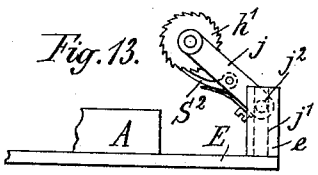


Fig. 14.

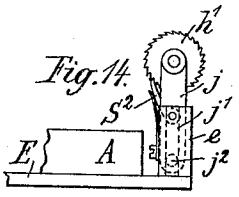


Fig. 16.

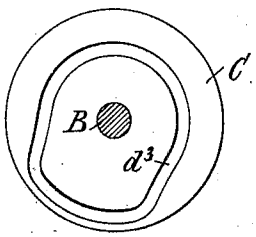


Fig. 17.

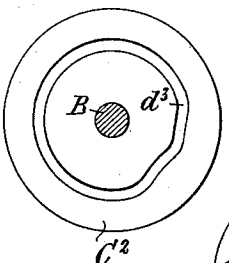


Fig. 19.

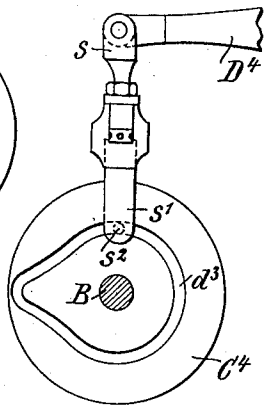
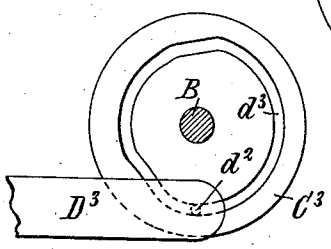


Fig. 18.



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UNITED STATES PATENT OFFICE.

VICTOR JOSEPH BUNET, OF PARIS, FRANCE.

AUTOMATIC MACHINE FOR PLACING AND FIXING ROLLERS IN METAL TUBES OR EYELETS.

1,062,765. Specification of Letters Patent. Patented May 27, 1913.

Application filed April 5, 1911. Serial No. 619,163.

To all whom it may concern:

Be it known that I, VICTOR JOSEPH BUNET, a citizen of the French Republic, residing at 16 Rue Immeubles-Industriels, Paris, France, have invented certain new and useful Improvements in Automatic Machines for Placing and Fixing Rollers in Metal Tubes or Eyelets, of which the following is a specification.

The machine that forms the subject matter of this invention is intended for fitting a small roller in an eyelet which has been made by the ordinary means. In order to effect this, two diametrically opposite holes are formed in the eyelet by means of punches. The roller is put opposite these holes and a wire cut to the required length is introduced into the holes in the eyelet and the roller. The ends of this wire are then tightly struck by means of riveters (hammers) and the pin or axle thus formed, the roller being left sufficient play for allowing it to rotate freely under the least impulsion.

The machine is illustrated in the accompanying drawings.

Figure 1 is a front elevation of the machine, Fig. 2 is a plan. Fig. 3 a side elevation. Fig. 4 a separate view in plan of the punching machine and its two riveters. Fig. 5 a view from below of the punching machine showing a single riveter. Fig. 6 a plan of the tube forming the matrix holder. Fig. 7 a side view of the same. Fig. 8 a section of a tube or eyelet furnished with its roller. Fig. 9 a plan of the eyelet. Fig. 10 a side view of the cutting counter-part forming shears and wire-guide. Fig. 11 a plan of the same. Fig. 12 an end view of the said counter-part. Fig. 13 a side view, at the starting point, of the devices that actuate the ratchet wheel. Fig. 14 a view of the same parts in the end position, after moving the wire forward. Fig. 15 is a side view illustrating the operating of a ball-jointed lever by means of a cam. Fig. 16 is a side view of the cam that actuates the punches. Fig. 17 the cam that actuates the riveters. Fig. 18 the cam that actuates the matrix holder. Fig. 19 the cam that actuates the lever, the end of which forms shears.

In all the figures the same reference letters indicate the same parts.

The eyelet to be formed (shown on an enlarged scale in Figs. 8 and 9) is composed of a tube o, a roller r and a wire f that forms its pin or rivet.

The machine is composed of a cast-iron frame and a table A supporting the whole of the mechanism. A driving shaft B, arranged at the back of the frame carries a fly-wheel B′ fixed, and a loose and tight pulley B^2 B^3 and six cam-disks C C′ C^2 C^3 C^4 C^5 which serve for operating a corresponding number of levers D, D′ D^2 D^3 D^4 D^5, supported by a shaft B^4. The functions of these levers are as follows: D is intended, in connection with a vertical shaft U supported by an arm U′ cast therewith, and through the medium of two connecting rods E and E′, to move the steel wire forward by means of a pawl S^2. D′ is intended, through the medium of the connecting rod, to actuate the punch holders F F, the punches N on which punch the eyelet. D^3 is intended, by the combination of levers and a connecting rod V to actuate the two riveters C and C′ (Figs. 2 and 4.) D^3 raises and lowers the matrix, holding a tube H; D^4, the axis of which is at T, is intended for cutting the wire to the required length, thus forming the rivet, and D^2 to cause the matrix holding tube H to execute a fourth of a turn through the medium of a connecting rod I and of the ring i provided with a slide I′ (Figs. 1 and 6). Moreover the pivot t of the lever D^5 is fixed on an angular piece D^6, the studs a of which enable it to be moved longitudinally so as to regulate the course of the ring i with the slide I′ which imparts a circular movement to the matrix holder H.

On the front of the machine the matrix holder H is arranged with slides in two bearings A′ fixed to the frame. It is supported by a mounting with pins J mounted at the end of a forked lever D^3 the height of which is regulated by two locking nuts K K. At its upper end the tube H carries a matrix L on which the whole of the work is executed. This matrix is illustrated in half-size in Figs. 6 and 7. It acts in the center of the plate Q (Fig. 2 and in half size in Figs. 4 and 5). In the plan (Fig. 2) its notched part L′ shown in Figs. 6 and 7 will be seen.

In order to operate, the eyelet is placed on the matrix L, its enlarged part O′ resting on the plate Q. Its upper rim reaches the base of the notch L′ and the roller r is put into this notch. Up to this time no device has acted, the machine being at its dead

point. The eyelet and the roller being thus placed the working begins. The two punches N (detail in Fig. 4) punch the eyelet laterally. These punches are operated by the mechanism shown in Figs. 4 and 5 which consists of a circular plate Q′ having an oscillating motion, circumferentially guided and turning in the fixed counter-plate Q which is hollowed out underneath. This plate Q′ has two eccentric openings W in which a pin *n* acts which is fixed below each punch holder F (Fig. 5). If the plate Q′ be caused to describe the arc of a circle by means of its tail Q^2, the two punches come together in the center and punch the holes in the eyelet. They then enter the holes M formed in the side of the matrix, cut in the interior and at the same time force away their cuttings which pass out by means of the bent rod X which is operated through the tube H. The plate Q′ is actuated by its tail Q^2 by a ball jointed lever D′, through the medium of an angular piece *c*, likewise ball-jointed, the pivot of which is in *d*. By way of example a ball is shown at *r*. (Fig. 15). The lever D′ is operated by the lever *d′* mounted on the fixed shaft B^4. This lever is oscillated by the cam C′ by means of a small roller d^2 fixed at its end and which moves in a groove d^3 formed on the side of the cam disk C′ (Fig. 15).

When once the holes are punched in the eyelet, the matrix holder H makes a quarter turn, carrying along in its rotary motion the roller and the eyelet itself. At this moment the eyelet adheres to the matrix by the small penetrating edges which leave the punches N in moving back. This quarter turn is effected by means of the ring *i* provided with a slide I′ that controls the connecting rod I and the lever D^5 (Fig. 1) which are moved horizontally by the cam C^5 by means of a small vertical roller d^4. In order that this quarter turn may be precisely effected the dividing ring O sliding to a very slight extent on the tube H, by means of a vertical interior groove combined with a slide, is stopped in its two principal positions by a strong spring P the end of which terminates in the form of a V and enters notches *v* formed on the circumference of the ring O. The first of the above two positions serves for punching the eyelet and the second for introducing the rivet into it. The quarter turn having been effected the matrix descends carrying along the roller placed in the notch L′ while the eyelet remains on the plate Q. This lowering is regulated, so that the hole in the roller comes opposite the holes in the eyelet and likewise opposite the groove Y (Fig. 2) in which is a rivet *f* cut to the required length by the end of the lever D^4 which has a cutting part that acts simultaneously with the counter part R′. This rivet is then pushed and introduced into the holes in the eyelet and in the roller by the riveter G′ (Figs. 2 and 4).

The lowering of the matrix holder H is effected by means of a mounting with pins J held between the nuts K, K. These pins are mounted in the fork of a straight lever D^3 that passes under the machine and the end of which carries a roller that moves in the groove of the cam C^3 that is mounted on the driving shaft B its pivot being in *b* (Fig. 3).

The wire is cut in the required length by the end of the lever D^4 (Figs. 2 and 3) forming shears with a counter-part R′ in the form of a Z, with counter part at *c* and serving at the same time as wire-guide (Fig. 2 and in detail in Figs. 10, 11 and 12), and having in its upper part a groove *c′* which is entered by the wire carried by the rollers S of the cage S′ (Fig. 3). The wire issues through the hole c^2 in the cutting part *c* and the rivet thus cut falls into the groove Y. The length of the rivet is determined by the stroke of the pawl S^2 actuating the grooved feed rollers S′, which act on one another through pinions *u* mounted on each of their shafts and, on the outer pivot of one of these rollers the ratchet wheel *h* is likewise mounted. This wheel is controlled by the pawl S^2 fixed on a small connecting rod *j* actuated by the slide E that terminates in an angular part *e* in which a vertical groove *j′* is formed that serves as guide for a roller j^2 fixed to the connecting rod *i*, that carries the pawl S^2 (detail Figs. 13 and 14). The end of the lever D^4 carries a link *s* provided with a slide *s′* guided vertically in a slot formed in the table A, and in its lower part is a roller s^2 that moves in the groove of the cam-disk C^4 (Figs 2, 3 and details Fig 19). The slide E is operated by the connecting rod E′ the pivot *k* of which is on the connecting rod *g* fixed to the lower end of the vertical shaft U. This shaft makes a quarter turn by means of the crank *h* pinned on the said shaft. This crank is controlled by the ball-jointed lever D actuated by a lever *d′* (Fig. 15) mounted on the fixed shaft B^4 and which is operated by the cam C by means of a small roller d^2 fixed to its end, which moves in a groove d^3 (Fig. 16) and has a lever *d′* identical with that in Fig. 15. The rivet that is in the groove Y is then conveyed to the eyelet by the riveter C′ (Figs. 2 and 4) which, at this moment, is below the wire-guide R′.

The riveter G′ is actuated by the connecting rod V mounted on one of the ends of the lever D^6 the pivot of which is at *l*. To the other end of this lever a connecting rod *q* is attached which controls a second lever D^7 the pivot of which is at *l′* and by which the riveter C is actuated through a slide l^2. These two levers thus coupled are intended to actuate the two riveters C and G′, the

riveters being intended for introducing the rivet into the eyelet whereupon the two riveters acting simultaneously slightly flatten the ends of the rivet. One of these coupled levers viz. D^6 is operated by a ball-jointed lever D^2 by means of an angular piece p applied to the lever D^6 and the said rod D^2 is controlled by a similar lever d' (Fig. 15) and by the cam C^2 (Fig. 17). The eyelet being furnished with its roller and the rivet flattened down (Figs. 8 and 9) it is removed by any suitable means.

I claim:

1. A machine of the character described comprising in combination a matrix holder secured at the front of the machine, a matrix upon the upper end of said holder adapted to execute a quarter turn, a plate above said matrix provided with a hole in its center through which said matrix passes, adapted to form a support for an eyelet, two punches for simultaneously punching the eyelet or ring at diametrically opposite points, and mechanism for riveting a roller in said ring after said matrix has executed its quarter turn, substantially as described.

2. A machine of the character described comprising in combination, means for supporting an eyelet or ring adapted to execute a quarter turn, mechanism for punching holes in the ring or eyelet at diametrically opposite points, means for bringing a roller with a bore therein in alinement with said holes, mechanism for projecting a suitable length of wire through said holes and roller, and means for riveting the ends of said wire after said supporting means have executed their quarter turn, substantially as described.

3. A machine of the character described comprising in combination, a support for a matrix having a slot, a roller within said slot, a plate above said matrix provided with a hole in its center through which said matrix passes, and supporting an eyelet, two punches for simultaneously punching an eyelet or ring at diametrically opposite points, means for actuating said punches, a spindle or rivet for riveting a roller in said ring after said matrix has executed its quarter turn, and means for actuating said riveting means, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

VICTOR JOSEPH BUNET.

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H. C. COXE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."