(No Model.) 4 Sheets—Sheet 1.

B. LYON & W. I. MACOMBER.

MACHINE FOR MAKING METALLIC BEADS.

No. 340,515. Patented Apr. 20, 1886.

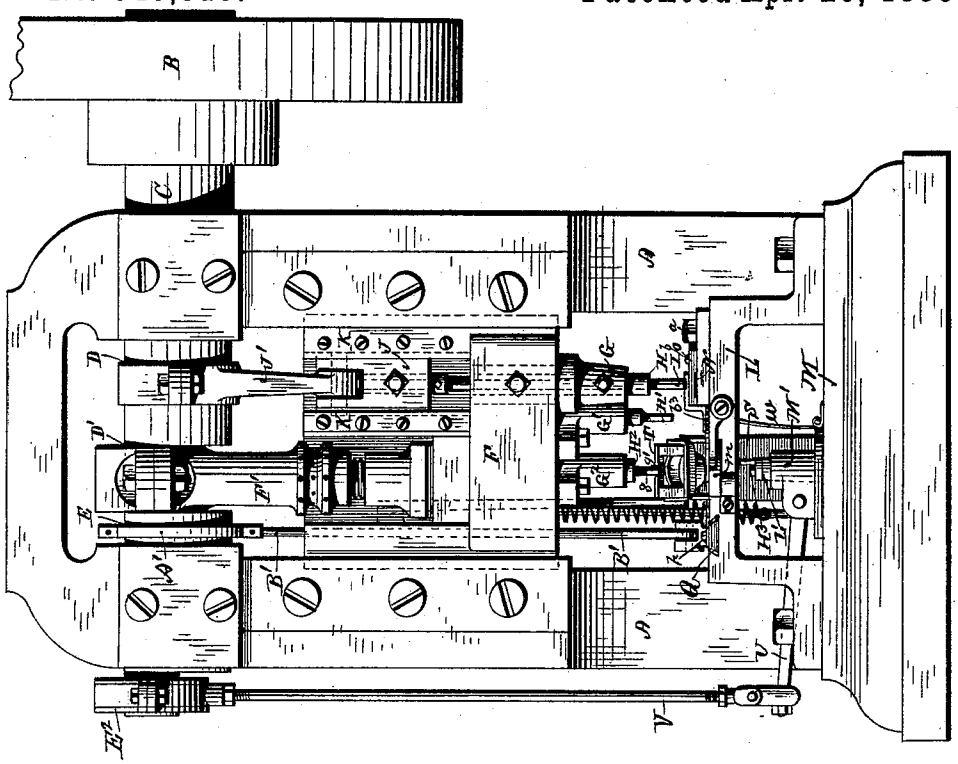

FIG. 1.

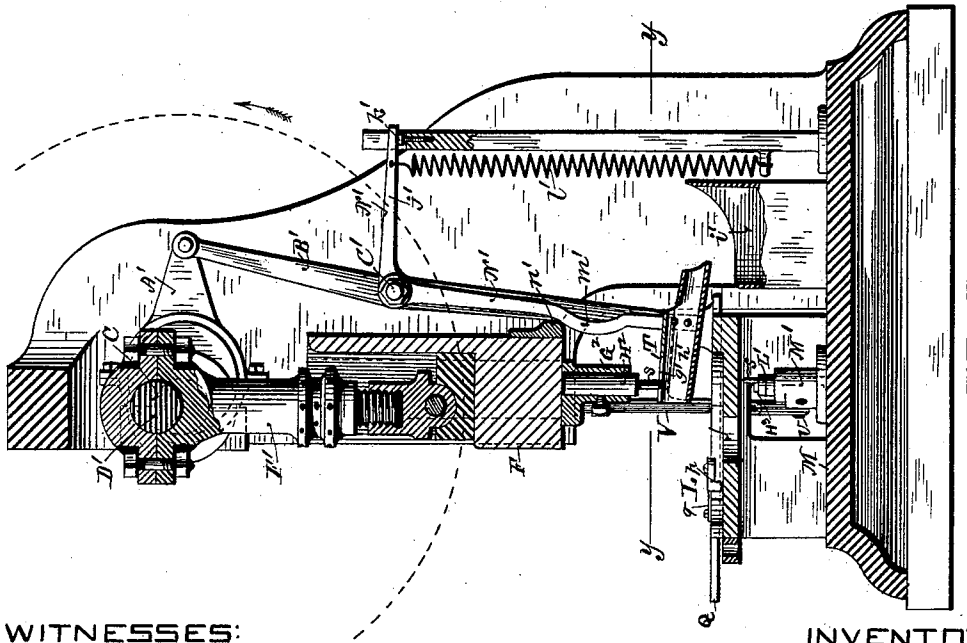

FIG. 2.

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MACHINE FOR MAKING METALLIC BEADS.

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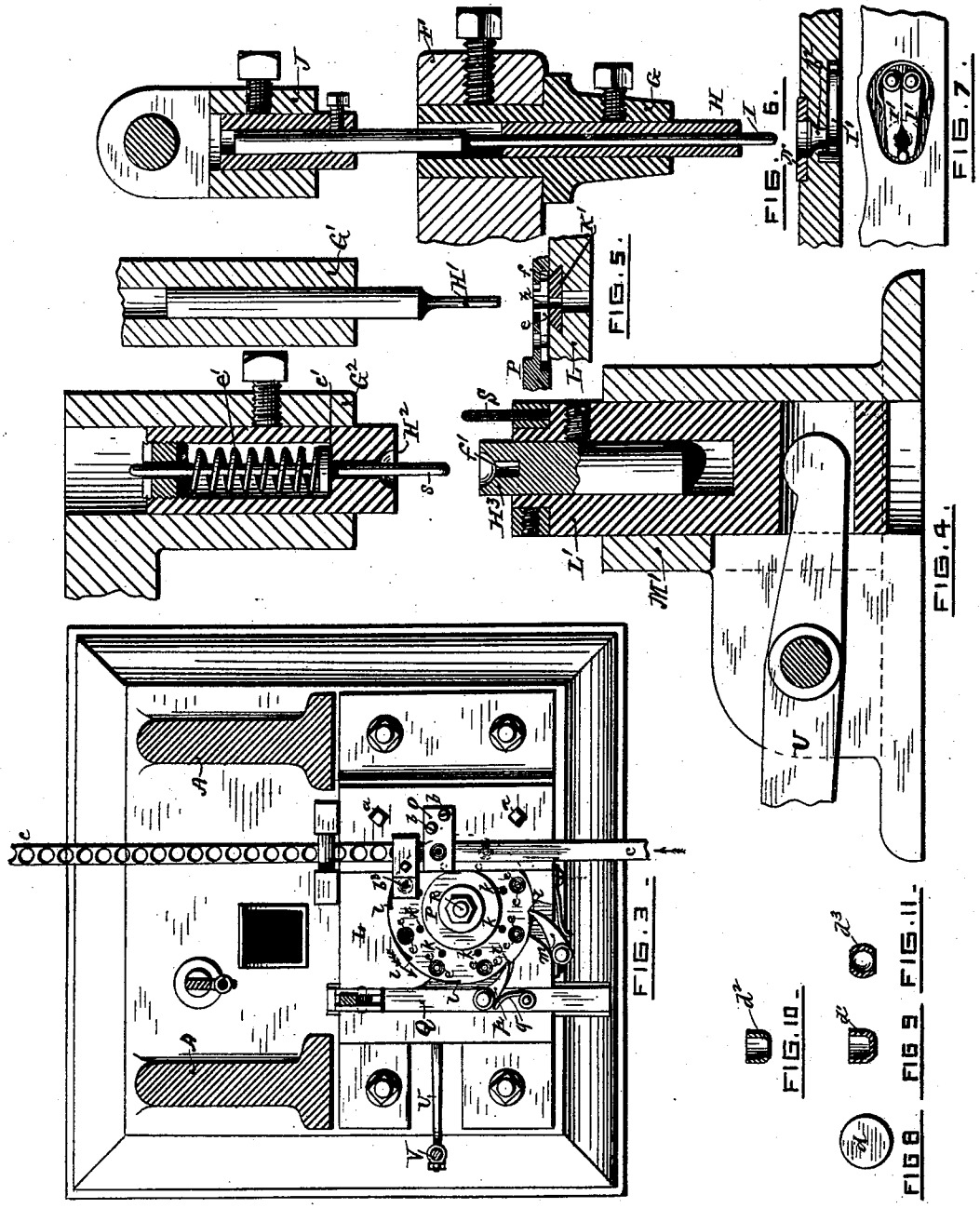

WITNESSES:

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(No Model.) 4 Sheets—Sheet 3.

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MACHINE FOR MAKING METALLIC BEADS.

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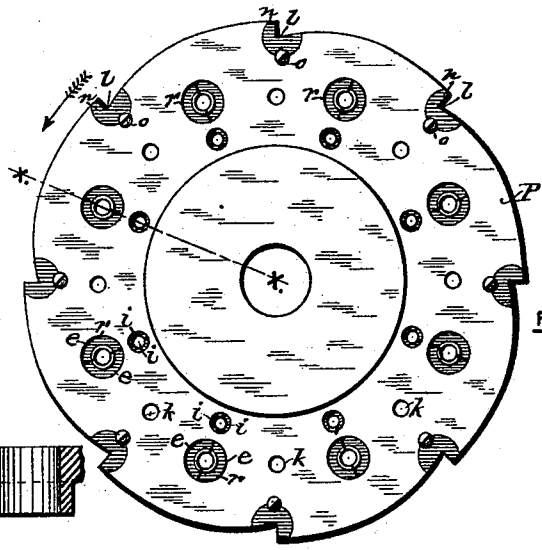


FIG. 12.

FIG. 14.

FIG. 13.

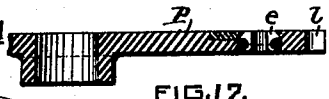


FIG. 17.

FIG. 15.

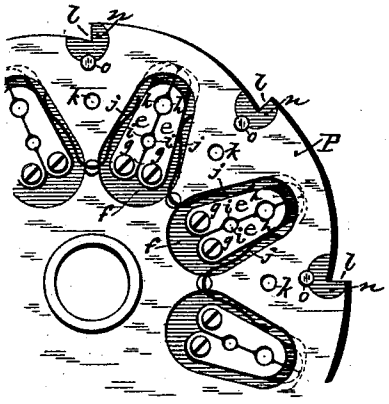
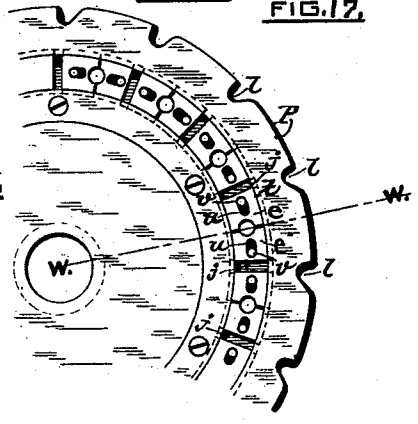


FIG. 16.



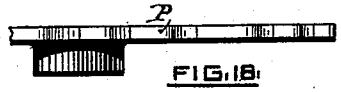


FIG. 18.

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(No Model.) 4 Sheets—Sheet 4.

B. LYON & W. I. MACOMBER.

MACHINE FOR MAKING METALLIC BEADS.

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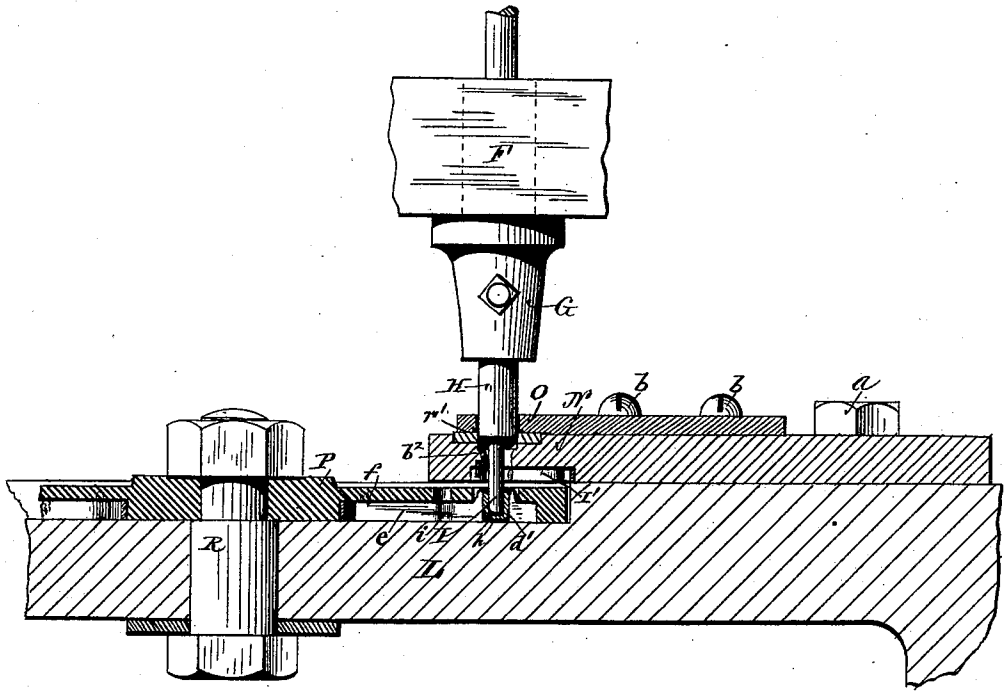

FIG. 19.

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UNITED STATES PATENT OFFICE.

BAXTER LYON AND WILLIAM I. MACOMBER, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS TO GEORGE L. VOSE, OF SAME PLACE.

MACHINE FOR MAKING METALLIC BEADS.

SPECIFICATION forming part of Letters Patent No. 340,515, dated April 20, 1886.

Application filed August 31, 1883. Serial No. 105,169. (No model.)

To all whom it may concern:

Be it known that we, BAXTER LYON and WILLIAM I. MACOMBER, of Providence, in the State of Rhode Island, have invented an Improvement in Machines for Making Hollow Metallic Beads, of which the following is a specification.

The nature of our invention consists in the improved combination and arrangement of punching and forming tools with an intermittently-revolving carrier-disk provided with spring-operated holding-jaws for transporting the metallic blanks in process of formation from one set of punches or forming-dies to another set of the same, as hereinafter fully set forth.

Figure 1 is a front elevation of a power-press provided with our improvement. Fig. 2 is a central vertical section of the same with the carrier-disk removed. Fig. 3 is a plan view of the bed of the machine with the upper portion of the press removed from the section-line *y y* of Fig. 2. Figs. 4, 5, and 6 are detail sections showing the construction of the tools employed in the machine. Fig. 7 is a plan view of the under side of the clearer-jaws shown in edge elevation in Fig. 6. Figs. 8, 9, 10, and 11 are views illustrating the formation of a hollow bead from a plate of sheet metal. Fig. 12 is an enlarged plan view of the upper side of the revolving carrier-disk provided with spring-operated holding-jaws. Fig. 13 is an edge elevation of the same. Fig. 14 is a section taken in the line *x x* of Fig. 12. Fig. 15 is a partial view of the under side of the revolving disk. Figs. 16, 17, and 18 are detail views of a modification of the spring-operated jaws of the carrier-disk. Fig. 19 is a vertical section taken in the line of the center of the carrier-disk and the axis of the punching-tool and forcer.

In the accompanying drawings, A is the frame of the press; B, the driving-pulley; C, the driving-shaft, provided with the cranks D and D′ and the eccentric E. The sliding head F is reciprocated by means of the crank D′ and its connecting-rod F′, and to the lower face of the sliding head are secured the tool-holders G, G′, and G^2, in which are inserted the tools H, H′, and H^2, respectively. The cutting-tool H (shown in enlarged section in Fig. 6) is made hollow to receive the forcing-tool I, which is attached to the sliding head J, held in the slides K K, which are made integral with the sliding head F, and which is operated in timely relation to the up-and-down movement of the sliding head F by means of the crank D and its connecting-rod J′.

Upon the bed-piece L, which is securely bolted to the projecting base M of the press, is secured the cutting-die N, by means of the screws *a a*, and to the upper side of the cutting-die N is secured the clearer O by means of the screws *b b*.

The thin metallic strip *c* is to be fed by suitable means under the clearer O of the cutting-die N, a horizontal groove, *r′*, being provided at the under side of the clearer to receive the said strip, and upon the descent of the cutting-tool H a circular planchet, *d*, as shown in Fig. 8, will be cut from the strip *c*, and upon the arrival of the cutting-tool H to its lower position in the die the forcing-tool I will be made to force the planchet *d* through a contraction, b^2, in the die, thus imparting a cup form to the planchet, as shown by *d′* in Fig. 9, and the continued downward movement of the forcing-tool will carry the cup *d′* completely through the die N to a position between the spring-operated jaws *e e*, a circularly-arranged series of which are held in the intermittently-revolving carrier-disk P, (shown enlarged in Figs. 12, 13, 14, 15, and 19,) the said disk extending under the die N, as shown in Fig. 19, Fig. 15 being a partial view of the under side of the plate. The holding-jaws *e e* are placed in a recess, F, at the back of the disk P, and are pivoted to the disk by means of the screws *g g*. The adjoining edges of the jaws *e e* are hollowed out in semicircular form at *h h*, to suitably receive and hold the cup *d′*, and the jaws *e e* are also hollowed at the points *i i*, in order to provide for the insertion of a tapering point or wedge for suitably opening the jaws against the action of the closing-springs *j j*, arranged to act upon the outer edge of the jaws *e e*. The disk P is also provided with perforations *k k k*, ar-

ranged intermediate between the several sets of jaws, and adapted to receive a spring-finger, *w*, (shown in Fig. 1,) which may be arranged to operate at the under side of the disk to hold the notches *l l l* of the disk in close contact with the end of the spring-operated pawl *m*, without backlash. The notches *l l l* are protected from wear by means of the hardened steel disks *n*, which are held in the edge of the disk P by means of the screws *o*.

Upon the sliding bar Q, which is made to reciprocate in timely relation to the up-and-down movement of the sliding head F, is secured the pivoted catch *p*, held against the notched edge of the disk P by means of the spring *q*. The required reciprocating movement is imparted to the bar Q by means of the eccentric E, connecting bar A′ and the lever B′, which is pivoted to the frame A at the stud C′, the lower end of the lever B′ being properly jointed to the sliding bar Q, and the reciprocating movement thus imparted to the catch *p* serves to impart an intermittent rotary movement to the disk P, which, upon the backward movement of the said catch, will be held stationary by means of the pawl *m*. The jaws *e e* are thickened at one side, and the thickened portion extends upward into the circular perforations *r r r*, which are made slightly larger than the thickened portion of the jaws, in order to allow the jaws to become sufficiently opened to receive and discharge the cup. The disk P is held for rotation upon the vertical stud R, secured to the bed-piece L, as shown in Fig. 19.

When the cup *b* has been formed and properly inserted between the jaws *e e* by the downward movement of the punching-tool H and forcing-tool I, as shown in Fig. 19, the said cup will be prevented from following the retrograde upward movement of the forcer by means of the spring-operated clearing-jaws I′, which are arranged under the cutting-die N, as shown in Figs. 6 and 19, and the continued movement of the driving-shaft C will cause the elevation of the sliding head F and the forward rotation of the disk P, thus carrying the cup *d′* under the tool H′, which, upon the succeeding downward movement of the sliding head F, serves to perforate the bottom of the cup *d′*, as shown by d^2 in Fig. 10, leaving the perforated cup d^2 still in position between the jaws *e e* to be carried by the succeeding elevation of the sliding head F and forward movement of the catch *p* under the forming-tool H^2, the perforation of the bottom of the cup being formed by means of the lower end of the tool H′ and the cutting-die K′, secured to the bed-piece L under the carrier-disk P, as shown in Fig. 5, the clearer b^3 serving to prevent the withdrawal of the perforated cup from the carrier. The descent of the forming-tool H^2 will now cause the upper edge of the perforated cup d^2 to be turned inward, as shown by d^3 in Fig. 11, thus forming a complete bead, which, when so formed, is released from the holding-jaws *e e* by the rise of the tapering pin S, which enters the space *i i* and forces the jaws *e e* to separate from each other. The bead will then be drawn upward by the spindle *s*, from which it will be removed by means of the clearer T upon the upward movement of the sliding head.

The forming-tool H^2 is hollowed at its face and adapted to receive the loose central spindle, *s*, which is forced downward to a shoulder, *c′*, by means of an inclosed spring, *e′*, as shown in Fig. 4, and immediately under the carrier-disk P, and in line with the axis of the forming-tool H^2 is placed the opposite tool, H^3, which is hollowed to fit the contour of the bead, and provided with a central chamber, F′, adapted to receive the lower end of the spring-operated spindle *s*.

The forming-tool H^3 is held in the central perforation of the sliding head L′, which moves vertically in the guide M′, secured to the bed M, and is operated up and down in timely relation to the up-and-down movement of the forming-tool H^2 by means of the pivoted lever U, connecting-rod V, and the eccentric E^2 upon the projecting end of the driving-shaft.

The clearer T is made in hollow form of sheet metal, and provided at its upper side with a slot, *g′*, adapted to fit the opposite sides of the spindle *s*, around which the bead is formed, so that upon the rise of the spindle the finished bead will be drawn off from the spindle and fall to the rearwardly-inclined bottom *h′*, from which it will roll into a suitable receptacle, *i′*, and the clearer T, which is attached to the pivoted bell-crank lever N′, the outer arm, *j′*, of which is held against an adjustable stop, *k′*, by means of the spiral spring *l′*, is operated in timely relation to the up-and-down movement of the sliding head F by means of the contact of the curved portion *m′* of the lever N′ with the bearing-piece *n′*, attached to the rear side of the sliding head.

A modification of the spring-jaws of the carrier-disk is shown in Figs. 16, 17, and 18, in which the jaws, instead of being pivoted to the disk, are made to slide in an annular groove, *t*, and the jaws *e e* are each provided with a slot, *u*, adapted to receive a pin, *v*, secured to the back of the disk, and which serves to limit and control the movement of the jaws *e e*.

Between each adjacent set of jaws are placed the springs *j j*, which serve to close the jaws upon the cup *d′*, and the said jaws may be opened by the insertion of a wedge between the adjoining faces of the same.

We claim as our invention—

In a machine for making hollow metallic beads, the combination of the cutting and forming die N, hollow punching-tool H, forcing-tool I, held within the punching-tool and operating in timely relation to the up-and-

down movement of the said punching-tool, the intermittently-revolving carrier-disk P, provided with holding-jaws and means for operating the same, perforating-tool H′, its cutting-die K′, located under the carrier-disk, forming-tool H^2, spring-operated spindle *s*, the opposing forming-tool H^3, clearer T, and mechanism for operating the several devices in timely relation to each other, substantially as described.

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