(No Model.) 3 Sheets—Sheet 1.

M. N. BRAY & E. M. POPE.

RIVET SETTING MACHINE.

No. 483,598. Patented Oct. 4, 1892.

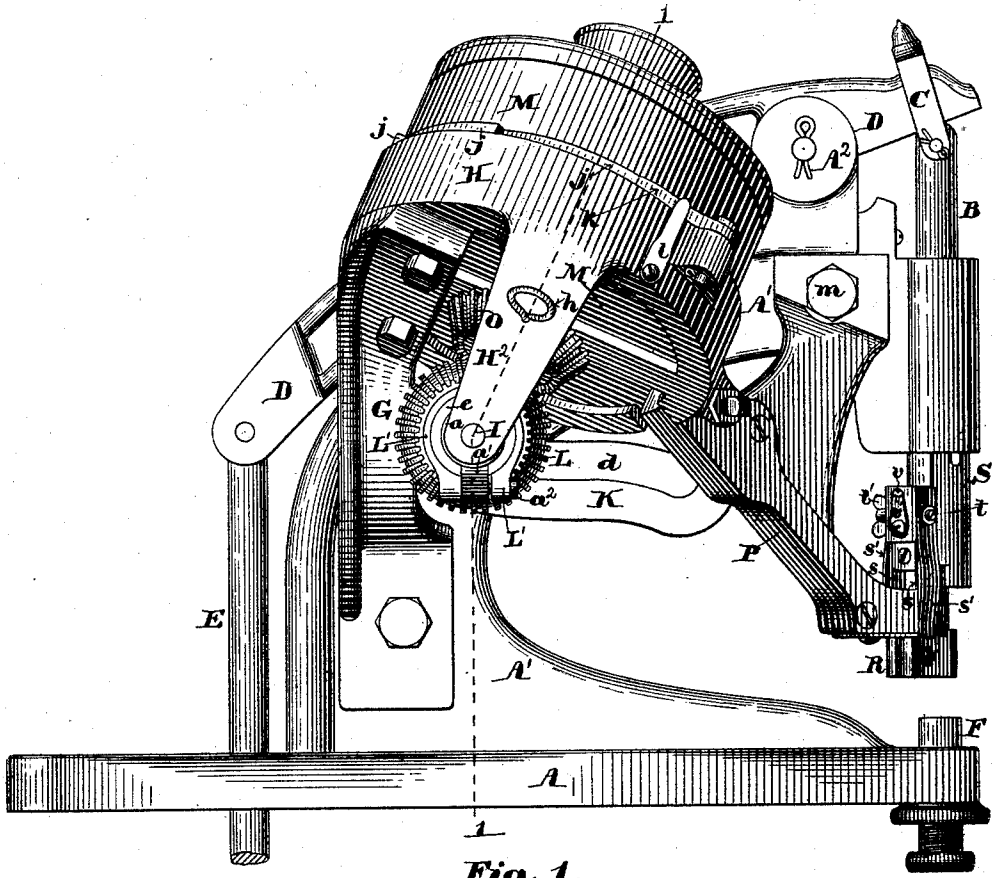

Fig. 1.

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Charles E. Wiggin

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(No Model.) 3 Sheets—Sheet 2.

M. N. BRAY & E. M. POPE.

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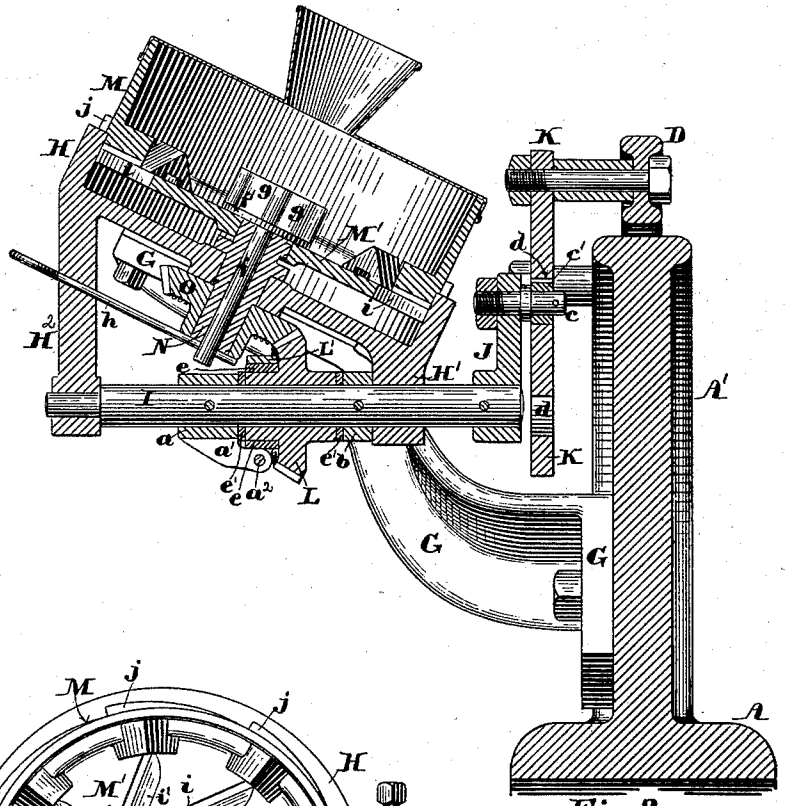

Fig. 2.

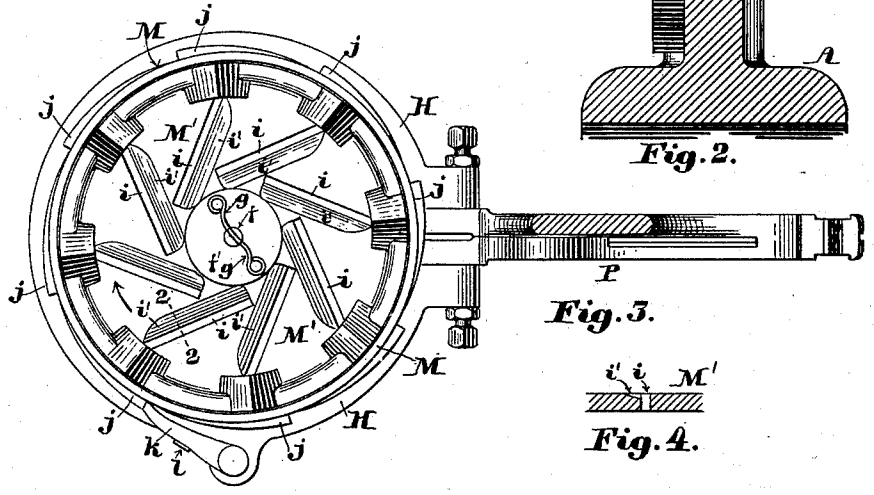

Fig. 3.

Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

M. N. BRAY & E. M. POPE.

RIVET SETTING MACHINE.

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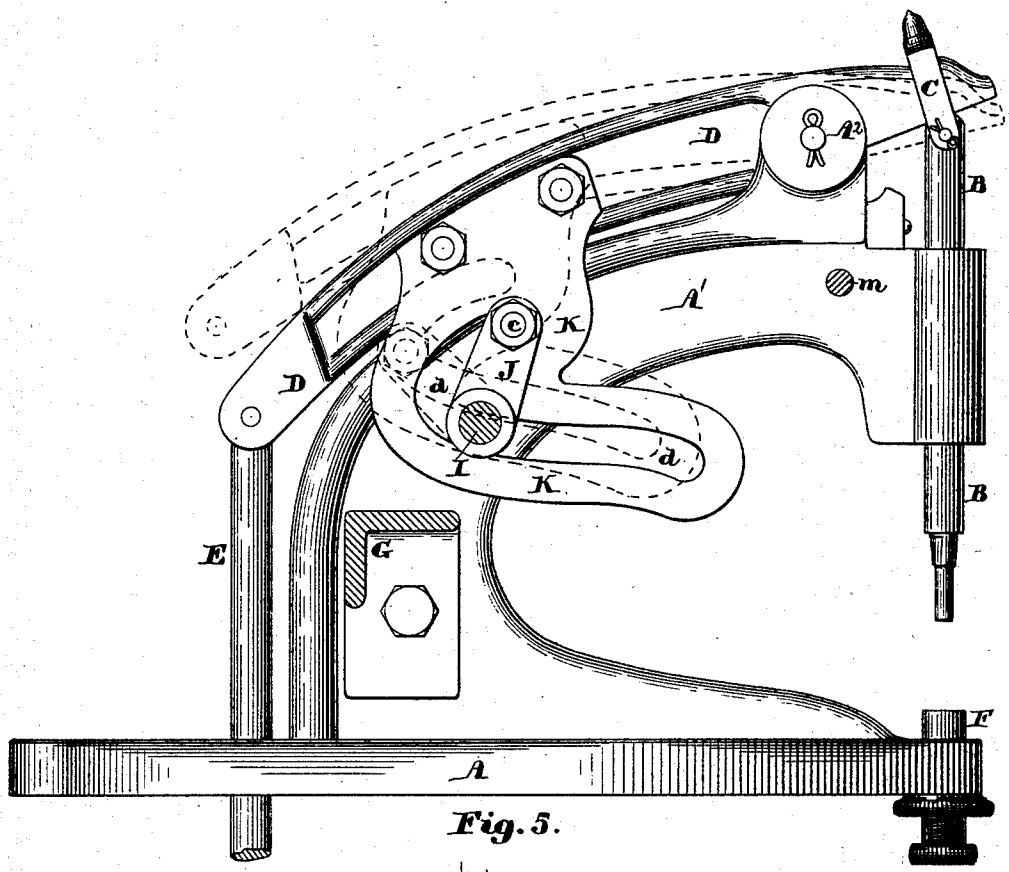
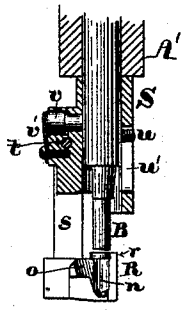


Fig. 5.



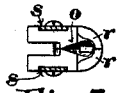


Fig. 7.

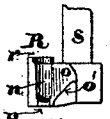


Fig. 9.

Fig. 8.

Fig. 6.

Fig. 10.

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Charles E. Wiggin

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UNITED STATES PATENT OFFICE.

MELLEN N. BRAY, OF BROOKLINE, AND EVERETT M. POPE, OF QUINCY, MASSACHUSETTS; SAID POPE ASSIGNOR TO SAID BRAY.

RIVET-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 483,598, dated October 4, 1892.

Application filed December 7, 1891. Serial No. 414,230. (No model.)

To all whom it may concern:

Be it known that we, MELLEN N. BRAY, of Brookline, and EVERETT M. POPE, of Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Rivet-Setting Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to rivet-setting machines, and is an improvement upon the machine described in the Letters Patent No. 441,388, granted to ourselves and Albert H. Taber November 25, 1890; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be readily understood by reference to the description of the drawings, and to the claims hereinafter given, and in which our invention is clearly pointed out.

Figure 1 of the drawings is a side elevation of a machine embodying our invention. Fig. 2 is a sectional elevation of the same, the cutting plane being on line 1 1 on Fig. 1 and viewed in a direction at right angles to the upper portion of said line. Fig. 3 is a plan of the hopper and the chute, with the cover of the hopper removed and said hopper placed in a horizontal position. Fig. 4 is a section of a portion of the hopper-bottom on line 2 2 on Fig. 3. Fig. 5 is a vertical section through the hopper-supporting stand, the hopper-operating shaft, and the bolt for attaching the chute to the goose-neck, and showing the goose-neck, the setting-spindle, the operating-lever, and the cam and crank for oscillating the hopper-operating shaft in elevation. Fig. 6 is a central vertical section of the anvil, the pocket-carrying sleeve, and a small portion of the nose of the goose-neck, and showing one jaw of the rivet-receiving pocket in inside elevation. Fig. 7 is a sectional plan of the pocket. Fig. 8 is an inverted plan of the same. Fig. 9 is an inside elevation of the pocket-jaw opposite to that shown in Fig. 6. Fig. 10 is a sectional plan of the same detached from its opposing jaw.

In the drawings, A is the base-plate of the machine-head, fitted to be mounted upon a column or a bench, as may be preferred, and having formed in one piece therewith the goose-neck A′, in the front end of which is fitted so as to be movable vertically therein the setting-plunger B, connected by the link or stirrup C to the front end of the operating-lever D, pivoted to ears A^2, projecting upward from the goose-neck A′, and having pivoted to its rear end one end of the rod E, the opposite end of which is connected to a treadle, (not shown in the drawings, but mounted upon the base of the supporting-column or a stand secured to the floor,) all in a well-known manner.

F is the clinching-anvil, set in the front end of the base-plate A and adjustable therein in a well-known manner.

G is a stand secured to the side of the goose-neck A′ and having bolted to its outer end the hopper-supporting wheel-like stand H, inclined toward the setting-anvil and provided with the downwardly-projecting arms H′ and H^2, in bearings in which is mounted the horizontal shaft I, upon which are firmly secured the two collars *a* and *b* and the crank J, all as shown in Fig. 2.

The crank J has set in its movable end the stud or crank pin *c*, upon which is mounted so as to be revoluble thereon the truck *c*′, which fits into and is acted upon by the path *d* in the cam-plate K, said plate K being firmly secured to or formed in one piece with the plunger-operating lever D and movable about the fulcrum of said lever therewith. The path *d* is made of such a form that a single complete upward or downward movement of the lever D and said cam will cause a movement of the shaft I and its crank J in two opposite directions.

The shaft I has mounted loosely thereon between the collars *a* and *b* the bevel gear-wheel L, the hub of which is surrounded by a band or hoop of leather or other suitable frictional material *e*, around which is placed the flexible metal strap L′, the two ends of which are connected together and to the ear *a*′, projecting from the collar *a*, by the clamping-screw a^2, by means of which any desired degree of friction may be obtained between said shaft I and the gear-wheel L. Disks of leather *e*′ *e*′ are placed on said shaft I between the ends of the hub of said gear-wheel L and the collars *a* and *b*, as shown in Fig. 2.

M is the hopper, in which the rivets to be set are placed in bulk, said hopper being in the form of a shallow circular receptacle having a flat bottom and fitted to a bearing in the circular rim of the stand H, so that it may be intermittently rotated therein by means of the short shaft N and the beveled gear-wheel O, the teeth of which engage with the teeth of the gear-wheel L, said hopper being coupled to the upper end of said shaft N by means of a spline-groove and a key, as shown in Fig. 2.

The shaft N is made in the form of a tube and has fitted to its bore the spindle *f*, which has formed upon or secured to it the collar *f'* to rest upon the upper end of said shaft N and the central portion of the hopper-bottom, and also has formed thereon or secured thereto above said collar the radial arms *g g*, said spindle, collar, and radial arms being held in a fixed position, while the hopper, its shaft, and the gear O are intermittently revolved by means of the pin *h*, which passes through the arm H^2 and the lower end of said spindle, all as shown in Fig. 2.

In the patent before cited was shown a hopper having the same general form as above described, in the bottom of which was formed a series of radial slots to receive the shanks of the rivets, and from which they were discharged into the chute to be conveyed to the pocket beneath the setting-plunger.

We have found by actual test that the rivets can be more certainly and readily arranged in rows in quantities to more surely supply the demand by forming a series of such slots *i* in the bottom M' of the hopper, arranged tangentially to a circle concentric to the axis of said hopper, and beveling a section of the hopper-bottom contiguous to each of said slots, upon the side thereof toward which the hopper intermittently rotates, as shown at *i'* in Figs. 3 and 4.

The hopper M has formed upon its exterior a series of ratchet-teeth *j*, with which the stop-pawl *k* engages to prevent backward rotation of said hopper, except to the extent of the amount of excess of forward movement that may be imparted thereto at each oscillation of the shaft I, said pawl being pressed into contact with the toothed portion of said hopper by the spring *l*, all as shown in Figs. 1 and 3.

P is an inclined chute or raceway connected at its upper end to the hopper-supporting stand H and at *m* to the goose-neck A', its lower end being constructed and arranged relative to the pocket and the pocket-carrying sleeve, substantially as shown and described in said before-cited Letters Patent.

The two jaws of the rivet-receiving pocket R are each provided with nearly one-half of a cylindrical chamber *n*, connected at its upper part with a vertical surface *o*, oblique to the line of division between said jaws, substantially as shown and described in said before-cited patent; but in order to adapt the machine to setting rivets having two prongs—such, for instance, as are shown and described in the Letters Patent Nos. 428,824 and 428,825, granted to William C. Bray May 27, 1890—we form below said oblique surfaces an inclined abutment or guiding-surface *o'* at right angles to the line of separation between said two jaws, as shown in Fig. 9, and we form a throat or outlet *p'* in the lower end of said pocket, that is rectangular in plan and having its longest sides parallel to the line of separation between the two halves of said pocket, as shown in Fig. 8. The upper end of each jaw of the pocket R has formed thereon the raised segmental rib *r* in front of the rivet-receiving chamber, which serves as a stop to arrest the outward movement of the outer rivet as it is delivered from the chute and compel it to drop into the pocket in a perpendicular position. The two jaws or halves of the pocket R are suspended from the sleeve S by the springs *s s*, which are reinforced by the springs *s' s'*, the upper ends of all of which springs are clamped to said sleeve by the bolt *t* and the nut *t'*.

The sleeve S is mounted loosely on the lower end of the setting-plunger B, so as to be movable thereon, is prevented from falling therefrom by the pin *u*, set in said plunger and projecting into the slot *u'*, formed in said sleeve, and is made to move with said plunger in either direction during a portion of the movement of said plunger by friction caused by the pin *v*, set in said sleeve, with its inner end in contact with the plunger, against which it is pressed by the spring *v'*, substantially as described in the Letters Patent first herein cited.

In the operation of our invention when the operator places his foot upon the treadle and by depressing it raises the rear end of the lever D the first part of the upward movement of said lever and the cam-plate K causes the crank-lever J to be moved from the position shown in full lines to the position shown in dotted lines in Fig. 5; but such movement would tend to move the hopper about its axis in a direction opposite to that indicated by the arrow on Fig. 3, which movement of the hopper is opposed by the pawl *k* engaging with a shoulder of one of the ratchet-teeth *j*, and as a consequence the shaft I will be partially rotated in the hub of the gear L in spite of the friction of the stop L' and the interposed hoop of frictional material *e*. A continuation of the upward movement of the lever D above the position indicated by the dotted lines in Fig. 5 will cause the crank J and the shaft I to be moved in the opposite direction, and as the pawl *k* then presents no resistance sufficient to overcome the friction on the hub of the gear L the hopper M will be moved about its axis in the direction indicated by the arrow on Fig. 3 a distance equal to the distance between two of the ratchet-teeth *j*. The downward movement of the lever D repeats these operations—that is, the first part of the movement, while it causes

a movement of the crank J and shaft I about the axis of said shaft, no movement of the hopper takes place, except to move one of the teeth *j* into contact with the pawl *k* if the hopper in its previous movement has moved more than the required angular distance; but during the last part of the downward movement of said lever the hopper will be moved by friction an angular distance equal to or slightly exceeding the distance between two contiguous teeth *j*, thus causing a movement of said hopper about its axis a certain distance at each upward and each downward stroke of the lever D, and thereby greatly increasing the chances of an ample supply of rivets to the chute and the certainty of a rivet always being supplied to the pocket for setting when required. This desirable end is accomplished by the peculiarly-shaped cam-plates K. The tangential positions of the series of slots in the bottom of the hopper and the beveling of the advance or forward sides of said slots greatly facilitates the gathering of the rivets into said slots, and the inclined abutment or guiding-surface *o'* and the oblong rectangular outlet *p'* of the pocket R insure the proper presentation and delivery of the rivet to the material.

We claim—

1. In a rivet-setting machine, the combination, with the setting-plunger and tool and a vibrating lever for operating the same, of a circular hopper mounted upon an inclined shaft, a horizontal shaft provided with a crank or lever at one end, suitable gears connecting said inclined and horizontal shafts, a cam-plate connected to and movable with said vibrating lever and provided with a cam-slot to engage said crank, the upper and lower portions of which are inclined in opposite directions, and a friction device interposed between said crank-lever and said hopper, whereby an intermittent movement of said hopper about its axis is obtained at each upward and each downward movement of said plunger-operating lever.

2. In a rivet-setting machine, the combination of the lever D for operating the setting-plunger, the cam-plate K, connected to and movable with said lever and provided with the path *d*, portions of which are inclined in two opposite directions, the shaft I, the crank J, the collars *a* and *b*, secured on said shaft I, the gear-wheel L, mounted loosely on said shaft between the collars *a* and *b*, the strap L', surrounding the hub of said gear L, the band of frictional material *e*, interposed between said strap and hub, the ear *a'*, projecting from the collar *a*, the bolt a^2 for clamping said strap upon said frictional material and the hub of the gear L, the gear O, shaft N, the hopper M, provided with the ratchet-teeth *j*, and the pawl *k*, all constructed, arranged, and operating substantially as described.

3. In a rivet-setting machine, the hopper M, provided with the series of tangentially-arranged slots *i*, cut through its bottom or that portion of the casing which is at right angles to its axis of rotation, and a portion of the upper surface of the hopper-bottom contiguous to each slot on its forward or advance side beveled or inclined toward said slots, as at *i'*, the opposite side walls of said slots being perpendicular to the inner face of said bottom for its entire thickness.

4. In a rivet-setting machine, a rivet-receiving pocket composed of two spring-pressed jaws, each having formed in its inner face the half of a rivet-holding socket with an oblong rectangular opening at its bottom and a laterally-inclined surface at the rear of the upper part of said socket and a vertically-inclined surface at right angles to the inner faces of or the line of separation between said jaws.

5. In a rivet-setting machine, the combination, with the anvil and setting-plunger and tool of a rivet-setting machine, of the rivet-receiving pocket R, composed of two spring-pressed jaws, each having formed in its inner face the half of a rivet-receiving socket *n* and the oblique surface *o* and upon its upper end the upwardly-projecting segmental lip or rib *r*, and the inclined guiding-surface *o'*, arranged at right angles to the inner faces of said jaws and abutting against said oblique surface *o*, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 30th day of November, A. D. 1891.

MELLEN N. BRAY.
EVERETT M. POPE.

Witnesses:
N. C. LOMBARD,
WALTER E. LOMBARD.